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Environmental Assessment

Millsite Allotment Analysis

Mesa Ranger District, Tonto National Forest
Pinal and Maricopa Counties, Arizona

For Information Contact: Kelly M. Kessler
5140 E. Ingram St.
Mesa, AZ 85205
480.610.3300

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CHAPTER 1 – INTRODUCTION

Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

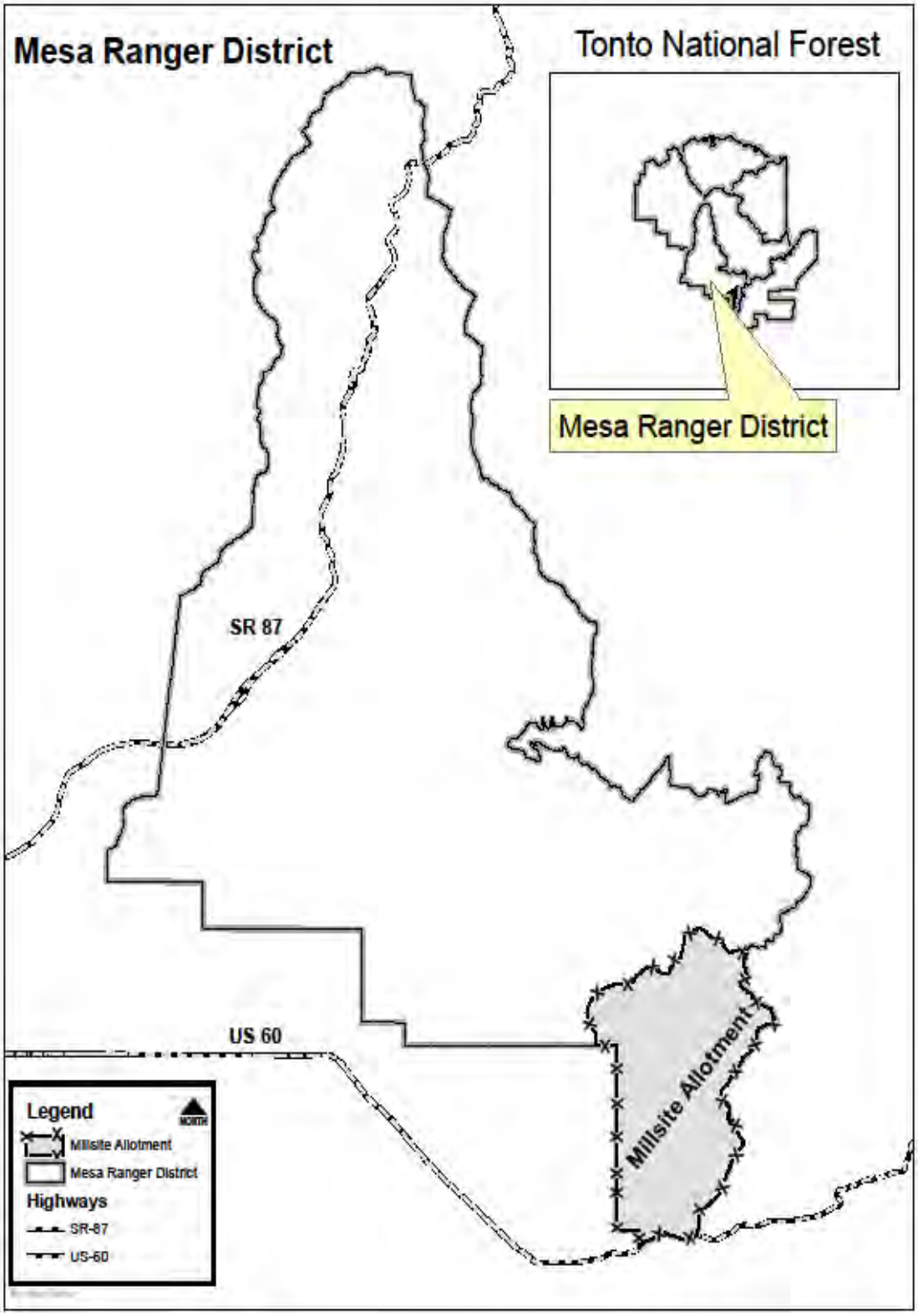
- *Introduction:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency"s proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Comparison of Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency"s proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and agency specialists. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- *Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Supporting documentation, including more detailed analyses and maps of project area resources, are on file in the project planning record located at the Mesa Ranger District of the Tonto National Forest in Mesa, Arizona. Throughout this EA, references to supporting documentation are shown in parentheses. For example, a reference "(PR Vol. 1 – Q)" would indicate that a specific passage in the EA is linked to information contained in Volume 1 under tab Q in the project record.

Purpose and Need for Action

The purpose of this project is to authorize livestock grazing in a manner that maintains or improves project area resource conditions and achieves the objectives and desired conditions as described in the Tonto National Forest Land Management Plan (LMP). There is a need for change from the current management system to allow more flexibility (adaptive management) in pasture use including; duration, rest, and seasonal deferment.

Map 1. Millsite Allotment Location Map



Existing Conditions

Location and Setting. The Millsite allotment consists of approximately 44,573 acres (Tonto NF Geographical Information System data) and is located approximately 20 miles east of Apache Junction, Arizona, on the southern end of the Mesa Ranger District of the Tonto National Forest (TNF) (Map 1). It is bordered on the northwest by the Superstition allotment, on the north by the Tortilla allotment, on the northeast by the Reavis and Brushiest (Globe Ranger District) allotments, and on the east and south by the Superior allotment. Of the abovementioned grazing allotments bordering the Millsite allotment, the Superior allotment (Globe Ranger District) is the only allotment that is currently active.

The vegetation on the allotment is dominated by Sonoran Desert scrub in the lower elevations and chaparral in the higher elevations with semi-desert grasslands occurring in a transition zone between desert and chaparral communities. Small areas of riparian vegetation occur in drainages. Topographical features range from nearly level valley and elevated plains in the southern half of the allotment to very steep mountains and scarps in the northern part, in and near the Superstition Wilderness. About 59 percent of the allotment is composed of nearly level to moderately steep slopes ranging from 0 to 40 percent. Elevations range from about 2,100 to 6,000 feet.

Mean annual precipitation ranges from approximately 10 inches at the lower elevations to 22 inches at the highest elevations. Climate on the Millsite allotment is characterized by a bimodal precipitation pattern with about 60 percent occurring as frontal systems in the winter from December to March, and about 40 percent occurring as monsoons in the summer from July to September. Summer storms can be more intense than winter storms but are generally of shorter duration and smaller aerial extent.

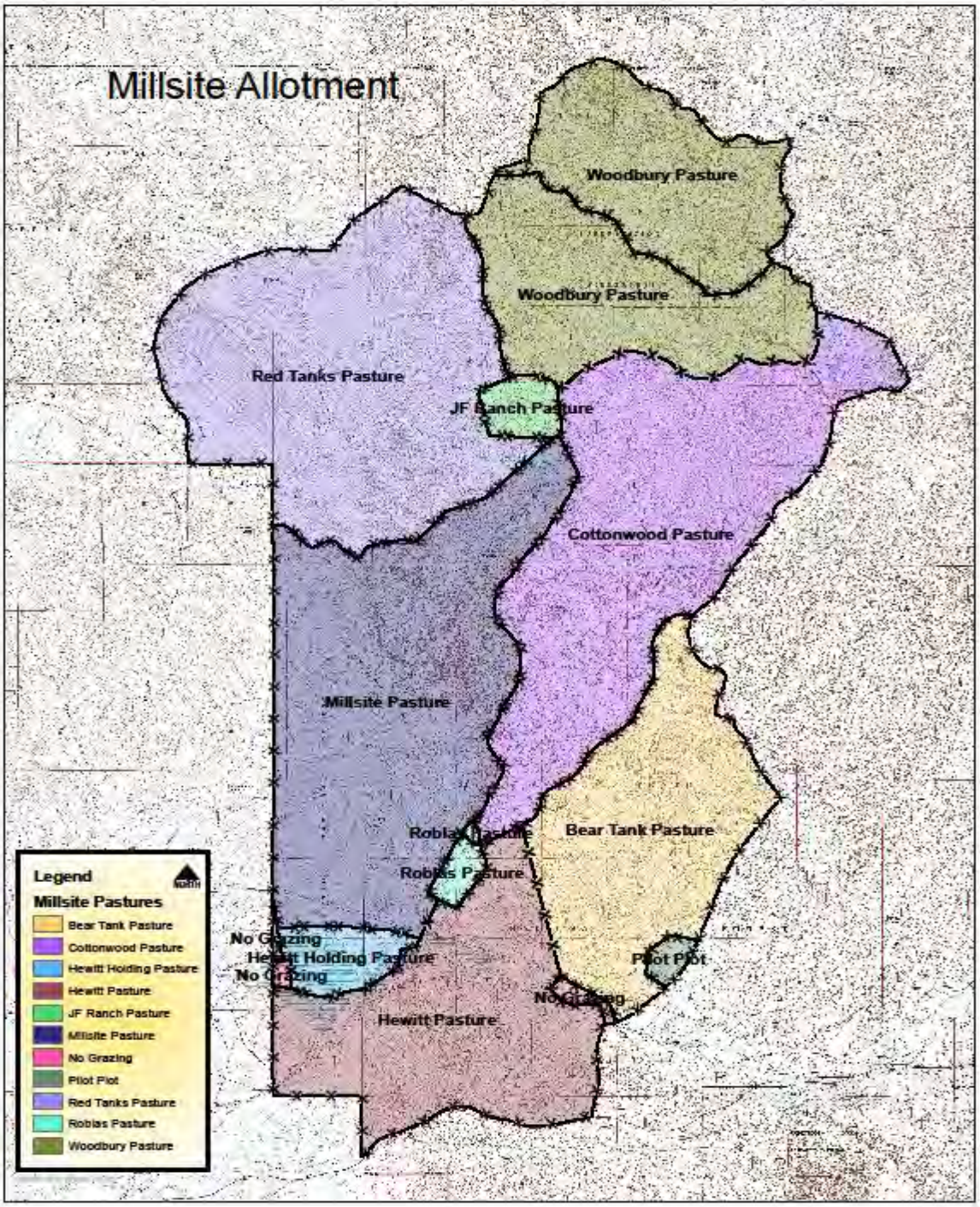
Management History. Historical records indicate that at the turn of the century, the acreage associated with the Millsite, Reavis, and Tortilla allotments were combined to form one allotment; „Allotment #50". The permit was for 1,101 head of cattle yearlong with temporary carryover of natural increase as late as 1946. The size and configuration of the Millsite allotment was formed, and has remained the same, since 1959. In 1959, a permit was issued allowing up to 307 adult cattle yearlong and 197 yearlings from January 1 to May 31 annually. Additionally, the allotment was managed by the same permittee from 1959 to 2008.

In 1983 a production – utilization (PU) study was completed; information obtained from this study was used to prepare an environmental assessment which was completed in 1985 (PR Vol. 1-F, G). The PU study indicated that "the allotment will not support the permitted number of livestock under current management without continued overuse of key areas, but with adequate distribution and scheduled rest for the forage resource the permit could be supported". Estimated capacity with improved management was determined to be 4,374 Animal Unit Months (AUMs).

The 1983 analysis showed 36,806 acres as full capacity range and 6,815 acres as no capacity range. Of the 36,806 acres of full capacity range, 5,281 were classified as being in fair condition and 31,525 acres were classified as being in poor condition. Of the full capacity range 17,359 acres were receiving some degree of livestock use while 19,447 acres were not being utilized (PR Vol. 1 – F).

An Allotment Management Plan (AMP) was developed in 1985 that incorporated a two unit; three pasture rest rotation management system in each unit (PR Vol. 1 – H). The pastures in the northern unit are the Red Tanks, Cottonwood, and Woodbury pastures. The pastures in the southern unit are the Bear Tank, Hewitt, and Millsite pastures (Map 2).

Map 2. Millsite Allotment Pasture Map



In 1999, the Woodbury pasture was divided (fence and natural barriers) into a north and south half. This division occurred due to the presence of Arizona hedgehog cactus (ESA, endangered) located on the granitic rock outcroppings in Rogers Canyon. With cooperation from the previous and current permittees, this northern portion has not been used for over ten years.

On January 31, 2008, the Millsite grazing permit was waived back to the Forest Service and issued to new permittees (PR Vol. 1 – NN). The current permit (#12091) allows up to 307 adult cattle yearlong and 197 yearlings from January 1 to May 31 annually. Currently (2010 grazing year), the following reduced number of cattle have been authorized to graze on the allotment: 80 Adult Cattle (03/01/10 – 02/28/2011), 9 Bulls (03/01/10 – 02/28/11), 30 Yearlings (01/01/10 – 05/31/10).

Rangeland Capability. The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current resource conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices (FSM 1905). The second step refers to the appropriateness (suitability) of livestock grazing in an area relative to all other competing resource values and management objectives. Suitability is determined both during the Forest planning process and at the project level. Although a project area may be located in a management area considered broadly suitable in the Forest Plan, analysis at the project level may identify additional areas considered unsuitable for grazing because other resource values are emphasized (e.g. riparian and wilderness).

Stocking Levels. Billing records, for the allotment, indicate that actual use over the past 23 years has averaged 2,981 head months (HMs)(68% of permitted numbers), ranging from a high of 4,319 HMs (99%) in 1987, to a low of 600 HMs (14%) in 2003 (PR Vol. 1 - J). From 2003 to 2009, the average authorized stocking rate has been 21% of permitted numbers (Bills of Collection are available in the 2230 files at the Mesa District Office). This reduction in annual authorized use, compared to permitted numbers, has been primarily due to the effects of a prolonged period of drought and the interrelated effect on vegetation, soil, and water availability.

Management Direction

Forest Service Policy and Direction

Authorization of livestock grazing on the Millsite allotment is consistent with the following Forest Service Policy and Direction:

- Where consistent with other multiple use goals and objectives there is Congressional intent to allow grazing on suitable lands[1].
- The Millsite allotment contains lands identified as suitable for domestic livestock grazing in the Tonto National Forest Land Management Plan (LMP) and continued domestic livestock grazing is consistent with the goals, objectives, standards, and guidelines of the LMP for lands occurring within Management Area 3I (LMP pages 24, 112-117).

[1] Multiple Use Sustained Yield Act of 1960, Wilderness Act of 1964, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976

- It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans (FSM 2203.1; 36 CFR 222.22c).

- It is Forest Service policy to continue contributions to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (FSM 2202.1).

The LMP identifies the following goals for the rangeland management program on the Forest. Page numbers indicated in parentheses throughout this section, refer to their location in the LMP.

Management Prescriptions - All Management Areas

- Maintain a minimum of 30% effective ground cover for watershed protection and forage production, especially in primary wildlife forage producing areas. Where less than 30% exists, it will be the management goal to obtain a minimum of 30% effective ground cover (pg. 40-1).

- Forage use by grazing ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species (pg. 42).

- Provide wildlife access and escape on all livestock and wildlife water developments (pg. 42).

Management Area 3B – Contains lands within the eastern portion of the Superstition Wilderness located within the Mesa Ranger District. Approximately 75 percent of the Woodbury pasture and almost the entirety of the Red Tanks pasture are within this management area.

Emphasis: managing for wilderness values, wildlife habitats, and natural ecological processes while allowing livestock grazing and recreation opportunities that are compatible with maintaining these values and processes (pg. 94).

Within Level B, priority will be given to maintenance of natural ecological successions and to the recovery of riparian areas. Also stated in the LMP, where allotments consist of both Wilderness and non-Wilderness areas, the level of range resource management outside the Wilderness will be raised to Level C or D (as appropriate) so that grazing pressure in areas of Level B management can be minimized.

Management Prescriptions

- Manage suitable rangelands at Level B – Management controls livestock numbers so that livestock use is within present grazing capacity. Improvements are minimal and constructed only to the extent needed to protect and maintain the range resource in the presence of grazing.

- Rangeland in less than satisfactory condition will be treated with improved grazing management (pg. 95).

- Minimal range improvements for protection of the forage and soil resources commensurate with wilderness values (pg. 95).

- Maintain utilization at acceptable levels within key forage producing and wilderness use areas (pg. 95).

Management Area 3I – Includes the remaining acreage associated with the Millsite allotment.

Emphasis: Manage for a variety of renewable natural resources with primary emphasis on improvement of wildlife habitat, livestock forage production, and dispersed recreation. Watersheds will be maintained so as to improve them to a satisfactory or better condition. Improve and manage the included riparian areas (as defined by FSM 2526) to benefit riparian dependent resources (pg. 112).

Management Prescriptions

- Manage suitable rangelands at Level D: Management seeks to optimize production and utilization of forage allocated for livestock use consistent with maintaining the environment and providing for multiple use of the range. From all existing range and livestock management technology, practices may be selected and used to develop cost effective methods for achieving improved forage supplies and uniform livestock distribution and forage use. Cultural practices such as brush control, type conversion, fertilization, site preparation and seeding of improved forage species may be used to improve quality and quantity of forage. Cultural practices may be combined with fencing and water developments to implement complex grazing systems and management methods (pg. 243).

- Develop structural improvements in association with AMP to maintain utilization at levels appropriate with management intensity and AMP objectives (pg. 115).

- Manage the chaparral type on a 30 year prescribed fire rotation on those sites managed intensively for forage production and water yield (pg. 114).

Other Management Direction

The Multiple Use Sustained Yield Act states that management of the National Forests must provide "sustained yields in perpetuity without impairment of the productivity of the land" (FSM 2550.1 Authority 1).

FSM 2550.3 policy states the USFS is to "manage forest and rangelands in a manner that will improve soil productivity".

FSM 2521.03 objectives state the USFS is to "manage terrestrial ecosystems and National Forest System watersheds to protect soil productivity and hydrologic function. Implement soil and water conservation measures with management activities to maintain satisfactory or optimum watershed conditions".

FSM 2520.02 objective states the USFS is to "protect National Forest System watersheds by implementing practices designed to maintain or improve watershed condition, which is the foundation for sustaining ecosystems and the production of renewable natural resources, values, and benefits".

The Wilderness Act of 1964, as enacted September 3, 1964, and amended October 21, 1978 (16 U.S.C. 1131-1136), specifies congressional policy to secure for the American people an enduring resource of wilderness for the enjoyment of present and future generations. It defines wildernesses as areas untrammeled by people that offer outstanding opportunities for solitude and directs agencies to manage wilderness to preserve natural ecological conditions (section 2320.6). With certain exceptions, the Act prohibits motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport. The Act permits mining on valid claims, access to private lands, fire control, insect and disease control, grazing, water resource structures (upon the approval of the President), and visitor use.

Desired Conditions

Based on Forest Plan guidance, Forest Service Manual (FSM) direction, and site-specific knowledge of the allotment, the following objectives constitute the desired condition for the analysis area:

Soils
The 1985 Tonto National Forest Plan (pp. 20, 44) articulated the following desired conditions:

- Manage vegetation to achieve satisfactory or better watershed conditions.
- Management activities within the desert zone must fully recognize the limitations this unique ecosystem has to the impacts of man‟s uses and activities.

Although the desired condition is to have all soils in satisfactory condition as described in FSH 2509.18-99-1, this is a long-term goal. Complete recovery of all soils is unlikely to occur within 10 years. Rates of recovery will differ depending on several factors such as magnitude of past soil loss, inherent soil properties, current vegetative ground cover, and type of ecosystem. The desired conditions for soils are to:

- Maintain or improve the 37,724 acres of soil currently in satisfactory condition.
- Improve the 3,592 acres that are in impaired soil condition so that they are reaching or moving towards satisfactory condition.
- Improve the 265 acres that are a combination of impaired and unsatisfactory soil condition so that they are reaching or moving toward at least impaired condition.
- Improve the 5,992 acres that are in unsatisfactory soil condition so that they are reaching or moving toward at least impaired condition.

Vegetation and Watershed
Grazing by domestic livestock can impact vegetation by changing; the mix of species in the plant community (species composition), the density and frequency of perennial herbaceous plants (plant frequency), and 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. Desired conditions for vegetation communities are to:

- Maintain a minimum of 30% effective ground cover for watershed protection and forage production. Where less than 30 % exists, it will be the management goal to obtain a minimum of 30% effective ground cover (pg. 40).
- Increase cover of native herbaceous species with an ultimate goal of achieving ecosystem potential.
- Increase plant basal area and litter.
- In Sonoran Desert communities allow for increased reproduction of jojoba.

- In grasslands, increase the foliar canopy coverage, basal cover, and vigor of grass species that decrease under grazing pressure.
- In chaparral, increase the foliar canopy cover and vigor of shrub species preferred by grazing animals. They are referred to as "A" species in Forest Service Handbooks (FSH 2209.21 R-3) and include but are not limited to desert ceanothus, mountain mahogany, and Wright silktassel.
- Improve livestock distribution in pastures to avoid areas of high impact and concentrated use and to allow for uniform light to moderate utilization (30-40%).
- Contain and eventually eliminate infestations of buffelgrass, fountain grass, Malta starthistle, and Saharan mustard. Reduce salt cedar where feasible and where no conflict exists with endangered species habitat.

Management Prescriptions for All Riparian Areas

The 1985 Tonto National Forest Plan (pp. 41-42) lists the following Forest-wide standards and guidelines for riparian areas and streams:

- Coordinate with range to achieve utilization in the riparian areas that will not exceed 20% of the current annual growth by volume of woody species.
- Coordinate with range to achieve 80% of potential riparian overstory crown coverage.
- Coordinate with range to rehabilitate 80% of the potential shrub and overstory canopy cover in riparian areas through the use of appropriate grazing systems and methods.
- Manage cottonwood and sycamore stands so that by 2030, over half of these areas include all age classes.
- Re-establish riparian vegetation in severely degraded but potentially productive riparian areas. Natural regeneration is anticipated to achieve this goal, but artificial regeneration may be necessary in some areas.

The Forest Service Manual (USDA 2004) provides direction for managing all Forest Service lands. Objectives and policy for riparian areas (FSM 2526.02 and 2526.03) include:

- To protect, manage, and improve riparian areas while implementing land and resource management activities.
- To manage riparian areas in the context of the environment in which they are located, recognizing their unique values.
- Manage riparian areas under the principles of multiple-use and sustained-yield, while emphasizing protection and improvement of soil, water, and vegetation, particularly because of their effects upon aquatic and wildlife resources. Give preferential consideration to riparian-dependent resources when conflicts among land use activities occur.
- Give attention to land along all stream channels capable of supporting riparian vegetation (36 CFR 219.27e).
- Give special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water. This distance shall correspond to at least the recognizable area dominated by the riparian vegetation (36 CFR 219.27e). Give special attention to adjacent terrestrial areas to ensure adequate protection for the riparian-dependent resources.

Desired Conditions for Riparian Key Reaches – The most common conditions limiting proper functioning condition of stream channels on the Millsite allotment are; high width-depth ratios, excessive erosion or deposition, and lack of riparian vegetation. Restoration and recovery of stream channel stability and proper functioning condition is dependent upon restoration and recovery of riparian vegetation.

According to the Grazing Permit Administration Handbook (FSH 2209.13 Chapter 90), the desired conditions described in Forest Plans should be further refined using the best available information and some description of site potential. The following project-specific desired condition statements have been developed for the riparian areas and stream channels on the Millsite Allotment, with the intent of achieving stream channel proper functioning condition (Barrett et al, 1993).

Desired conditions for key reaches include both short-term and long-term timeframes. The most important short-term desired conditions are to:

- Maintain residual herbaceous vegetation along the greenline or streambank whenever precipitation is expected.
- Re-introduce riparian vegetation if native riparian species are absent.
- Minimize the annual impacts to seedling and sapling riparian woody species.
- Limit physical impacts to alterable streambanks and greenlines.

The most important long-term desired conditions are to:

- Optimize riparian tree and shrub establishment, especially following episodic, regional winter storms.
- Increase the density, and vertical and horizontal canopy cover of woody riparian tree species.
- Increase the proportion of obligate and facultative riparian species.
- Maintain or increase canopy cover of herbaceous species to at least 50% (or 5% to 25% for reaches now at trace to 1%).
- Decrease the greenline to greenline width.
- Optimize the establishment of floodplains and streambanks.
- Improve stream channel function and stability.

Reaching desired conditions for riparian areas and stream channels will depend not only on management activities, but on climatic events. Both drought and floods have the potential to affect riparian areas and stream channels. High flows (> 10 year recurrence interval) are likely to scour impaired or unstable channels. Even moderate flows (> 2 year recurrence interval) could cause unstable channels to widen or incise.

Wildlife/Fisheries – Wildlife and fish habitat elements will be recognized in all resource planning and management activities to ensure coordination that provides for species diversity and greater wildlife and fish populations through improvement of habitat. Ensure that fish and wildlife habitats are managed to maintain viable populations of existing native vertebrate species. Improve habitat for selected species. Cooperate with appropriate State Fish and Wildlife agencies. Prevent destruction or adverse modification of critical habitats for Threatened and Endangered species and manage for a goal of increasing population levels that will remove them from the lists (LMP pg. 20-1).

Desired conditions for Wildlife and Fisheries are:

- Manage the chaparral type to emphasize the production of whitetail deer (pg. 114).
- Manage higher ecosystem extensions in the desert scrub type to emphasize cottontail production (pg. 114).
- Manage the desert scrub type to emphasize production of javelina and Gambel‟s quail (pg. 114).
- Provide wildlife access and escape ramps on all livestock and wildlife water developments (pg. 42).
- Provide a minimum of four waters per section in small game, and one water per section in big game key areas (pg. 42).
- Maintain a minimum of 30% effective ground cover for watershed protection and forage production, especially in primary wildlife forage producing areas. Where less than 30% exists, it will be the management goal to obtain a minimum of 30% effective ground cover.
- Improve wildlife habitat in the chaparral community type through the use of prescribed fire.

Fuels – The long-term goal for fire management on the Tonto National Forest is to reintroduce fire back into fire dependent ecosystems and allow it to resume its natural role. This will most likely be accomplished through the combined use of prescribed fire, mechanical treatments, and resource benefit fires. Over time, restoring fire to those ecosystems will shift areas currently classified as Fire Regime Condition Class (FRCC) 3 to FRCC 1 and 2 while serving to maintain those areas already classified as FRCC 1.

Fire Regime Condition Classes:

FRCC 1 – represents ecosystems with low (<33 percent) departure from a defined reference period – that is, landscapes still within the natural or historical range of variability

FRCC 2 – indicates ecosystems with moderate (33 to 66 percent) departure from reference conditions.

FRCC 3 – indicates ecosystems with high (>66 percent) departure from reference conditions.

The 2,063 acre Montana Mountain prescribed burn is currently being planned for the northeastern portion of the allotment, south of the Wilderness boundary in the Cottonwood and South Woodbury pastures. This area occurs on steep slopes within the interior chaparral biotic community, currently classified as FRCC 3. The purpose of the prescribed burn is to improve wildlife habitat through the reintroduction of fire back into a fire dependent ecosystem. This project will be analyzed and approved in a separate document and decision.

Recreation/Wilderness – Following the completion and implementation of Travel Management; compliance mandates that AMPs and term grazing permits describe access needs on the designated transportation system. Continued access by recreational users to trails, campsites, and other recreation opportunities is essential, as well as continued cooperation between recreation users and livestock managers.

Illegal cross country travel can negatively impact soils and vegetation through direct impacts on soils and removal or degradation of herbaceous or woody vegetation. Travel Management is intended to analyze alternate motorized routes in order to provide access and a recreation experience sufficient, so vehicle operators no longer feel compelled to travel off established roads or trails. Once routes are established, maps will be available to the public and modified as needed to reflect changes.

According to the Superstition Wilderness Implementation Plan (SWIP) the implementation objective is to provide for livestock grazing as authorized by law, while minimizing its impact on the Wilderness resource and visitors to it, through practical, reasonable, and uniform application of established guidelines and policy (FSM 2323.2 and FSH 2309.19). The SWIP clearly states that stocking rates for the portions of the allotment within the Wilderness will make adequate allowances for reserve forage for wildlife and recreationists" livestock based on production-utilization studies and consistency with Wilderness values (PR Vol. 2 – FF).

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

- Archaeological surveys will be conducted prior to construction of any new range improvements and locations selected where impacts to heritage resource sites are avoided.
- Heritage resource sites with standing walls will be inspected to determine whether or not livestock are causing damage to structures and measures taken (such as fencing) to alleviate on-going damage.
- Existing range facilities (water troughs, corrals) where cattle regularly congregate are periodically inspected to determine whether livestock are causing damage to heritage resource sites.
- Salting locations are placed outside the boundaries of heritage resource sites.

Proposed Action

In compliance with Forest Service policy and Forest Plan objectives, the Mesa Ranger District proposes to continue to authorize yearlong grazing on the Millsite allotment. Grazing authorizations would be accomplished through the issuance of new 10-year term grazing permit in accordance with FSH 2209.13. An AMP would be prepared for the allotment and would be included as Part 3 of any new term grazing permit. The AMP will describe: 1) the management objectives for the allotment; 2) livestock management practices, including allowable use levels, necessary to achieve the management objectives; 3) mitigation measures necessary to comply with Forest Plan standards and guidelines and with applicable terms and conditions of biological opinions; and 4) monitoring requirements necessary to determine if management objectives are being achieved. The AMP will incorporate an adaptive management strategy under which the duration, timing, and frequency of grazing, as well as the number of livestock authorized annually, may be continually modified in response to changing resource conditions and achievement of management objectives.

The proposed action is described in more detail in Chapter 2.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action and the other alternatives in order to make the following decisions:

The Mesa Deputy District Ranger (Ranger) is the official responsible for the decision regarding management of the Millsite allotment. Based in part on the results of the NEPA analysis, the Ranger will issue a decision document that includes a determination of the significance of the environmental effects and whether an environmental impact statement (EIS) will be prepared. If the deciding officer determines that there are no significant impacts, the decision will be documented in a Decision Notice and implemented through the issuance of a new 10-year Term Grazing Permit (based on the selected alternative) and an AMP. If there is a finding of significant impacts, an EIS will be prepared. The decision 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 Ranger determines it is not necessary to prepare an environmental impact statement, the Ranger will decide whether or not livestock grazing will continue to be authorized. If grazing continues to be authorized, the Ranger would determine which management actions, mitigation measures, and monitoring requirements would be prescribed in the AMP, including permitted number of animals, season of use, allowable utilization standards, and the term of the permit.

Public Involvement

A project initiation letter was sent to the selected Interdisciplinary (ID) Team in February 2009, to solicit their involvement and comments for natural resource issues on the allotment. This proposal was listed in the Schedule of Proposed Actions in April 2009. A scoping document for the proposed action was sent to the public on May 18, 2009. The purpose of the document was to describe the proposed action to any interested/affected parties, and solicit comments from those who may have concerns with the proposed action. The scoping document was sent to the following: 6 individuals, 9 members of private organizations, 19 members of various tribes, 3 state agency officials, 1 federal agency official, and the permit holder. From these scoping activities, 8 responses were received. Using those comments, along with the input of the ID Team, a list of issues and mitigation measures were identified and alternatives to the proposed action were drafted. Those who responded to the scoping letter were sent a copy of the Draft EA, for comment. The public notice for the Draft EA was published in the Arizona Capitol Times on November 13, 2009. Four comments were received, and used to amend and/or further refine the EA, where appropriate. The permittee requested, and was given Applicant Status to review the Biological Assessment before it was sent to the US Fish and Wildlife Service for concurrence (April 2010).

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council for 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)…"

The Forest Service identified two significant issues raised during scoping. These include:

1) The proposed action will not provide adequate protection for riparian resources. Alternatives 1 and 3 immediately address this concern through; no grazing, and the exclusion of five of the ten selected key riparian areas. Furthermore, the following mitigation measures have been added to all of the grazing alternatives; 1) Conservative utilization levels have been added to all grazing alternatives, 2) Monitoring methods were modified to account for riparian areas in early seral stage (i.e. 100 percent surveys), 3) Maintenance of low authorized numbers to account for reuse of pastures, until management moves to a one unit system, 4) If monitoring indicates that utilization levels are consistently above guidelines, management adjustments will be made.

2) The proposed action will not initially provide pasture rest, and reuse of pastures will negatively affect resources.

Alternatives 1 and 3 immediately address this concern through; no grazing, and the immediate movement to a one herd; five pasture modified rest-rotation grazing system. Additionally, the proposed action includes the annual authorization of a reduced number of livestock until the planned improvements are in place and functional, and management has moved to a one herd; six pasture modified rest-rotation system (~ 5 years). Furthermore, upland and riparian monitoring will ensure that livestock use is within defined utilization limits. For degraded Sonoran Desert areas, utilization levels and grazing intensity will be monitored to ensure that resource conditions are maintained or improved.

CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Millsite Allotment. This section presents the alternatives in comparative form, in order to define the differences between each alternative and provide a clear basis for choice among options by the decision maker and the public. Mitigation and monitoring measures incorporated into the alternatives are also described.

Alternatives Considered In Detail

Alternative 1: No Action – No Grazing

Under this alternative the Term Grazing Permit currently authorizing use on the Millsite allotment would be cancelled following guidance in 36 CFR 222.4 and Forest Service Manual 2231.62. Twenty percent of the permitted numbers on the face of the permit would be removed from the allotment each year until no more grazing is permitted (5 years). In the event that all cattle are removed from the allotment at the time of implementing this decision, due to drought or some other circumstances, the permit would be canceled. If a reduced number of cattle were on the allotment, due to range conditions, at the time of this decision, twenty percent of that stocking level would be reduced each year until no more grazing is permitted (5 years).

Alternative 2: Current Management

This alternative proposes to continue yearlong livestock grazing under the current two units; three pasture deferred rotation grazing system. Pasture use would be deferred; however, to decrease duration within each pasture (~ 3 months), pastures would likely be used more than once annually. Grazing authorization would be accomplished through the issuance of a new term grazing permit in accordance with 36 CFR 222.3. A new allotment management plan (AMP) would be prepared for the allotment and would be included in Part 3 of the term grazing permit. An adaptive management strategy would be employed under which the duration, timing, and frequency of grazing, as well as the number of livestock authorized annually in the Annual Operating Instructions (AOI), may continually be modified in response to annual monitoring, changing resource conditions, and achievement of management objectives.

Permitted numbers would remain the same as they are on the current term grazing permit; 307 Adults (Cows/Bulls) 01/01 – 12/31 and 197 Yearlings (Natural Increase) 01/01 – 05/31. The initial stocking rate would be approximately 29% of the permitted number, which reflects the current stocking level. This number is based on current conditions, water availability, and condition of improvements.

Alternative 3: Wilderness Pasture (Red Tanks) Exclusion

This alternative proposes to continue yearlong livestock grazing, under a one unit; five pasture modified rest rotation grazing system. Under this alternative, the two herds would immediately be combined into one herd. The Red Tanks pasture (8,367 acres), located in the northwestern portion of the allotment, would be removed from the allotment's designated acreage; thus forming a new allotment boundary encompassing approximately 36,206 acres. This alternative was developed to address, and eliminate, riparian area resource concerns within the Red Tanks pasture; particularly Red Tanks, Fraser, and Randolph Canyons.

Grazing authorization would be accomplished through the issuance of a new term grazing permit in accordance with 36 CFR 222.3. A new AMP would be prepared for the allotment and would be included in Part 3 of the term grazing permit. An adaptive management strategy would be employed under which the duration, timing, and frequency of grazing, as well as the number of livestock authorized annually in the AOI, may continually be modified in response to annual monitoring, changing resource conditions, and achievement of management objectives.

Permitted numbers would be adjusted based on suitable acres removed from the allotments total acreage equating to; 286 Adults (Cows/Bulls) 01/01 – 12/31 and 183 Yearlings (Natural Increase) 01/01 – 05/31. The initial stocking rate for the proposed action would be approximately 29% of the permitted number, which reflects the current stocking level. This number is based on current conditions, water availability, and condition/installation of improvements.

Alternative 4: Proposed Action

The Mesa Ranger District proposes to continue yearlong livestock grazing on the Millsite allotment using a "phase in" approach to move management from the current two units; three pasture rotation to a one unit; six pasture modified rest-rotation grazing system. Under this alternative, the current grazing system would continue until all of the proposed improvements, listed below, have been installed (~5 years); thereby increasing water availability and facilitating livestock distribution. Until such time, pasture use would be deferred; however, to decrease duration within each pasture (~ 3 months), pastures would likely be used more than once annually, with the exception of the Red Tanks pasture, due to riparian resource concerns. Following implementation of the six pasture management system, use in the Red Tanks pasture would be limited to every other year, and only short duration, dormant season use would be authorized. Dormant season is defined as the time from leaf drop, to leaf set.

Grazing authorization would be accomplished through the issuance of a new term grazing permit in accordance with 36 CFR 222.3. A new AMP would be prepared for the allotment and would be included in Part 3 of the term grazing permit. An adaptive management strategy would be employed under which the duration, timing, and frequency of grazing, as well as the number of livestock authorized annually in the AOI, may continually be modified in response to annual monitoring, changing resource conditions, and achievement of management objectives.

Permitted numbers would remain the same as they are on the current term grazing permit; 307 Adults (Cows/Bulls) 01/01 – 12/31 and 197 Yearlings (Natural Increase) 01/01 – 05/31. The initial stocking rate for the proposed action would be approximately 29% of the permitted number, which reflects the current stocking level. Authorized numbers would remain low until the one unit; six pasture grazing system is implemented (~ 5 years), allowing for pasture deferment and rest. This mitigation measure is necessary to ensure; 1) maintenance and improvement in overall resource conditions, and 2) that grazing frequency and intensity allow for the physiological requirements of upland and riparian vegetation.

Adaptive Management

Alternatives 2, 3, and 4 would implement the use of adaptive management as described in FSH 2209.13, Ch. 90. Adaptive management uses monitoring results to continually modify management in order to achieve specific objectives. The proposed action and grazing alternatives would provide sufficient flexibility to adapt management to changing circumstances. If monitoring indicates that desired resource conditions are not being achieved, adaptive

management decisions would be used to modify management. Such changes may include annual administrative decisions to adjust the specific number of livestock, specific dates for grazing, class of animal, or pasture rotations. These changes would not exceed the limits for timing, intensity, duration, and frequency as defined in the term grazing permit.

Adaptive management also includes monitoring to determine whether identified structural improvements are necessary or need to be modified. In the case that changing circumstances require physical improvements or management actions not disclosed or analyzed herein, further interdisciplinary review would occur. The review would 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 District Ranger would determine whether correction, supplementation, or revision of the EA is necessary in accordance with Forest Service policy or whether further analysis under NEPA is required.

Management, Mitigation, and Monitoring Common to All Grazing Alternatives

Upland Management, Mitigation, and Monitoring

Duration and timing of grazing. Use on the allotment would be authorized yearlong as resource conditions dictated. Grazing management would ensure that pastures receive periodic growing season rest and/or deferment in order to provide for grazed plant recovery. The sequence and timing of on/off dates, pasture rotations, or other moves would be set annually based on monitoring of range readiness, ecological condition, and utilization and formalized in the AOI.

Grazing Intensity. Forage utilization would be managed at a level corresponding to light to moderate grazing intensity in order to provide for grazed plant recovery, increases in herbage production, and retention of herbaceous litter to protect soils. Conservative use equates to 30-40% on herbaceous species and < 50% use on browse (current year"s leaders). Consistent patterns of utilization in excess of 40% on 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. It is inherent in the term "conservative use" that watershed conditions and vegetative ground cover will be optimized as appropriate to various range sites. At no time will excessive use be considered acceptable. The goal is to achieve conservative use in the uplands over successive years. This strategy recognizes the importance of adaptive management. Management actions include, but are not limited to; adjustments of timing, intensity, frequency, and duration of grazing to reach resource objectives (FSH 2209.13 - Chapter 90). The document "Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands" will provide guidance for utilization data collection and interpretation.

Given the conditions on the allotment, utilization monitoring is appropriate for the grasslands, chaparral, and may be appropriate for Sonoran Desert communities in better condition. In grassland and chaparral areas, if monitoring of key areas shows that utilization limits are acceptable, then management goals can be expected to be met. In Sonoran Desert areas in good condition, utilization limits may allow management goals to be met. In other areas, especially degraded Sonoran Desert systems, it is important that the 50% utilization limit on jojoba and other browse species not be exceeded, however, even if this limit is met, management goals of improved soil and vegetation conditions may not necessarily follow in these areas. Measures,

such as grazing intensity, may be more appropriate than utilization measurements for degraded Sonoran Desert areas.

Indicators of Grazing Intensity:
Grazing Intensity classes have been adapted from the Interagency Technical Reference 1734-3 "Utilization Studies and Residual Measurements" (1996), the Forest Service Region 3 Rangeland Analysis and Management Training Guide (June 1997), "Grazing Intensity Guidelines" by Jerry L. Holechek and Dee Galt (June 2000, Rangelands 22-3), and from the Forest Service Grazing Permit Administration Handbook: Region 3 Supplement to Chapter 90 (September 2007).

Conservative Grazing Intensity: Visual Indicators

Rangeland may be topped, skimmed, or grazed in patches.
Areas greater than 1 mile from water show little use.
There is no evidence of livestock trailing to forage.
Good forage plants have abundant seed stalks (60-80% of stalks remain).
1/3 to ½ of good forage plants have been grazed in key areas.
Most young plants are not damaged.
Poor forage plants are not grazed at all.

Moderate Grazing Intensity: Visual Indicators

Most of the accessible range shows some use.
Areas between 1 mile to 1 ½ miles from water show some use.
There is little evidence of livestock trailing to forage.
Good forage plants have some seed stalks left (15-25% of stalks remain).
About ½ to 2/3 of the good forage plants show some use.
Some young plants show damage.
Less than 10% of the poor forage plants are utilized.

As livestock use each specific pasture, the District will monitor effects of grazing activities in the uplands such as use on herbaceous and woody vegetation, trailing, and effects on soils and wildlife habitat. This information would be used to help determine when cattle should rotate out of the scheduled pasture during the grazing season. If livestock are reaching use limits for current annual production or causing other undesirable effects they would be moved from the pasture to the next scheduled pasture. Post grazing monitoring would then document effects and, when combined with actual livestock use information over time, would help determine the carrying capacity of each pasture to refine future allotment management. If livestock consistently reach forage use limits before their scheduled move dates, annual authorized numbers would be adjusted in the next year"s annual operating instructions. Over time, this information could be used to adjust permitted numbers on the term grazing permit.

Monitoring. The objective of monitoring is to determine whether management is being properly implemented and whether the actions are effective at achieving or moving toward desired conditions.

Effectiveness monitoring includes measurements to track condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring would be done following procedures described in the Interagency Technical Reference[2] and the Region 3 Rangeland Analysis and

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

Training Guide[3] or the most current acceptable method. 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 would occur at least once over the ten-year term of the grazing authorization, or more frequently if deemed necessary.

Implementation monitoring would occur yearly and would include such things as inspection reports, forage utilization measurements in key areas, livestock counts, and facilities inspections. Utilization measurements are made following procedures found in the Interagency Technical Reference[4] and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands, or the most current acceptable method. The purpose of implementation monitoring is to determine whether grazing meets conservative use guidelines in upland and riparian areas.

Utilization would be monitored on key forage species, which are native perennial grasses or browse species that are palatable to livestock. At a minimum monitoring would include use in key areas, but may include monitoring outside of key areas. The Mesa District range personnel, the permittee, and cooperators would be responsible for monitoring livestock grazing utilization. Over time, changes in resource conditions or management may result in changes in livestock use patterns. As livestock use patterns change, new key areas may be established and existing key areas may be modified or abandoned in cooperation with the permittee.

Monitoring information from the Cooperative Extension"s, "*Reading the Range*" program would be evaluated and considered. Data include dry weight rank, fetch relationships (distance to closest perennial plants), utilization, and palatable forage production information. Consistent patterns of utilization meeting conservative use guidelines of 30-40% on key species in key upland areas or exceeding guidelines for riparian areas would be used as a basis to modify management practices or take administrative actions such as reducing authorized and permitted numbers in order to reduce utilization in subsequent grazing seasons.

Information would be collected through routine pasture inspections, end of season utilization monitoring, Parker Three-Step monitoring, and the "*Reading the Range*" program, in cooperation with the permittee and outside agency representatives. Specific schedules for monitoring would be flexible from year to year based upon resource needs which could change with climatic variations and management changes. Monitoring for plant cover, vigor, recruitment, and diversity, using techniques described in aforementioned publications, would ensure that wildlife needs and riparian and watershed conditions were moving toward desired conditions as outlined in Chapter 1.

Key areas are described in "Sampling Vegetation Attributes" (Interagency Technical Reference, 1996) as indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be an area representative of the range as a whole, an area where livestock use occurs, located within a single ecological site and plant community, and be a minimum of 100 yards from fencelines, exclosures, roads, and trails.

[3] Rangeland Analysis and Management Training Guide. 1997. USDA Forest Service, Southwestern Region.
[4] 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.

While monitoring techniques as described above would be conducted in key areas, these would not be the sole locations for gathering information from the grazing allotment to make decisions about the timing, intensity, duration, or frequency of livestock grazing in a given grazing season. The overall condition of the allotment, and such things as distribution patterns or rangeland improvement conditions, could be assessed at any given time to help make those decisions.

Riparian Management, Mitigation, and Monitoring

Riparian use guidelines for implementation monitoring will be applied where specialists have identified "key reaches". Key reaches, similar to upland key areas, are those stream channels, springs, or riparian areas that are representative, responsive to changes in management, accessible to livestock, and should contain key vegetative species.

The Tonto National Forest‟s Riparian Area Management Utilization Guidelines protocol requires a minimum reach length of 1000 feet, a minimum density of riparian obligate species (woody and herbaceous), and a minimum length of alterable streambank in order for the collected data to be statistically valid. Of the key reaches selected, Burro Basin is currently the only riparian area with enough measurable riparian vegetation and length, to apply the protocol. Therefore, until the density of vegetation increases, 100 percent surveys will be conducted in each key reach, mid-season, to monitor utilization levels. Additionally, utilization levels will be set lower than (≤ 30 percent) levels described below, to allow for re-establishment of riparian species. If utilization levels are determined to be above these guidelines, livestock will either be moved to a different portion of the pasture, to avoid use in the riparian area, or removed from the pasture. If use within any of the key reaches is consistently above the utilization limits, annual authorized numbers may need to be adjusted, riparian areas may be excluded (fencing), and/or a change in management prescription may be warranted.

Once riparian vegetation has become re-established in key reaches, at a density sufficient for monitoring, riparian utilization measurements (implementation monitoring) will be made following the Interagency Technical Reference (1996), McBride and Grove (2002), and Cowley and Burton (2005) or the most current acceptable method. Use guidelines are as follows: *obligate riparian tree species* – limit use to < 50% of terminal leaders (top 1/3 of plant), which equates to 20% growth by volume, on palatable riparian tree species accessible to livestock (usually ≤ 6 feet tall); *deergrass* – limit use to < 40% of plant species biomass; *emergent species* (rushes, sedges, cat-tails, horse-tails) – maintain six to eight inches of stubble height during the grazing period. The goal of the deergrass utilization guideline is primarily to provide residual vegetation for stream channel protection, and secondarily to protect plant vigor. Emergent vegetation is supported by perennial surface or subsurface water, and has high potential for regrowth following grazing. The goal of the emergent species guideline is to provide physical protection to the stream channel. Livestock will be moved from the key area or pasture when recommended guidelines are met.

Additionally, changes in riparian vegetation and stream channel geomorphology condition and trend will be measured at 5 to 10 year intervals (effectiveness monitoring) using protocols described in the Interagency Technical Reference (1996), Cowley and Burton (2005), and Harrelson et al (1994), or the most current acceptable method.

Riparian Mitigation Measures

- *Reintroduce herbaceous species such as American bulrush (*Schoenoplectus americanus*) in key reaches currently lacking a functional herbaceous component.
- Eliminate livestock trailing in riparian areas through herding techniques or hauling livestock.
- Provide alternative water sources away from riparian areas.
- Continue non-use of the North Woodbury pasture to protect riparian resources in Rogers Canyon.
- **Due to the steepness of the terrain and current lack of developed waters in the Red Tanks pasture, under Alternative 2, use will be limited to short duration (~ 2 months), dormant season use. Under the Proposed Action, following movement to a one-herd system, the Red Tanks pasture would only be used once every other year, and limited to short duration, dormant season use. Dormant season use will be defined as the time from leaf drop to leaf out of riparian woody species.

  *Reintroduction of American bulrush would also occur under Alternative 1.
  **Applies only to Proposed Action and Alternative 2.

Noxious Weed Mitigation

- While invasive species are spread in a variety of ways, it is certain that presence of grazing livestock will increase their spread. This can be minimized by timing grazing in infested pastures prior to seed set. This is very difficult with buffelgrass, which flowers and sets seed throughout much of the year.
- Any seed used for revegetation on the Forest should be tested according to Tonto Forest policy, Manual Supplement 2081.2, which became effective April 2009.
- If feeding hay on the National Forest, use only hay that has been certified as weed-free by a State-authorized or State-designated official.
- Any straw mulch used on the National Forest should be certified as weed-free by a State-authorized or State-designated official.
- Incorporate measures from the Forest Service "Guide to Noxious Weed Prevention Practices" into the allotment management plan.
- For any range improvement work involving vehicles or heavy equipment, clean equipment of all mud, dirt, and plant parts before entering the National Forest. Ensure equipment is not passing through or working in areas of noxious weed infestation. If equipment goes through noxious weed infestations on the forest, thoroughly clean equipment before it moves from the infested site. Avoid working in areas of infestation during seed production and dispersal phases.

Wildlife and TES Mitigation

The objective is to mitigate impacts to wildlife from livestock grazing and from disturbance associated with construction of range facilities.

- All water developments will include wildlife access and escape ramps.
- All reconstructed fencing will be built to Forest Service standards 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 the ground and a total height of 42 inches or less.

- Maintain livestock exclosure around Whitlow dam, to exclude livestock grazing from suitable, unoccupied Southwestern willow flycatcher habitat.
- Continue non-use of the North Woodbury pasture to improve upland and riparian wildlife habitat, and a known Arizona hedgehog cactus population.

Heritage Mitigation and Monitoring

New rangeland improvements not currently analyzed in this decision would be independently assessed for need. Any range improvement, which would disturb soil, would require an archaeological clearance by the Forest Archaeologist or a certified para-archaeologist. New improvements not anticipated by this decision would also require a separate analysis to comply with NEPA regulations. Salting, watering, or supplemental feeding would not be permitted where cultural sites or resources exist.

Mitigation of impacts to heritage resources for all alternatives will be accomplished by avoiding these properties through the placement and construction of all range improvements. Minimizing localized concentration of animals, improving livestock distribution across the allotment, and reducing the intensity of grazing will also minimize surface disturbance to heritage resources. Where proposed improvements will involve ground disturbance, 100% archaeological survey will be conducted. Other, more specific mitigation requirements may be identified as each of these improvements is developed and a heritage inventory is made of their areas of potential effect. Such protective measures are developed in accordance with the goals of the project taking into account site vulnerability as well as the methods of project implementation. All inventoried heritage sites are treated as eligible for the National Register of Historic Places with the exception only of those that have been formally determined to be not eligible in consultation with SHPO.

Archaeological clearance must be approved with all necessary consultation with the State Historic Preservation Officer (SHPO) and the potentially interested Tribes prior to issuing any decision regarding the construction, modification, or removal of all improvements. This approach is based on long-term consultation with SHPO and Region 3 policy as embodied in the *First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities* between the USDA Forest Service Region 3, the State Historic Preservation Officers of Arizona, New Mexico, Texas, and Oklahoma, and the Advisory Council on Historic Preservation, signed 12/24/03, and specifically, Appendix H, the *Standard Consultation Protocol for Rangeland Management* (Protocol) developed pursuant to Stipulation IV.A of the *Programmatic Agreement* is considered to be the "standard operating procedure" for treating potential grazing impacts to heritage resources on the Tonto National Forest signed on 05/17/2007 (PR Vol. 3 – CC).

Mitigation. Archaeological surveys will be conducted for areas proposed for surface disturbance, which have no previous survey coverage, or have out-dated surveys which do not conform to current standards.

- Relocation or redesign of proposed range improvements and ground-disturbing management practices to avoid direct and indirect impacts to historic properties.
- Relocation of existing range improvements and salting locations sufficient to ensure the protection of historic properties being impacted by concentrated grazing.

- Fencing or exclosure of livestock from individual sensitive historic properties or areas containing multiple sensitive historic properties being impacted by grazing.
- Periodic monitoring to assess site condition and to ensure that protection measures are effective.
- Other mitigation measures involving data recovery, for example, may be developed and implemented in consultation with the SHPO as the need arises. The appropriate tribes will be consulted if the mitigation is invasive or it affects a Traditional Cultural Property or other property of concern for them.

Monitoring. In accordance with the Protocol, monitoring will be conducted as part of the day-to-day activities of the professional cultural resource specialists and certified para-archaeologists working in the area. Grazing allotments cover most of any given forest, and when archaeologists are in the field conducting surveys they are most likely surveying within a grazing allotment. The archaeologists will use these opportunities to observe and report on grazing activities, the effectiveness of the grazing strategy, and potential impacts to heritage resources. Any incidents of damage to historic properties from grazing will be reported, and the archaeologists will draw upon the protection measured outlined in the Protocol to ensure that the effects are avoided or minimized.

Management Objectives

Management objectives are measurable parameters that can be used to describe attainment of desired conditions. The achievement of these objectives is highly dependent upon adequate precipitation levels and implementation of range improvement practices and other planned vegetation management practices. The anticipated timeframe to achieve objectives is 5-10 years. If trends are upward towards the stated objective when monitored, then management may be considered effective in moving towards the desired condition.

- Maintain or improve range condition to fair or better levels, or demonstrate an upward trend towards this objective in key areas.
- Improve livestock distribution to allow more uniform conservative utilization of forage resources and diminish concentration areas.
- Maintain satisfactory watershed conditions and effective groundcover.
- Maintain or improve riparian resources and hydrologic functioning in selected key areas.

Terms and Conditions Common to All Grazing Alternatives

Administrative action necessary to implement the decision – The following administrative actions would be used to implement the NEPA-based decision to authorize grazing.

- **Permit Issuance –** Implementation of Alternatives 2, 3, or 4 would require reissuance of a term grazing permit.
- **Allotment Management Plans (AMP) –** This environmental analysis, and subsequent Decision, would be used to develop an AMP based on the following; goals and objectives for the allotment, management strategies designed to meet those goals, range improvements, and monitoring requirements. The AMP would be incorporated into Part 3 of the term grazing permit.

- **Annual Operating Instructions (AOI) –** On an annual basis the District and permittee would jointly prepare an annual plan, that sets forth:
  - The numbers, class of livestock, and the timing and duration of use for the current season.
  - The planned sequence of grazing in pastures on the allotment, and the monitoring criteria that would 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 standards to be applied and followed by the permittee to properly manage livestock.
  - Monitoring for the current season that may include, among other things, documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP and AOI.

Improvements Planned for Grazing Alternatives

The proposed improvement projects listed in Table 1 have been pre-approved for funding through the Natural Resources Conservation Service (NRCS), Environmental Quality Incentives Program (EQIP). The NRCS, in coordination with the Forest Service and the permittees, prepared a Coordinated Resource Management Plan (CRMP) identifying resource concerns and planned practices to address those concerns. The CRMP is a five year plan, with development of improvements planned through 2013. The purpose of these projects is to improve livestock distribution within the affected pastures, protect riparian areas by providing upland waters, and to increase water availability for wildlife.

The **bolded** improvements below are planned for the Red Tanks pasture, and therefore, would only be included in the Proposed Action and Alternative 2. Construction of new range improvements, within the Wilderness, may be approved if they are necessary for resource protection (range and/or wilderness) and for the effective management of these resources (FSM 2323.26a(2) (PR Vol. 1 – II). Improvement location maps are located in Appendix A or the Project Record (PR Vol. 2 – V).

Table 1. Proposed Range Improvements

Pasture	Improvement(s)	Purpose and Need
Woodbury	Add a solar pump and 10,000 gallon water storage tank to the Woodbury windmill located in the South Woodbury pasture. Install ~ 2 miles of pipeline to feed a new 600 gallon trough to be located in the uplands east of Randolph Canyon.	Provide reliable water source to improve livestock distribution; mitigate conflicts with recreational users on TR 110.
Red Tanks	Continuation of Woodbury pipeline to new 600 gallon trough located north east of Randolph spring.	Provide reliable, alternative water source to Randolph spring; improve wildlife habitat; improve riparian condition.

Pasture	Improvement(s)	Purpose and Need
JF Holding/Red Tanks	Install a solar pump, 10,000 gallon water storage tank, 1.5 miles of pipeline, and trough to the JF Well. Trough will be located conspicuously in the uplands south of Fraser Canyon.	Provide reliable, alternative water source away from Fraser Canyon; mitigate user conflicts with recreational users on TR 108; reduce impacts to the riparian resource.
Millsite	Install a well and solar pump in the southern portion of the pasture.	Provide a reliable water source to the southern portion of the allotment.
Bear Tank	Install a solar pump and 10,000 gallon water storage tank to Noble windmill. Water will be piped to two troughs located ~ 1 mile south of the windmill.	Provide a reliable water source in the central portion of the pasture and lessen dependency on Bear Tank spring.
Bear Tank	*Install pipe fencing around Bear Tank spring excluding livestock access.	Provide protection for riparian resource; provide wildlife habitat.
Hewitt	Install a 10,000 gallon storage tank, 1.5 miles of pipeline, and two troughs. A valve will be installed on the AZ Water Company pipeline to provide water to the tank.	Provide reliable water source to improve livestock distribution.
Cottonwood	Install a 10,000 gallon storage tank to Valles #2 windmill. Develop Byous spring and pipe water ~ 1 mile south to a new 600 gallon trough to be located in the uplands.	Provide alternative water source to Byous spring; improve riparian resources at the spring; improve wildlife habitat.

*The Forest Service will provide materials, install, and maintain.

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 permit would be re-issued and 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. A more detailed analysis will be included in Chapter 3.

Table 2. Comparison of Alternatives

Attribute	Alternative 1 (No Grazing)	Alternative 2 Current Management	Alternative 3 Red Tanks Exclusion	Alternative 4 Proposed Action
Tonto NF LMP and FS Policy	Consistent with LMP but not with FS Policy (FSM 2202.1, 2203.1).	Not consistent with LMP (vegetation and riparian areas) over the long term; consistent with FS Policy.	Consistent with LMP and FS Policy.	Consistent with LMP and FS Policy.
Meets Purpose and Need	Does not authorize grazing but achieves LMP resource objectives and addresses resource concerns.	Authorizes grazing and provides for adaptive management to meet management objectives. Does not allow for flexibility in rotation or pasture rest.	Authorizes grazing and provides for adaptive management to meet management objectives to maintain and improve conditions.	Authorizes grazing and provides for adaptive management to meet management objectives to maintain and improve conditions.
Soil	Soil condition is likely to improve more rapidly than under the other alternatives. Compacted soils would begin to recover. Most of the improvement would occur in the flatter, desert soils in the southern part of the allotment.	If appropriate monitoring occurs and, based on monitoring, proper adjustments are made to numbers of livestock or duration of grazing, then soil conditions are likely to improve. Improvement is likely to be slower in the flatter, Sonoran Desert portions of the allotment than tend to get the heaviest use.	Effects would be similar to Alternative 4 except for the Red Tanks Pasture. In this pasture the effects would be similar to Alternative 1. Most of the improvement in this pasture would occur in the relatively few flat areas that tend to get the bulk of the use.	Effects would be somewhat better than Alternative 2 due to do longer rest periods and better distribution. Soil conditions are expected to improve if proper monitoring and adjustments are made.

Attribute	Alternative 1 (No Grazing)	Alternative 2 Current Management	Alternative 3 Red Tanks Exclusion	Alternative 4 Proposed Action
Vegetation	Vegetation conditions most likely to improve more rapidly than under the other alternatives.	Vegetation conditions most likely to remain stable or improve slowly; if authorized numbers remain low. Pasture use would be deferred; however, pastures would likely be used more than once annually.	Vegetation conditions within the Red Tanks pasture would likely improve with livestock exclusion. Vegetation conditions within the remaining pastures, most likely to remain stable or improve; through improved distribution (improvements), pasture rest and deferment.	Initially, vegetation condition will likely remain stable, until movement to one herd. Following implementation of the one unit; six pasture rest- rotation management strategy, vegetation conditions most likely to remain stable or improve through improved distribution (improvements), pasture rest and deferment.
Riparian and Hydrology	Highest probability of riparian area improvement at the fastest rate.	Vegetation and stream channel conditions should improve, but at the slowest rate.	Same as Alternative 1for the riparian areas in the Red Tanks Pasture. Same as Alternative 2, for the remaining riparian areas, except for the elimination of the effects of regrazing in the same year, which should be beneficial.	Same as Alternative 2 until all the planned EQIP improvements are constructed, then same as Alternative 3, except for the Red Tanks Pasture. In the Red Tanks Pasture the effects of grazing will be reduced, recovery will likely be slower than Alternatives 1 and 3, but faster than Alternative 2.

Attribute	Alternative 1 (No Grazing)	Alternative 2 Current Management	Alternative 3 Red Tanks Exclusion	Alternative 4 Proposed Action
Wildlife	No effect on Southwestern willow flycatcher suitable habitat or AZ hedgehog cactus from grazing. Leaves the most cover and available forage for wildlife. Livestock water facilities would not be developed or maintained which may impact some segments of wildlife populations.	Proposed utilization levels account for wildlife forage and cover needs. Livestock/wildlife water developments would be developed and maintained. Dormant season use in the Red Tanks pasture should help improve riparian habitat. No complete pasture rest and pastures subjected to use twice annually, may hinder establishment of riparian woody and herbaceous species, and slow improvement of upland habitat.	Proposed utilization levels account for wildlife forage and cover needs. Livestock/wildlife water developments would be developed and maintained (Excluding Red Tanks). Riparian habitat within the Red Tanks pasture would likely improve, providing for wildlife habitat needs. Management provides for rest and deferment which will benefit wildlife and wildlife habitat.	Proposed utilization levels account for wildlife forage and cover needs. Livestock/wildlife water developments would be developed and maintained. Management provides for rest and deferment which will benefit wildlife through improved soil and vegetation condition. Riparian habitat would likely improve, providing for wildlife habitat needs.
Recreation and Wilderness	No conflicts between recreational users and livestock. Range developments would not be maintained. Without permittee presence, OHV route proliferation would possibly be higher than other alternatives.	Potential conflicts with recreational OHV users mitigated through Travel Management. Range developments (corrals and water) would be maintained. Dormant season use, no trailing of livestock through riparian areas, and proposed improvements would mitigate conflicts with recreational/Wilderness users.	Potential conflicts with recreational OHV users mitigated through Travel Management. Range developments (corrals and water) will be maintained. Dormant season use, rest, and no trailing through riparian areas will mitigate conflicts with recreational users. Exclusion of the Red Tanks pasture would eliminate conflict between Wilderness users and livestock (in that portion of the Wilderness).	Potential conflicts with recreational OHV users mitigated through Travel Management. Range developments (corrals and water) would be maintained. Dormant season use, rest, and no trailing through riparian areas would mitigate conflicts with recreational users.

Attribute	Alternative 1 (No Grazing)	Alternative 2 Current Management	Alternative 3 Red Tanks Exclusion	Alternative 4 Proposed Action
Heritage	No effect on heritage resources	Managed grazing is not considered in and of itself to constitute an effect on heritage resources. Livestock are distributed as evenly as possible across the allotment.	Managed grazing is not considered in and of itself to constitute an effect on heritage resources. Livestock are distributed as evenly as possible across the allotment.	Managed grazing is not considered in and of itself to constitute an effect on heritage resources. Livestock are distributed as evenly as possible across the allotment.
Socio-Economics	Removal of the livestock would result in an initial reduction in gross economic returns to the permittee, unless the cattle could be placed on private land. The FS would not receive grazing fees. Local businesses could lose revenue generated from the permittee.	Possibly greater economic return for the permittee. Economic return would vary depending on number of livestock annually. The economies of surrounding communities could benefit through sales and purchases. The FS would receive grazing fees.	Possibly greater economic return for the permittee. Economic return would vary depending on number of livestock annually. The economies of surrounding communities could benefit through sales and purchases. The FS would receive grazing fees.	Possibly greater economic return for the permittee. Economic return would vary depending on number of livestock annually. The economies of surrounding communities could benefit through sales and purchases. The FS would receive grazing fees.

CHAPTER 3 – ENVIRONMENTAL CONSEQUENCES

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

Soils

Affected Environment

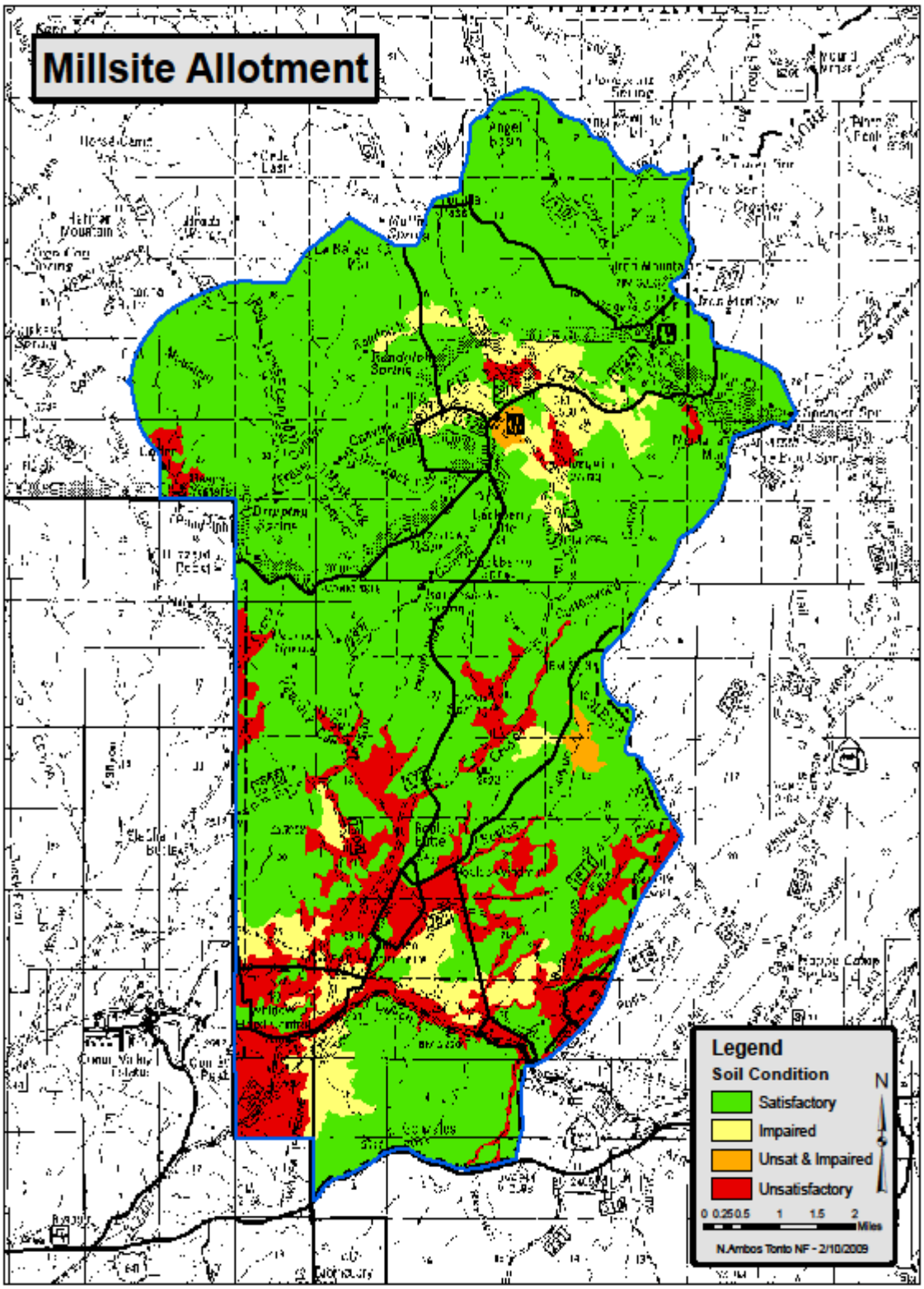
About three-fourths of the Millsite Allotment is dominated by Sonoran Desert scrub. Most of the easily accessible lower elevation flats have been heavily impacted by domestic livestock grazing and are in relatively poor condition (PR Vol. 1 – X, Y; PR Vol. 2 – DD). In these areas, vegetative diversity is low, reproduction of jojoba is sparse, and jojoba plants are strongly hedged. Pastures with the heavier impacts include Millsite, Bear Tank, and Hewitt pastures and the lower part of the Cottonwood pasture. Steeper desert slopes are in better condition. Jojoba seedlings are more prevalent on these slopes (Ambos, personal observation 2004 and 2009; Taylor, 2003). Most of the grasslands, covering about 10% of the allotment, occur on steeper slopes are in relatively good condition. About 10 to 15% of the allotment contains chaparral. Most of the chaparral occurs on steeper slopes and the density of the more desirable browse species (mountain mahogany, Wright silktassel, and desert ceanothus) is generally good. The Woodbury and Red Tanks pastures, in the northern portion of the allotment occur on steep and very steep slopes with more than 60% of these pastures occurring on slopes of greater than 40%. On these slopes soil loss typically exceeds deposition and these slopes are considered to be active. Generally these slopes are naturally unstable and are considered "No capability range". Grazing capacity is not assigned to these areas even though incidental livestock use may occur (FSH 2209.21 R-3).

Soil condition was evaluated by using a combination of field inspections conducted in 2004, data from the in-progress Terrestrial Ecological Unit Inventory (TEUI) survey collected in 2008 (PR Vol. 2 – DD), inspections in 2009, Digital Elevation Models (DEM"s), aerial photo interpretation, and topographic maps. The soil condition represents an approximation. It was not possible to visit all areas. Interpretations were based on historical livestock use patterns and slope characteristics. It was observed in the field that 0 to 15% slopes had higher impacts. Fifteen to 40% slopes had more moderate impacts except rocky areas, where impacts were low. Most slopes steeper than 40% had low impacts. Areas with less than satisfactory soil condition are a result of past and current management practices and/or grazing systems. The soil condition map (Map 3) displays soil condition classes by pasture.

Table 3. Soil Condition Acres

Condition	Acres	Relative Percent
Satisfactory	34,724	78%
Impaired	3,592	8%
Unsatisfactory-Impaired	265	1%
Unsatisfactory	5,992	13%
Total	44,572	100%

Map 3. Soil Condition Map



The satisfactory soil condition class covers 34,724 acres (78%). Generally, these soils have not been heavily impacted and have high effective vegetative ground cover. Most of these soils occur on steeper slopes. Plant species‟ density and diversity are high.

Eight percent of the soils (3,592 acres) have impaired soil condition. Most of these soils occur in Sonoran Desert scrub on moderate slopes ranging from 15 to 40%. Specifically, these have slight to moderate soil compaction and have lost part of the original "A" horizon through moderate sheet and rill erosion. These soils have not been compacted as much as the heavily used soils in unsatisfactory condition. Nutrient cycling is limited as well, with a poor distribution of litter in the interspaces. Vegetation diversity and species composition is relatively low.

The unsatisfactory and impaired soil condition class makes up 265 acres (1%) in the allotment. These areas have a combination of the two condition classes with the unsatisfactory soils generally occurring on flatter slopes.

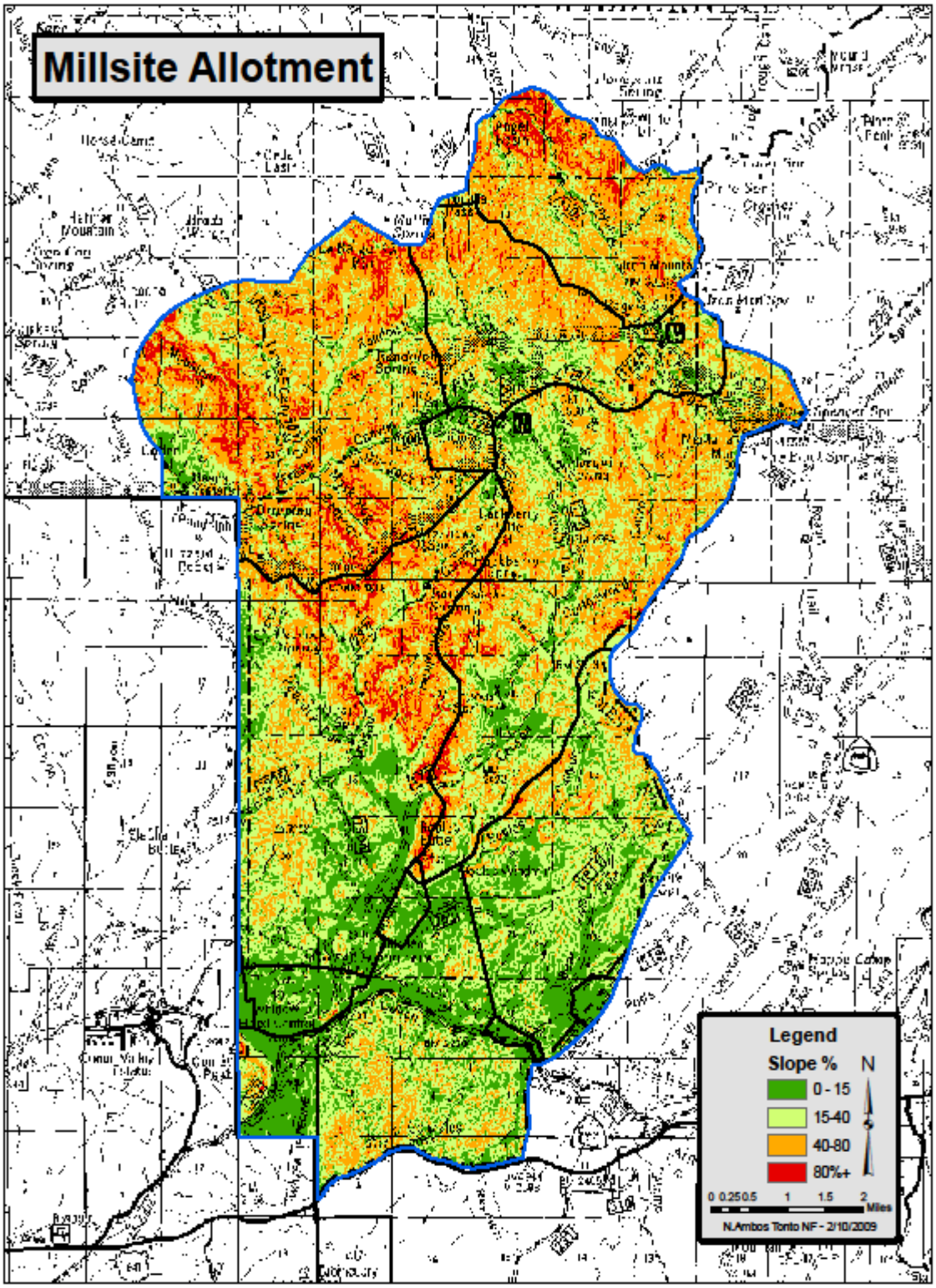
The unsatisfactory soil condition class makes up 5,992 acres (13%) in the allotment. Most of these soils occur on Sonoran Desert scrub on slopes ranging from 0 to 15% on the southern parts of the allotment. The bulk of the unsatisfactory soil occurs in the Saguaro/Triangle Bursage vegetation type in the Hewitt, Millsite, Roblas, and Bear Tank pastures. Plant species‟ diversity is low. These soils have high amounts of surface compaction, poor soil porosity, and poor root distribution resulting in moderate to high amounts of sheet, rill, and some gully erosion.

Topographical features on the allotment range from nearly level valley and elevated plains in the southern half of the allotment to very steep mountains and scarps in the northern part in and near the Superstition Wilderness. About 59% of the allotment is composed of nearly level to moderately steep slopes ranging from 0 to 40 percent. Table 4 and Map 4 display slope classes.

Table 4. Acres by Pasture and Slope

Pasture	0-15%	15-40%	40-80%	80%+	Total
Bear Tank	1,830	2,404	680	24	4,939
Cottonwood	1,073	3,500	3,509	287	8,369
Hewitt	2,265	2,170	831	12	5,278
Hewitt Holding	545	119	10	1	675
JF Ranch	72	179	155	5	411
Millsite	2,015	3,307	2,652	541	8,516
Pilot Plot	138	19	0	0	157
Private	168	14	5	1	187
Red Tanks	577	2,503	4,335	952	8,367
Roblas	148	80	18	3	248
Woodbury	605	2,521	3,751	538	7,414
Total	9,436	16,816	15,946	2,364	44,561
Percent by Slope Class	21%	38%	36%	5%	100%

Map 4. Slope Map



Environmental effects of livestock grazing on soils and vegetation

Livestock grazing can affect soil quality in several ways. Pressure exerted on the soil surface by large animals can cause compaction. Heavy grazing can reduce vegetation and litter cover. These factors can lead to decreased rainfall infiltration, increased runoff, increased erosion, and reduced soil organic matter and root growth. Changes in soil quality can also affect the productivity and composition of plant communities (NRCS, 2001).

Environmental effects of grazing in the Sonoran Desert

The Nature Conservancy"s report "*The Impacts of Grazing in the Sonoran Desert: A Literature Review and Syntheses*" states: "Compared to more productive rangelands, both domestic livestock grazing impacts and grazing management strategies are poorly documented in the scientific literature for the Sonoran desert. Although the literature, when viewed comprehensively, does document that livestock grazing can cause adverse impacts, it does not provide sufficient information regarding thresholds of grazing intensity that can enable one to distinguish between benign and damaging grazing intensities" (TNC 2005). Due to a lack of research on grazing impacts in the Sonoran Desert, it is necessary to rely on proven principles and practices from other ecosystems and be more conservative considering the sensitive nature of the ecosystem.

Direct Effects. Hoof action of cattle can directly impact soils by compacting soils. Compaction decreases water infiltration, restricts rooting depth, and increases the hazard of water erosion. The risk for compaction is greatest when soils are wet (NRCS, 1996). Trailing by cattle on steeper slopes can physically displace soils, leading to erosion. Cattle tend to concentrate on flatter areas especially if they are fairly open. Holechek reports that cattle tend to use 10 to 30% slopes, thirty percent less than 0 to 10% slopes, and 30 to 60% slopes, sixty percent less than flats. Slopes over 60% are seldom used (Holechek, 1992). Because of the tendency of cattle to use flatter slopes, areas of impacted soils are more likely to be found on gentler slopes.

Indirect Effects. Cattle indirectly impact soils by removing vegetation resulting in a loss of protective cover including litter. The loss of vegetation and litter reduces infiltration and exposes the soils to raindrop impact and overland flow thus leading to soil crusting and increased erosion. The reduced cover can also result in a loss of soil organic matter and a reduction in soil microbes which play a significant role in nutrient cycling. Soils that are lower in organic matter have poorer structure which can also affect infiltration and root growth.

Cumulative Effects. Cumulative effects include the direct and indirect effects of the proposed action and alternatives when added to all past, present, and reasonably foreseeable future actions. Past grazing actions have resulted in soil erosion and compaction while current management has, in some cases, prevented or slowed recovery. Other actions occurring in the project area that can impact soils and vegetation include recreation, mining, roads, OHV use, livestock and wildlife grazing, and wildfire. Improperly maintained roads can cause soil erosion where runoff from roads is allowed to concentrate. Road maintenance that includes Best Management Practices (FSH 2509.25) should reduce sedimentation into the streams and be beneficial to the watershed.

Unauthorized cross country travel can negatively impact soils and vegetation through direct impacts on soils and removal or degradation of herbaceous or woody vegetation. The ongoing Travel Management designation process is intended to analyze alternate motorized routes in

order to provide access and a recreation experience sufficient so vehicle operators no longer feel compelled to travel off established roads or trails. Once routes are established, Motor Vehicle Use maps (MVUM) will be available to the public and modified as needed to reflect any changes. Enforcement would be imperative to assure compliance.

A long history of livestock grazing has most likely contributed to the existing soil, riparian, and stream channel conditions. The existing soil conditions on much of the flatter, more accessible portions of the Millsite allotment are less than satisfactory and this has reduced their ability to function properly.

Environmental Consequences by Alternatives

The four alternatives include; Alternative 1: No Action (No Grazing), Alternative 2: Current Management - Continues yearlong livestock grazing under the current two units; three pasture deferred rotation grazing system. Alternative 3: Wilderness Pasture (Red Tanks) Exclusion - Proposes yearlong livestock grazing under a one-unit; five pasture modified rest rotation grazing system. The Red Tanks pasture (8,367 acres), located in the northwestern portion of the allotment and entirely within the Superstition Wilderness, would be removed from the allotment. Alternative 4: Proposed Action – Proposes yearlong livestock grazing using a „phase in" approach to move management from the current two units; three pasture rotation to a one unit; six pasture modified rest-rotation grazing system. Under this alternative, the current grazing system would continue until all of the proposed improvements have been installed (~ 5 years), thereby increasing water availability and facilitating livestock distribution. Authorized numbers will remain low until the one unit; six pasture grazing system is implemented (~ 5 years), allowing for pasture deferment and rest.

Criteria used to evaluate alternatives.

The alternatives are contrasted based on the likelihood of upland vegetation and soils attaining the short and long-term desired conditions described in the affected environment. The likelihood of attaining desired conditions depends largely on the type of management and stocking rates. Meeting short-term utilization goals will limit the annual impacts of livestock grazing. Long-term desired conditions are measured through effectiveness monitoring. Generally, grazing intensity (the cumulative effects grazing animals have on rangelands during a particular time period (Holechek, 1998) has a greater influence on impacts to soils and vegetation than timing of grazing.

The Millsite allotment is largely dominated by browse; chaparral on the steeper slopes in the northern portion and jojoba in Sonoran Desert scrub that covers most of the rest of the allotment. Grasslands dominate a narrow transitional area that occurs between the chaparral and desert. The soils in less than satisfactory condition are generally on flats in the southern part of the allotment under Sonoran Desert scrub. In these areas, vegetative diversity is low, reproduction of jojoba is sparse, and jojoba plants are strongly hedged. Pastures with the heavier impacts include Millsite, Bear Tank, and Hewitt pastures and the lower part of the Cottonwood pasture. In most of these areas the heaviest historic impacts have been on the flats; steeper slopes within the Sonoran Desert generally have more herbaceous production and better jojoba reproduction.

Forage utilization would be managed at a level corresponding to light (conservative) to moderate intensity (30 to 40% utilization on herbaceous species and 50% on browse). However, because of the degraded conditions of the jojoba communities in the above mentioned pastures, the

utilization standards alone may not be fully appropriate for these ecosystems. The limit on browse use does not speak to the issue of the establishment or survival of jojoba seedlings, in these areas of unsatisfactory soils, where reproduction is sparse and other desirable Sonoran Desert plants are absent. The use limit also does not consider the effects of grazing on compacted soils. Achieving a 50% use rate on jojoba neither ensures seedling survival nor an improvement in compacted soils. It is questionable if achieving a 50% use rate will achieve desired conditions. Even with proper utilization, hoof action may slow or prevent recovery of compacted soils. Therefore, stocking rate (number of cattle-days per unit area) may be a more important gauge than utilization (Engels, 1999).

Given the conditions on the allotment, utilization monitoring is appropriate for the grasslands, chaparral, and may be appropriate for Sonoran Desert communities in better condition. In grassland and chaparral areas, if monitoring of key areas shows that utilization limits are acceptable, then management goals can be expected to be met. In Sonoran Desert areas in good condition utilization limits may allow management goals to be met. In other areas, especially degraded Sonoran Desert systems, it is important that the 50% utilization limit on jojoba not be exceeded, however, even if this limit is met, management goals of improved soil and vegetation conditions may not necessarily follow in these areas. Measures, such as grazing intensity, may be more appropriate than utilization measurements for degraded Sonoran Desert areas. Therefore, the alternatives will be evaluated on the likelihood of: (1) chaparral and semi-desert grassland ecosystems meeting management goals as gauged by utilization limits and (2) Sonoran Desert scrub meeting management goals as gauged by overall grazing intensity of conservative to moderate.

Alternative 1 – No Grazing

Direct and Indirect Effects. Hoof action of cattle can cause direct impacts by compacting soils which decreases water infiltration, restricts rooting depth, and increases the hazard of water erosion (NRCS, 2001). The quickest and most likely recovery from past grazing activities would occur with complete protection from grazing. The amount of time required for complete recovery of degraded systems can vary from several years to decades depending on the severity of the impacts and the nature of the ecosystem. Studies in southeastern Arizona show increased infiltration and decreased compaction when cattle were excluded from an area. The greatest improvement occurred in an area excluded for 54 years and least in an areas excluded for 11 years (Castellano 2006).

About 20% of the allotment contains soils that are less than satisfactory. Actions under the other alternatives may slow or prevent recovery of these soils. The No Grazing Alternative will be the most likely to allow recovery of impacted soils. Overall, the direct and indirect effects of Alternative 1 are likely to be more positive than the other alternatives.

Cumulative Effects. The direct, indirect, and cumulative effects of eliminating grazing impacts will generally be beneficial and provide the best potential for attaining desired conditions.

Alternative 2 – Current Management

Direct and Indirect Effects. The success of meeting the short and long-term desired conditions will depend on timely monitoring and cattle management. The potential for adverse effects of cattle grazing on soil and vegetation is greatest under this alternative. About 20 percent of the

soils are in less than satisfactory condition, many with a significant increase in bulk density (FSH 2509.18-99-1). These soils are located in the Millsite, Bear Tank, and Hewitt pastures and the lower part of the Cottonwood pasture. In these areas conservative use guidelines could be met (50% on browse) and still not allow compacted soils to recover nor improve diversity of Sonoran Desert plants. It is difficult to predict the rate of recovery but it is likely to be slow if recovery occurs at all.

Recovery of compacted soils is strongly correlated with grazing intensity (Engels, 1999). In other areas of the allotment (steeper slopes, semi-desert grasslands, and chaparral) soil and vegetation conditions are better. Given the conditions on the allotment, utilization monitoring is appropriate for the grasslands, chaparral, and may be appropriate for Sonoran Desert communities in better condition. In grassland and chaparral areas, if monitoring of key areas shows that utilization limits are acceptable, then management goals can be expected to be met. In Sonoran Desert areas in good condition utilization limits may allow management goals to be met. Until improvements are in place, proper distribution of cattle will be more difficult. Areas favored by cattle may be overused. Under this alternative pastures would likely be used more than once and, in some cases, a pasture would be re-entered before re-growth has taken place. Overall, the direct and indirect effects of all the other actions alternatives are likely to be slightly more positive than Alternative 2. The effects of Alternative 1 would be more positive.

Cumulative Effects. The direct and indirect effects of grazing in the uplands when combined with other past, present or reasonably foreseeable actions (cumulative effects) may slow or prevent recovery of those ecosystems in poor condition. In other areas (steeper slopes, semi-desert grasslands, and chaparral), where ecosystems are in better condition, effects will be minimal. The overall cumulative effects of the other alternatives would be more beneficial than Alternative 2.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion

Direct and Indirect Effects. Under this alternative, yearlong livestock grazing under a one-unit, five pasture modified rest rotation grazing system would begin immediately. The success of meeting the short and long-term desired conditions will depend on timely monitoring and cattle management. In about 80 percent of the allotment (mostly semi-desert grasslands, chaparral, and steeper desert areas) soil and vegetation conditions are satisfactory. Given the conditions on the allotment, utilization monitoring is appropriate for the grasslands, chaparral, and may be appropriate for Sonoran Desert communities in better condition. In grassland and chaparral areas, if monitoring of key areas shows that utilization limits are acceptable, then management goals can be expected to be met. In Sonoran Desert areas in good condition utilization limits may allow management goals to be met. About 20 percent of the soils in less than satisfactory condition, many with a significant increase in bulk density (FSH 2509.18-99-1), occur in parts of Millsite, Bear Tank, and Hewitt pastures and the lower part of the Cottonwood pasture. In these areas conservative use guidelines could be met (50% on browse) and still not allow compacted soils to completely recover nor improve diversity of Sonoran Desert plants.

Recovery of compacted soils is strongly correlated with grazing intensity rather than type of grazing system (Engels, 1999). Overall, the direct and indirect effects would be not as beneficial as Alternative 1, slightly more beneficial than Alternative 2, and slightly more beneficial than Alternative 4 for the first five years, and after that, similar to Alternative 4 except for the Red Tanks Pasture, where Alternative 3 would be more beneficial. The rest rotation proposed for

Alternative 3 (and within five years in Alternative 4) should lead to better distribution and longer periods of rest.

Cumulative Effects. The direct and indirect effects of grazing in the uplands, where ecosystems are in poor condition, when combined with other past, present, or reasonably foreseeable actions (cumulative effects) may slow or prevent recovery in these areas. In other areas, where ecosystems are in better condition, effects will be minimal. The overall cumulative effects would not be as beneficial as Alternative 1, slightly more positive than Alternative 2, and, after five years, similar to Alternative 4 except for the Red Tanks Pasture where Alternative 3 in more beneficial.

Alternative 4 – Proposed Action

Direct and Indirect Effects. This alternative proposes yearlong livestock grazing using a „phase in" approach to move management from the current two units; three pasture rotation to a one unit; six pasture modified rest rotation grazing system. Under this alternative, the current grazing system would continue until all of the proposed improvements have been installed (~ 5 years); thereby increasing water availability and facilitating livestock distribution. Authorized numbers will remain low until the one unit; six pasture grazing system is implemented, allowing for pasture deferment and rest.

The success of meeting the short and long-term desired conditions will depend on timely monitoring and cattle management. In about 80 percent of the allotment (mostly semi-desert grasslands, chaparral, and steeper desert areas) soil and vegetation conditions are satisfactory. Given the conditions on the allotment, utilization monitoring is appropriate for the grasslands, chaparral, and may be appropriate for Sonoran Desert communities in better condition. In grassland and chaparral areas, if monitoring of key areas shows that utilization limits are acceptable, then management goals can be expected to be met. In Sonoran Desert areas in good condition utilization limits may allow management goals to be met. About 20 percent of the soils in less than satisfactory condition, many with a significant increase in bulk density (FSH 2509.18-99-1), occur in parts of Millsite, Bear Tank, and Hewitt pastures and the lower part of the Cottonwood pasture. In these areas conservative use guidelines could be met (50% on browse) and still not allow compacted soils to completely recover nor improve diversity of Sonoran Desert plants. Recovery of compacted soils is strongly correlated with grazing intensity rather than type of grazing system (Engels, 1999). Alternatives 3 and 4 are, however, expected to achieve better distribution than Alternative 2 which should help with recovery of areas that normally receive heavy use. It is difficult to predict the rate of recovery but it is likely to be slow. Overall, the direct and indirect effects would not be as beneficial as Alternative 1, more positive than Alternative 2, and, after all improvements are in place, similar to Alternative 3 except for the Red Tanks Pasture where Alternative 3 is more beneficial. Since this alternative retains current management until improvements are in place, the effects of this alternative will be similar to Alternative 2 but slightly less effective than Alternative 3 for approximately five years.

Cumulative Effects. The direct and indirect effects of grazing in the uplands, where ecosystems are in poor condition, when combined with other past, present, or reasonably foreseeable actions (cumulative effects) may slow or prevent recovery in these areas. In other areas, where ecosystems are in better condition, effects will be minimal. The overall cumulative effects would be not as beneficial as Alternative 1, slightly more positive than Alternative 2, and, after

improvements are in place, similar to Alternative 3 except for the Red Tanks Pasture where Alternative 3 in more beneficial.

Vegetation

Affected Environment

As previously mentioned, the allotment is currently managed as two units comprised of three primary pastures per unit. The southern unit is predominately comprised of the Sonoran Desert scrub biotic community. The area is primarily in the Arizona Upland Subdivision of this biotic community, but the southwest corner borders the Lower Colorado River Valley Subdivision. Principal perennial plants within the unit include; yellow paloverde, saguaro, cholla, prickly pear, flattop buckwheat, Wright"s buckwheat, ephedra, turpentine bush, snakeweed, ratany, jojoba, creosote bush, ocotillo, crucifixion-thorn, desert lavender, calliandra, Christmas, hedgehog, and barrel cactus, triangle leaf bursage, brittlebush, bush muhly, three-awn species, side-oats grama, and cane beard grass. Drainages that dissect the unit include such riparian plants as blue paloverde, baccharis, mesquite, cat-claw and scattered cottonwoods and willows.

Important perennial forage plants within this unit include; jojoba, ephedra, ratany, Wright"s buckwheat, calliandra, and scattered perennial grasses. A flush of annual vegetation provides forage during the winter and early spring months. The amount of annual production is highly variable, depending on the amount and timing of winter precipitation.

The northern unit is more complex, from a vegetation standpoint, than the southern unit. This unit includes a mix of three biotic communities. The first biotic community is Sonoran Desert scrub as described for the southern unit; the second is the interior chaparral biotic community, which supports a much different vegetation component. Principle plants in the interior chaparral community include; mountain mahogany, turbinella oak, silktassel, manzanita, juniper, pinyon pine, sugar sumac, ceanothus, skunkbrush, and hollyleaf buckthorn. The third biotic community is a semi-desert grassland transition zone, occurring between the desert and chaparral communities. The herbaceous component consists primarily of three awn species, sideoats grama, slender grama, cane beardgrass, and Lehmann"s lovegrass.

The most important perennial forage plants in the chaparral community are mountain mahogany, ceanothus, silktassel, and buckthorn. Annual forage plants in the Interior chaparral community provide a much smaller percentage of available forage than they do in the Sonoran Desert scrub community.

Map 5. Millsite Vegetation Types

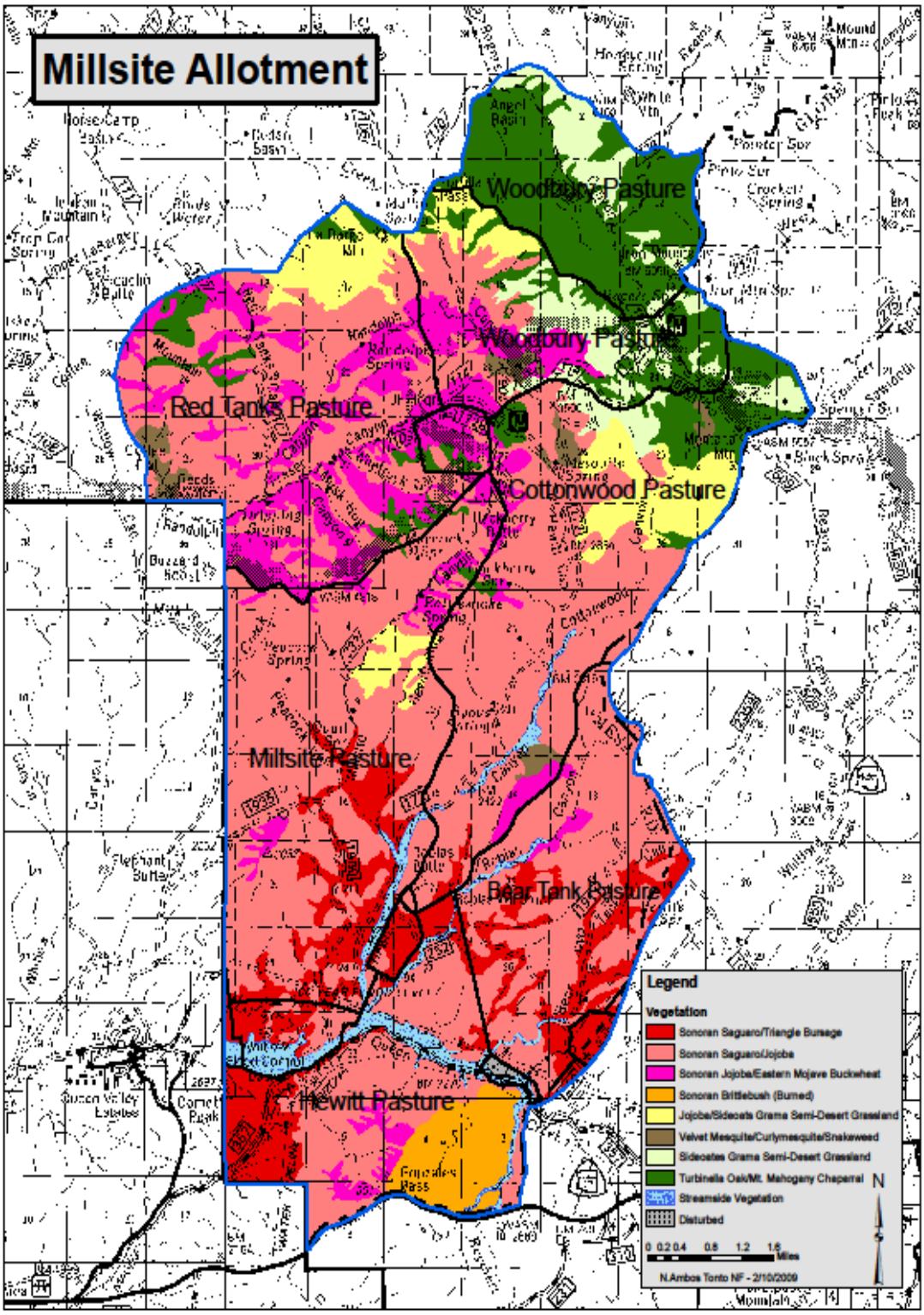


Table 5. Vegetation Types

Vegetation	Vegetation Groups	Acres
Sonoran Saguaro/Triangle Bursage	Sonoran Desert Scrub	4,107
Sonoran Saguaro/Jojoba	Sonoran Desert Scrub	23,197
Sonoran Jojoba/ Eastern Mojave Buckwheat	Sonoran Desert Scrub	4,660
Sonoran Brittlebush (Burned)	Sonoran Desert Scrub (Burned)	1,053
Velvet Mesquite/ Curlymesquite Snakeweed Semi-Desert Grassland	Semi-Desert Grasslands	513
Jojoba/Sideoats Grama Semi-Desert Grassland	Semi-Desert Grasslands	2,453
Sideoats Grama Semi-Desert Grassland	Semi-Desert Grasslands	2,086
Turbinella Oak /Mountain Mahogany Chaparral	Chaparral	5,393
Streamside Vegetation	Streamside Vegetation	1,069
Disturbed Lands	Disturbed Lands	42
Total		44,572

*Small areas of vegetation of less than 0.5% of the allotment were combined with similar types for this report. See project record for complete list.

Parker Three-Step monitoring sites (Clusters) and Pace Transects were established in key areas on the allotment in the mid 1950s. These sites provide historical data and are used to determine the effectiveness of management and long-term range and watershed trends. Data were collected at the seven clusters in 1956, 1961, 1967, 1982, 1991, and 2003 (PR Vol. 1-X, Y). However, scoring discrepancies, inaccuracies, and conflicting data discovered when comparing historical data to the most recent data, makes an accurate assessment of trend difficult. Therefore, to provide the most reliable data, the vegetation and soil condition ratings listed in Table 6, were obtained by analyzing data collected in 1991 and 2003.

Table 6. Parker Three- Step Vegetation and Soil Condition Ratings

Cluster Number	Cluster Location NAD 27	Pasture	Vegetation Rating and Trend	Soil Rating and Trend
C1	12S 0481688/3689872	Cottonwood	Very Poor, Stable	Fair, Stable
C2	12S 0480870/3698124	Woodbury	Fair, Stable	Poor, Stable
C3	12S 0482238/3685011	Bear Tank	Poor, Stable	Poor, Stable
C4*	12S 0476920/3685780	Millsite	Poor, Downward	Poor, Stable
C5	12S 0476751/3690328	Millsite	Poor, Downward	Poor, Stable
C6	12S 0478685/3685742	Hewitt	Fair, Downward	Poor, Stable
C7	12S 0480972/3696237	Cottonwood	Poor, Stable	Poor, Stable

*C4 is impacted by power lines and maintenance activities and will no longer be used to determine trend.

In 2009 the permittees began participating in the Arizona Cooperative Extension „Reading the Range" program. Seven key areas (KA) were selected, one KA per pasture (two in Bear Tank) and will be re-read annually. Data collected include: forage production, soil type, frequency, and utilization. The Cooperative Extension is currently compiling the 2009 and 2010 data which will be given to the Mesa District and the permittee once completed. Information obtained from yearly monitoring of these KAs will provide valuable data in determining if range condition is meeting, moving toward, or moving away from LMP standards.

Individual Pasture Assessments – Condition, Composition, and Production.

Bear Tank Pasture – 5,096 acres in size, including the Pilot Plot. Vegetation type is Sonoran Desert scrub.

Range Condition - The Bear Tank pasture is dominated by Sonoran Desert scrub including brittlebush, little leaf palo verde, range ratany, false mesquite, jojoba, Mormon tea, cat claw acacia, cholla spp., and prickly pear. Trace amounts of three-awn grasses are present. A Parker Three-Step transect (Parker) (C3) and a 100 point pace transect were completed in February 2003. C3 was re-read in September 2003 and showed a vegetation rating of „Poor" with a stable trend. The soil stability rating was „Poor" with a stable trend. The poor rating is due to a lack of herbaceous cover and composition. Relative species abundance at C3: brittlebush (23%), jojoba (16%), chain fruit cholla (13%), staghorn cholla (11%), false mesquite (10%), prickly pear (7%), little-leaf palo verde (6%), three-awn spp. (5%), Christmas cholla (5%), senna (2%), range ratany (1%) and wolfberry (1%).

Relative species abundance at the pace transect: triangle-leaf bursage (65%), prickly pear (9%), hedgehog (7%), Christmas cholla (5%), staghorn cholla (5%), jojoba (4%), wolfberry (4%), mammalaria (2%), brittlebush (3%), range ratany (1%), white thorn acacia (1%) (PR Vol. 1 – X).

Two key areas (*Reading the Range* program) were established in the Bear Tank pasture; KA1 and KA2 (PR Vol. 2-A).

KA1 is located on a SW facing slope approximately 200 yards west of FR 1903. KA2 is located on a NE facing slope approximately 10 yards east of FR 1903. These two sites were chosen to show the variation in vegetation within the pasture and the differences between vegetation on NE and SW facing slopes. Forage clipping data show the following production (grass and browse):

KA1:

Average dry weight forage production (90% CI); 248 lbs/acre (upper CI) and -26[6] lbs/acre (lower CI).

KA2:

Average dry weight forage production (90% CI); 491 lbs/acre (upper CI) and 133 lbs/acre (lower CI) (PR Vol. 2 – A).

[6] Negative numbers for lower confidence intervals are due to variability in sampling.

Bear Tanks Pasture – Key Area 2 Transect Location – Reading the Range Program 01/06/2009

Hewitt Pasture – 5,278 acres in size, excluding Hewitt Holding pasture (675 acres), which is excluded from livestock use due to suitable, unoccupied Southwestern willow flycatcher habitat. Vegetation type is Sonoran Desert scrub.

Range Condition – The Hewitt pasture is dominated by typical Sonoran Desert scrub vegetation. Primary forage species within this pasture are jojoba and range ratany. Flat-top buckwheat is somewhat palatable; however, livestock will choose the aforementioned browse species over buckwheat.

Parker Three-Step Transect C6 was re-read in September 2003 and showed a vegetation rating of „Fair" with a downward trend. The soil stability rating was „Poor"with a stable trend.

Relative species abundance at C6: Flat-top buckwheat (30%), jojoba (19%), Christmas cholla (11%), triangle leaf bursage (10%), hedgehog cactus (9%), range ratany (5%), and prickly pear (2%) (PR Vol. 1 – X).

In 2009, KA4 was established in the Hewitt pasture. Forage clipping data show the following (grass and browse) production:

Average dry weight forage production (90% CI); 546 lbs/acre (upper CI) and -86 lbs/acre (lower CI) (PR Vol. 2 – A).

Hewitt Pasture – C6 T1 09/24/2003

Millsite Pasture – 8,516 acres in size. Vegetation type is Sonoran Desert scrub.

Range Condition – The Millsite pasture is dominated by typical Sonoran Desert scrub. Primary forage plants include; jojoba, range ratany, calliandra, and to a lesser extent, perennial grasses such as three-awn species and side-oats grama.

Two Parker Three-Step Transects are located in the Millsite pasture; C4 and C5. C4 is located near (and through) a road used to access power lines and receives high recreational impacts, therefore, it was determined to no longer use this site in assessing range trend. C5 is located on a northeastern facing slope approximately 100 meters south of FR1900.

C5 was re-read 09/30/2003 and data show the following relative species abundance; Calliandra (31%), flat-top buckwheat (10%), jojoba (9%), prickly pear (9%), turpentine brush (9%), snakeweed (2%), yellow paloverde (2%), and three-awn species (2%). The 2003 data show a vegetation rating „Poor" with a downward trend, and the soil stability rating was „Poor" with a stable trend (PR Vol. 1 – X).

KA3 is located approximately 1.5 miles south of C5. Forage clipping data show the following (grass and browse) production:

Average dry weight forage production (90% CI); 943 lbs/acre (upper CI) and 131 lbs/acre (PR Vol. 2 – A).

Millsite Pasture – North facing slope south of FR 1935 – March 2009.

Cottonwood Pasture – 8,369 acres in size. Vegetation consists of upper Sonoran Desert scrub and semi-desert grassland species.

Range Condition – The Cottonwood pasture is dominated by mesquite, blue and foothills paloverde, desert hackberry, jojoba, wolfberry, catclaw acacia, calliandra, range ratany, Wright‟s buckwheat, buckhorn and chain fruit cholla, curly mesquite, three-awn species, and to a lesser extent slender and sideoats grama, and cane beardgrass.

Two Parker Three – Step transects are located in the Cottonwood pasture; C1 in the southeastern portion of the pasture, and C7 located in the northwestern portion. Data collect in September 2003 indicate the following relative species abundance; C1 – curly mesquite (85%), prickly pear (9%), and snakeweed (3%). C7 – snakeweed (21%), calliandra (18%), Wright‟s buckwheat (14%), range ratany (12%), hedgehog spp. (11%), prickly pear (6%), three-awn species (6%) (PR Vol. 1 – X).

The 2003 trend data for C1 show a vegetation condition rating of “Very Poor” with a stable trend, and a soil condition rating of “Fair” with a stable trend. Trend data for C7 show a vegetation condition rating of “Poor” with a stable trend, and a soil condition rating of “Poor” with a stable trend.

KA7 was established 01/21/2009. Forage clipping data show the following (grass and browse) production:

Average dry weight forage production (90% CI); 793 lbs/acre (upper CI) and 291 lbs/acre (lower CI) (PR Vol. 2 – A).

Typical vegetation near C7 – Cottonwood Pasture 04/16/2008

Woodbury Pasture – 7,414 acres in size. The Woodbury pasture is in a transition zone, containing both upper Sonoran Desert scrub and semi-desert grassland species. Approximately 75% (~6,400 acres) of this pasture is within the Superstition Wilderness (Wilderness) (Management Area 3B). The pasture is divided (fencing and natural barriers) into a North Woodbury and South Woodbury pasture. This division occurred due to the presence of Arizona hedgehog cactus (ESA endangered) on the Granitic cliffs located throughout Rogers Canyon. No livestock or livestock sign was observed in the northern pasture during recent field visits (2008 and 2009).

Range Condition – As previously mentioned, the Woodbury pasture is in a transition zone between upper Sonoran Desert scrub and semi-desert grassland vegetation, as such, greater species diversity is present within this pasture. Dominant browse vegetation includes; Wright‟s buckwheat, jojoba, calliandra, and deerweed. Perennial grass species include; sideoats grama, wolftail, three-awn species, Arizona cottontop, Cane beardgrass, slender grama, bush muhly, Boer‟s lovegrass, and Lehmann‟s lovegrass.

One Parker Three-Step transect (C2), and two pace transects (P2 and P4) are located in the Woodbury pasture. Data collected in October 2003 indicate the following relative species abundance; Calliandra (44%), Lehmann‟s lovegrass (16%), three-awn spp. (8%), Wright‟s buckwheat (6%), jojoba (4%), and prickly pear (2%) (PR Vol. 1 – X).

The 2003 trend data for C2 show a vegetation condition rating of “Fair” with a stable trend and a soil condition rating of “Poor” with a stable trend.

Data were collected at KA6 on 01/21/2009. Forage clipping data show the following (grass and browse) production:

Average dry weight forage production (90% CI); 1,123 lbs/acre (upper CI) and 417 lbs/acre (lower CI) (PR Vol. 2 – A).

KA6 Location – Woodbury Pasture (06/09/08)

Red Tanks Pasture – 8,367 acres in size. Vegetation is primarily Sonoran Desert scrub with areas of semi-desert grassland vegetation in the northern portion of the pasture, and chaparral species located in the higher elevations. The Red Tanks pasture is almost entirely within the Superstition Wilderness. Approximately 52% of this pasture contains 40% to 80% slopes, with roughly 11% of the country containing slopes 80% or greater. Due to the steepness of the terrain in this pasture, and the lack of developed waters, livestock have historically remained in the canyon bottoms (Fraser, Red Tanks, Randolph) resulting in concentrated use areas and over utilization of riparian resources (PR Vol. 1 – EE).

Range Condition – There are no Parker Three-Step transects established in the Red Tanks pasture. Two paced transects, both located in the central east portion of the pasture were read in 1962 and 1967. KA5 (Reading the Range) was established on 06/06/2008, and is located near paced transect 7; however, no forage production data were collected in 2008. Data will be collected at this site in 2010.

Historical data indicate the following relative species abundance; snakeweed (30%), calliandra (27%), prickly pear (13%), three-awn spp. (9%), desert hackberry and catclaw acacia (4%), and side oats grama (2%). Quantitative data has not yet been collected at this key area, however, from ocular estimates; it appears that three-awn spp., Arizona cottontop, curly mesquite, and side oats grama have increase in abundance over the past four decades.

Key Area – Located north of Randolph Canyon on a south facing slope – 06/09/2009.

Past range analyses, inspections, and monitoring reports indicate a history of livestock distribution problems on the allotment, resulting in areas of concentrated use particularly in the lower elevation pastures, along roads, and areas with gentle terrain. Poor distribution practices, length of time spent in pastures (6 months), and drought conditions, particularly in the early part of 2000, resulted in overutilization (>50%) of upland key herbaceous and browse species, concentrated use, and overutilization in riparian areas (PR Vol. 1 - O, EE, FF).

Due to the reduction in herd size in 2003 (600 Head Months) and continued low authorized numbers (1217 HM in 2009), accelerated pasture moves, several years of above normal precipitation, and improved on the ground management, resource conditions have improved on the allotment. Data collected from 2007 through 2010 indicate that upland utilization levels have been within the limits set in the AOIs, recruitment of key upland herbaceous and browse species has been observed throughout the allotment, and the „hedging" of browse species, noted in the 2002 through 2004 data, is no longer occurring (PR Vol. 1 - JJ, KK, PP, RR, SS). Although some improvement in range condition has been noted; lack of complete pasture rest and adequate seasonal deferment, to provide for the physiological needs of range plants, and limited water availability are still negatively impacting resources.

A review of the best available scientific information from the field of rangeland management supports the concept that conservative or moderate livestock use yields results in plant vigor and diversity that are similar to an absence of livestock grazing (Holechek et al. 1999, Navarro et al. 2002, Loeser et al. 2007). These studies do not specify whether soils influenced by livestock grazing pressure were in satisfactory condition or some form of impaired condition (i.e. compacted) when the studies began. Climatic fluctuations such as precipitation rates continue to play a significant role in this concept as well.

Climatic changes over the next several years indicate warmer and drier conditions may develop in the southwest. A recent summary of scientific information provided in *Rangelands* (Archer and Predick 2008) notes that these projections would likely affect vegetation composition, diversity, and rate of growth in desert ecosystems, reduce water availability, and trigger soil erosion losses through a reduction in stability as soil moisture content decreases and the intensity of rainfall events increases. Adaptive management strategies would become increasingly important if this occurs.

Environmental Consequences

Direct and Indirect Effects. Livestock grazing on vegetation directly impacts plants by removing the current year"s growth. Warm season perennial grasses such as curly mesquite, three-awns, and sideoats grama are opportunistic and become productive following summer monsoonal moisture and spring moisture. Grama (*Bouteloua spp.*) species should receive very light grazing pressure during periods of rapid growth, which typically follow summer monsoon rain events. They can then be grazed more aggressively following seed set in the fall and winter months with little negative effect. Curly mesquite (*Hilaria belangeri*) should be protected from use during key growth periods to facilitate seed set and stolon production, which can help stabilize loose soils (USDA Forest Service 1988).

Other important forage species on this allotment include a variety of shrubs. The flowers and beans of catclaw (*Acacia spp.*), mesquite (*Prosopis spp.*), and mimosa (*Mimosa spp.*) are palatable and desirable to livestock when produced in late spring and early summer following adequate winter precipitation. Browsing of flowers, beans, and current year"s growth occurs during key production times and when herbaceous forage is scarce.

Turbinella oak (*Quercus turbinella*), buck brush (*Ceanothus spp.*), mountain mahogany (*Cercocarpus spp.*), and jojoba (*Simmondsia chinensis*) are palatable, and browsing of current year"s growth occurs during winter and early spring months when perennial grasses and forbs have become dormant. False mesquite (*Calliandra eriophylla*) produces good quality browse in early spring following adequate winter precipitation and is often available before the onset of perennial grasses. It has a tendency to become dormant in early summer when precipitation is scarce but becomes productive again following adequate moisture from summer monsoon rains. False mesquite can withstand aggressive grazing pressure and often becomes the dominant forage plant on the landscape when perennial grasses have been removed (USDA Forest Service 1988).

Various species of spring annuals are the preferred choice for livestock grazing when adequate winter moisture allows sufficient growth. Spring annuals can occur in all life zones on the Millsite allotment but, as previously mentioned, are more prevalent in the lower elevation pastures. They are most abundant following winter and early spring rains when the ground begins to warm, usually in March and April but occasionally extending into early May. Pasture inspections on the Millsite allotment and other allotments on the Mesa Ranger District indicate that grazing pressure on accompanying shrubs is reduced while annuals are green and palatable. Once they begin to cure, use of palatable shrubs in those areas begins to increase, as the shrubs are experiencing new growth and flower production resulting from the winter moisture.

Cumulative Effects. The Millsite allotment is adjacent to five other livestock grazing allotments within the same watersheds, however, the Superior allotment, administered by the Globe Ranger District is currently the only active allotment, and has been conservatively stocked for the past 10

years. As a result, cumulative watershed effects for these allotments are anticipated to be minimal in contrast to the size and complexity of the watersheds themselves.

Historic grazing on this allotment also contributed to cumulative effects. Stocking rates were disproportionately high during the first half of the 20th century. Impaired soils and vegetation observed today are likely a result of those early impacts followed by stocking rates of several hundred animals each year throughout the remainder of that century. Historical overuse by livestock in the lower elevations and flatter terrain of the allotment has led to impaired soil conditions and a reduction in the vigor and diversity of desirable plant species (Vol. 2 – Z, DD).

Environmental Consequences by Alternatives

The alternatives are contrasted based on the likelihood of upland vegetation attaining the short and long-term desired conditions described in Chapter 1. The likelihood of attaining desired conditions depends largely on the type of management, permittee effort, and stocking rates. Meeting short-term utilization goals would limit the annual impacts of livestock grazing. Long-term desired conditions are expected to be achieved through attainment of short-term desired conditions. Conditions would be measured through effectiveness monitoring.

Alternative 1 – No Grazing

Direct and Indirect Effects. As described earlier, the effects of conservative or moderate livestock use yields results in plant vigor and diversity that are similar to an absence of livestock grazing (Holechek et al. 1999, Navarro et al. 2002, Loeser et al. 2007). Recovery of desirable plant species in the absence of grazing may initially be faster in some areas, particularly riparian areas, but those rates would depend on soil recovery, precipitation, and other climatic factors. Grazing and browsing by deer and bighorn sheep would still impact herbaceous and browse plant species however, these impacts are expected to be minimal. Areas of traditional livestock concentration, such as near water developments, or salting and bedding grounds, may recover the most rapidly in the absence of livestock grazing. This alternative provides the best opportunity for allowing plants to maximize growth given the description of plant phenology provided above.

In the absence of livestock grazing, land managers may choose to remove range improvements from the allotment. Removal of these improvements may negatively impact recreational users and wildlife. Often, recreational users take advantage of existing corrals and water developments to care for their horses or mules while using National Forest System trails. Additionally, some wildlife species may have grown accustomed to reliable water at water developments, so there may be short-term detrimental impacts to their populations without those water sources. If range improvements were left on the allotment, the Forest Service would need to appropriate funds, equipment, and personnel for their maintenance. Currently, permittees are responsible for maintenance of all improvements under the terms of their grazing permits (PR Vol. 1 – NN).

Cumulative Effects. This alternative is expected to allow for the most rapid rate of improvement in soil and vegetation condition, density, and diversity. Additionally, this alternative would remove grazing from the entire southeastern portion of the Mesa District, improving overall watershed conditions.

Consistency with Forest Plan. This alternative will meet the short and long-term desired conditions described in Chapter 1. This alternative does not meet Forest Service policy for land management (FSM 2202.1, 2203.1).

Alternative 2 – Current Management

The current two units; three pasture rotation was initially developed (1985 AMP) as a rest-rotation grazing system, utilizing two pastures within each unit, for six months each. However, in the early 2000s, monitoring determined that six months use, within any given pasture, was resulting in detrimental upland and riparian resource conditions (PR Vol. 1 – Multiple Locations). As mentioned previously, to help mitigate these negative impacts, pasture moves were accelerated, removing the flexibility to allow for complete pasture rest.

This alternative proposes to continue yearlong livestock grazing under the current two units; three pasture deferred rotation grazing system. Pasture use would be deferred; however, to decrease duration within each pasture (~ 3 months), pastures would likely be used more than once annually, with the exception of the Red Tanks pasture. An adaptive management strategy would be employed under which the duration, timing, and frequency of grazing, as well as the number of livestock authorized annually in the AOI, may continually be modified in response to annual monitoring, changing resource conditions, and achievement of management objectives. The North Woodbury pasture would remain in non-use.

This management system, is not a recognized grazing system per se, but closely resembles a continuous or season-long grazing system. Research suggests that this type of system requires a very light stocking rate to ensure that adequate forage remains, and that animals are allowed maximum dietary selectivity throughout the year (Howery et al 2001). The literature also suggests that this type of system is best suited for flat, well watered areas such as shortgrass prairies and northern mixed prairies of the Great Plains (Howery et al 2001); not for the topography or vegetative communities present on the Millsite allotment.

Direct and Indirect Effects. The success of meeting the short and long-term desired conditions would depend on maintaining conservative utilization levels, low authorized numbers, and intensive livestock management.

Because of the bimodal precipitation pattern and climate on the allotment, perennial herbaceous and browse species often don"t have a defined „end of growing season" period. Therefore, a management system that does not allow for periodic pasture rest and/or adequate seasonal deferment can have detrimental effects on the physiological requirements of perennial forage species.

The intent of the proposed water developments, listed in Chapter 2, is to improve livestock distribution. These improvements could allow for more uniform grazing use patterns and lessen impacts to riparian areas, including springs, by providing additional water sources.

Cumulative Effects. Under this alternative, no pastures would receive yearlong rest, and several pastures would likely be grazed more than once annually. If stocking levels remain light, improvements were added, and conservative utilization levels were achieved; vegetation condition, density, and diversity would most likely remain stable, or increase slightly. This alternative is not considered sustainable given the topography and biotic communities present on the allotment, without a reduction in permitted numbers.

Consistency with Forest Plan. With intensive management, low authorized numbers, and the addition of waters, this alternative would meet the short-term desired conditions described in Chapter 1, but long-term conditions may not be achieved without a reduction in permitted numbers.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion

This alternative proposes to continue yearlong livestock grazing under a one unit; five pasture modified rest rotation grazing system. Under this alternative, the two herds would immediately be combined into one herd. The Red Tanks pasture (8,367 acres), located in the northwestern portion of the allotment and entirely within the Superstition Wilderness, would be removed from the allotment"s designated acreage; thus forming a new allotment boundary encompassing approximately 36,206 acres. This alternative was developed to address, and eliminate, riparian area resource concerns within the Red Tanks pasture; particularly Red Tanks, Fraser, and Randolph Canyons. The North Woodbury pasture would remain in non-use.

Permitted numbers would be adjusted based on suitable acres removed from the allotments total acreage equating to; 286 Adults (Cows/Bulls) 01/01 – 12/31 and 183 Yearlings (Natural Increase) 01/01 – 05/31. The initial stocking rate for the proposed action would be approximately 29% of the permitted number, which reflects the current stocking level. This number is based on current conditions, water availability, and condition/installation of improvements.

Direct and Indirect Effects. For the Red Tanks pasture, the effects of this alternative would be the same as were described under Alternative 1. Immediately moving to a one unit; five pasture modified rest-rotation system would allow for deferment and rest of pastures. Implementation of adaptive management, conservative upland forage utilization guidelines, and conservative riparian forage utilization guidelines would allow this action to move vegetative conditions on the allotment toward desired conditions as outlined in Chapter 1 of this EA. The flexibility given to resource managers to adjust the timing, intensity, frequency, and duration of livestock grazing in any pasture, at any time will ensure that plants are not used beyond levels that would provide for recovery, improved vigor, and recruitment of desirable species.

Cumulative Effects. Continued livestock grazing combined with historic overgrazing effects on this allotment may slow the rate of recovery of impaired vegetation and soils. However, through conservative use and adaptive management principals, desired conditions should be realized, although not as rapidly as Alternative 1.

Consistency with Forest Plan. This alternative would meet the short and long-term desired conditions described in Chapter 1. This alternative meets Forest Service policy for land management (FSM 2202.1, 2203.1).

Alternative 4 – Proposed Action

The proposed action is to continue yearlong livestock grazing on the Millsite allotment using a "phase in" approach to move management from the current two units; three pasture rotation to a one unit; six pasture modified rest-rotation grazing system. Under this alternative, the current grazing system would continue until all of the proposed improvements have been installed (~ 5 years); thereby increasing water availability and facilitating livestock distribution. Until such time, pasture use would be deferred; however, to decrease duration within each pasture (~ 3 months), pastures would likely be used more than once annually, with the exception of the Red Tanks pasture, due to riparian resource concerns. Following implementation of the six pasture management system, use in the Red Tanks pasture would be limited to every other year, and only short duration, dormant season use would be authorized. The North Woodbury pasture would remain in non-use.

Permitted numbers would remain the same as they are on the current term grazing permit; 307 Adults (Cows/Bulls) 01/01 – 12/31 and 197 Yearlings (Natural Increase) 01/01 – 05/31. The initial stocking rate for the proposed action would be approximately 29% of the permitted number, which reflects the current stocking level. Authorized numbers would remain low until the one unit; six pasture grazing system is implemented (~ 5 years), allowing for pasture deferment and rest. This mitigation measure is necessary to ensure that grazing frequency and intensity allow for the physiological requirements of upland and riparian vegetation.

Direct and Indirect Effects. Until management moves to the one unit; six pasture rotation, the effects would be the same as described under Alternative 2. Following implementation of the six pasture modified rest-rotation system, effects would be the same as described under Alternative 3, except for use within the Red Tanks pasture. In this pasture, vegetation conditions should improve more rapidly given limited use, every other year, and shorter duration, dormant season use.

Cumulative Effects. Continued livestock grazing combined with historic overgrazing effects on this allotment may slow the rate of recovery of impaired vegetation and soils. However, through implementation of a modified rest-rotation system, conservative use, and adaptive management principals, desired conditions should be realized, although not as rapidly as Alternative 1.

Consistency with Forest Plan. This alternative would meet the short and long-term desired conditions described in Chapter 1. This alternative meets Forest Service policy for land management (FSM 2202.1, 2203.1).

Riparian Areas/Hydrology

Affected Environment

There are approximately 65 miles of named streams on the USGS 1:24,000 topographic quadrangles within the Millsite Allotment (PR Vol. 2-Z). The stream channel network of the Millsite allotment includes at least as many miles of unnamed streams (delineated as blue lines on the USGS topographic quadrangles). These unnamed streams are the ephemeral and intermittent tributaries to the named streams. These channels are primarily headwaters, channels dominated by upland vegetation, or ephemeral washes. They provide important functions relating to water quantity, water quality, the flood regime, hydrological connectivity, riparian vegetation and wildlife habitat (Levick et al. 2007) within the watershed.

Most of the allotment is within the Middle Queen Creek and Lower Queen Creek 5th code watersheds. Major stream channels within these watersheds include Reymert Wash, Bear Tank Canyon, Roblas Canyon, Hewitt Canyon, Millsite Canyon, Cottonwood Canyon, Fraser Canyon, Randolph Canyon, and Red Tanks Canyon. All of these streams drain predominantly from north to south. Many of these stream channels are partially confined in canyons. These streams are tributaries to Queen Creek, which drains from east to west. Queen Creek is approximately 27 miles long from its headwaters below Fortuna Peak (just north of Superior) to its confluence with the Gila River.

Rogers Canyon, in the northeastern corner of the allotment, drains from north to south to the Salt River. It lies within the Salt River-Apache, Canyon, and Saguaro Lakes 5th code watershed.

A small portion of the allotment lies within the Pinto Creek 5th code watershed. Spencer Spring Creek in the east corner of the Cottonwood pasture (east side of allotment) is the only tributary to Pinto Creek within the allotment.

The existing condition of watersheds, stream channels and riparian areas has been affected by both natural disturbances and human activities. Similar to other grazing allotments on the Tonto National Forest and in central Arizona, poor grazing management practices have significantly affected watersheds, stream channels, and riparian areas. The earliest range inspection reports in the 2210 Forest Service range allotment files date from the 1930s. The reports focus on the deterioration of the uplands. The decreases in grassland and other vegetation types from livestock grazing have been generally associated with increased surface runoff, decreased soil infiltration, decreased soil moisture capacity, and increased soil erosion. These watershed changes have likely indirectly affected adjacent riparian areas and aquatic habitats by increasing the intensity of floods and promoting sediment deposition (Gori and Backer 2005).

Presently, of the 65 miles of named streams, there are approximately nine miles of existing riparian areas that are associated with the stream reaches identified in Table 7 below. Within these nine miles, there are ten riparian reaches that have the potential to improve within a relatively short time period (10 years). These ten areas have been identified as "key reaches" for this analysis. Key reaches, similar to upland key areas (Interagency Technical Team 1996), are stream channels/ springs/ riparian areas that are representative, responsive to changes in management, accessible to livestock, and should contain key species.

Stream channel condition data were collected on six of the key reaches. Condition was assessed using a condition assessment developed on the Tonto National Forest (Mason and Johnson 1999); and is based on stream channel stability. Channel stability is defined as the ability of a stream to carry the water and sediment of its watershed while maintaining its dimension, pattern, and profile, without aggrading or degrading, over time and in the present climate (Rosgen 1996). The condition rating classes are stable, impaired, or unstable. Parameters used to assess stability include depositional pattern, stream bank vegetative cover (Thompson et al. 1998), stream channel width/depth ratio, channel stability rating (Pfankuch 1975), and bank erosion hazard index (Rosgen 1996).

The stream channels and adjacent riparian areas on the Millsite allotment have received concentrated grazing pressure for many years. Riparian areas and springs were relied upon as the primary source of livestock water, as developments were not adequately maintained to provide alternative water sources. Extended pasture use (6 months), use of the same salting grounds, and a prolonged drought only exacerbated the negative impacts to riparian areas. Data collected between 2002 and 2004 indicated that stream channels had incised, over-widened, and filled with sediment (PR Vol. 1-Z, AA, EE, FF). Furthermore, most of the riparian areas had very low species diversity, very low canopy cover, and limited structural diversity lacking several classes of trees and shrubs. The herbaceous component, critical to stream channel recovery, was not only lacking in species diversity, but dominated by non-native species.

Table 7. Key Reaches – Location and Condition.

Pasture	Key Reaches	Stream Type*	Condition*
Red Tanks	Lower Fraser Canyon	F	Unstable
	Randolph Spring		Not Assessed
	Randolph Canyon above Dripping Spring		Not Assessed
	Randolph Canyon below Dripping Spring		Not Assessed
	Burro Basin		Not Assessed
Cottonwood	Hewitt Canyon	F	Unstable
	Byous Spring	F	Unstable
Millsite	Millsite Canyon	F, B	Unstable, Impaired
Bear Tank	Roblas Canyon	F/B	Unstable
	Bear Tank Spring	F	Unstable

*Stream Types are defined in the Definitions section of this document.

Six of the key reaches were monitored in 2009 (PR Vol. 1-VV; Vol. 2-E, J, O). In Millsite and Fraser Canyons, the cover and density of vegetation in the riparian areas has increased since 2003. These improvements in condition are attributed to livestock using alternate water sources, reduction in authorized use, and accelerated pasture moves. In lower Fraser Canyon, the density of seedling and sapling riparian obligate species is increasing, and Bermuda grass is narrowing the stream channel and increasing stream channel sinuosity. Generally though, species diversity and structural complexity of the six key reaches monitored in 2009 remains low.

Description of Selected Key Reaches – Additional and supporting data are available in the 2210 files located at the Mesa Ranger District, and in the Project Record.

Lower Fraser Canyon. Fraser Canyon is an approximately 3.5 mile long tributary to Randolph Canyon. It shares the steep ridge to the north with Randolph Canyon, and a steeper ridge to the south with Millsite Canyon. Similar to these parallel drainages, it has an east-west orientation. It originates above the JF Ranch in the Woodbury Pasture. In the lower two miles of the canyon, the valley narrows, the channel becomes wetter and the vegetation increases. The channel remains an "F", but the potential for a defined channel with streambanks increases. This reach of Fraser Canyon is characterized by a series of narrow, bedrock canyons, some with pour-offs, that occur where the steep valley side walls constrict the valley bottom. There are several short perennial reaches associated with these narrow areas. In between these constrictions, the valley widens somewhat and the channel has streambanks supported by deergrass and Bermuda grass and a small floodplain. Although patches of riparian vegetation (totaling about 1.5 miles in length) are fragmented in this lower reach, and species diversity, structural complexity and cover remain low, the cover and density of riparian vegetation is higher in lower Fraser Canyon than in the upper reach due to the greater presence of water. Common species include Fremont cottonwood, Goodding"s willow, sycamore, coyote willow, tamarisk, seep willow, desert broom, net-leaf hackberry, deergrass, rushes, yellow monkey flower, Bermuda grass, rabbit-foot grass, petunia and cat-tail. With the exception of the stand of mature sycamore located above Fraser Canyon"s confluence with Randolph Canyon, most of the trees (predominantly cottonwoods and willow) are young sapling and pole-sized trees.

Randolph Spring. The uppermost riparian area in Randolph Canyon occurs at Randolph Spring. Information for this site comes from April 2002 and January 2004 field visits. The riparian area in the vicinity of the springs is about one-half mile long, lying in a narrow bedrock dominated channel with scattered pools and riparian vegetation. The site was developed for stock water in the past. There is a concrete dam in the channel that has completely filled in with fine sediments.

The site supports a number of obligate riparian plants, including Fremont cottonwood, Goodding's willow, buttonbush, seep willow, squaw waterweed, tamarisk, cattail, monkey-flower, rabbitfoot grass, Bermuda and deergrass. The cover and density of all riparian species was very low, each averaging less than one percent cover. Species and structural diversity of riparian vegetation is higher upstream in the drier reach. As with the other drainages in the Red Tanks Pasture, the valley side slopes are steep and the valley bottom is narrow, concentrating livestock use in the stream channel and floodplain. In both years, the site was heavily impacted by cattle. Livestock grazing, browsing, and physical impacts to the vegetation and channel were limiting the development of riparian vegetation in the Randolph Spring area.

Randolph Canyon from Red Tanks Canyon to Dripping Spring. The only field source of data for Randolph Canyon from the confluence of Red Tanks Canyon to Dripping Spring is from a June 1999 field inspection. This reach is about one-half mile long. It was described as having an interrupted perennial flow regime, with water in the vicinity of in-channel springs. There are several 100 foot long stretches of bedrock stream channel which supports perennial pools. One of these reaches is located at the confluence of Fraser Canyon upstream of Dripping Spring. Water has been documented at this location from all of the field trips down Fraser Canyon. The field notes from 1999 describe very low cover (< 1% cover) of Fremont cottonwood and Gooding willow, the most common trees. A few red willow, Arizona alder and velvet ash were also observed. Most of the trees were large saplings and medium sized trees. Seep willow, deergrass and a rush were noted.

Randolph Canyon from Dripping Spring to the allotment boundary. Dripping Spring is the name given to the steep, north-facing, rock face on the south wall of Randolph Canyon below its confluence with Fraser Canyon. Water seeps over the cliff face creating perennial pools in the stream channel below Dripping Spring. Downstream of the spring, the channel is intermittent. It is downcut to bedrock and there are no channel features, though the vegetation coming in is beginning to form a channel. The information for this reach is from field visits in January 2004 and April 2009. Although the 1980 NWI maps do not delineate riparian vegetation in Randolph Canyon below Dripping Spring, recent field visits report Fremont cottonwood and Goodding‟s willow from Dripping Spring to the allotment boundary. Bermuda grass is the most common herbaceous grass along the greenline. Deergrass occurs infrequently. There is no documentation of grazing in this reach. In 2009, cattle scheduled in the Red Tanks Pasture did not use this reach.

Burro Basin. Burro Basin is a small watershed on the west side of the Millsite Allotment. It drains into Randolph Canyon just west of the allotment boundary on state land. The USDI National Wetland Inventory map delineates approximately 1.0 mile of intermittent channel, with half of that distance supporting riparian vegetation.

Red Tanks Pasture - Burro Basin - January 2004

The length of the riparian area, estimated in the field to be approximately 100 meters long, is considerably shorter than the reach delineated on the NWI map. Perennial water appears to be limited to a short reach below a spring. A field inspection in 2004 documents an intermittent channel with bedrock pools of water, dominated primarily by deergrass. A few Fremont cottonwoods, Goodding‟s willows and netleaf hackberries were observed. Other obligate riparian species noted include cat-tail and veronica. Grazing use in 2004 appeared to be light.

Hewitt Canyon. Hewitt Canyon is the longest stream within the Millsite Allotment. Tributary to Queen Creek, it is almost 9 miles long. Most of it lies in the Cottonwood Pasture (6.3 miles). The lower 2.6 miles of Hewitt Canyon are in the Millsite Pasture.

Hewitt Canyon is an intermittent stream. The National Wetland Inventory maps delineated only four small, isolated patches of Fremont cottonwood along the nine mile long channel, all located in the Cottonwood Pasture. Most of the field inspections have focused on the lowermost reach of Hewitt in the Cottonwood Pasture). The lowermost riparian area supports an overstory of several remnant large cottonwood trees. The channel here is a wide, shallow, dry “F” type with few channel or bank features. Between 1998 and 2000, field notes document high numbers of newly established cottonwood and Goodding‟s willow seedlings. Most showed heavy browsing. Deergrass plants were rare. In 2001, flooding removed most of the tree seedlings. Heavy impacts from recreational and vehicle use were noted. This site has not been monitored for livestock use since that time.

Field visits in 2004 documented riparian tree and deergrass vegetation upstream near the mouth of Cottonwood Canyon. In 2009, vehicle use and livestock trailing were noted in Hewitt Canyon above the Byous Spring confluence. Forest Road 1902 is located in Hewitt Canyon and runs the full length, connecting with FR 172 in the upper reach.

Byous Spring. Byous Spring lies in an unnamed tributary to Hewitt Canyon just below the Forest Road 172 road crossing. The NWI delineates the 1.5 mile length of channel above the road originating at a spring as having riparian vegetation. Based on a field visit in 2004, only a

few scattered Goodding‟s willow trees occur in this reach. In 2009, riparian vegetation was documented in the one-half mile reach below FR 172 to Hewitt Canyon. There is a non-functioning concrete trough below the road, and an old, breached, rock wall dam, that extends up the ridge on either side of the channel (see photos). There are several old, decadent Fremont cottonwood trees below the road. The reach supports scattered cottonwood and Goodding‟s willow seedling, sapling, and pole-sized trees. Other riparian species include seep willow, rushes, cat-tail, canyon ragweed, rabbit-foot grass and burrobrush. The channel is intermittent, although the spring may maintain perennial flow in the channel below it. The channel is wide and shallow, and with large eroding banks and side slopes.

Millsite Canyon. Millsite Canyon is an approximately 5.75 mile long tributary to Hewitt Canyon located entirely within the Millsite Pasture. Millsite Canyon lies just west of, and parallel to, Hewitt Canyon, separated by the steep, rugged, volcanic Hewitt Ridge. To the north is the JF Ranch and Fraser Canyon.

The watershed of the upper four miles of Millsite Canyon is a narrow, steep-walled drainage. Forest Trail 237 follows, crosses, lies within and adjacent to Millsite Canyon for its four mile length above Quail Spring. The channel alternates from a “B” type where the valley is narrow to an “F” type where the valley is wider. The “B” reaches exhibit a step/pool sequence where the bedrock pools may support perennial water. The dominant sediment in these reaches is cobble/boulder with small finer sediment banks and floodplains that support riparian vegetation. The “F” reaches are wide and shallow with eroding stream banks, which, along with the road, are contributing large amounts of sediment to the channel.

Millsite Canyon

Most of the 1.5 miles of broadleaf deciduous riparian vegetation is found around springs in the upper four miles of Millsite Canyon and its unnamed tributary that contains Millsite Spring. Quail Spring, found at the confluence of Peacock Canyon, marks the lower end of riparian vegetation dominated by Fremont cottonwood and Goodding‟s willow. These two overstory species occur in isolated patches along Millsite Canyon and the unnamed tributary at Quail

Spring, Campsite Spring, Rattlesnake Spring, and Millsite Spring. Understory smaller trees and / or shrubs include desert hackberry, coyote willow, seep willow, salt cedar, mesquite, sugar sumac, hopbush, buttonbush, burrobrush, desert broom and algerida. The herbaceous component has very low species diversity and is dominated by non-native species. Bermuda grass, clover, rabbitfoot grass and a lovegrass have low cover, but are most common. Deergrass, yellow monkey flower, cattail, evening primrose, a nutsedge, and a rush were observed with very low densities in upper Millsite Canyon.

The flow regime associated with this riparian vegetation includes perennial springs drying to intermittent reaches. The riparian vegetation of the intermittent reaches varies from forested to shrub dominated, reflecting the continuum from year-round subsurface flows, to much drier regimes. Between these patches of riparian vegetation, the channel transitions from an intermittent to ephemeral flow regime.

Field notes from 1999 indicate that cattle were present throughout the canyon, as well as recreational and vehicle impacts. Notes indicated that there were no seedling or sapling riparian trees present or perennial grasses. Field notes from 2003 indicate presence of cattle at Quail Spring, but no use was observed upstream. Based on a 2009 field visit, there has been an increase in the density of young riparian trees and shrubs. The species diversity and cover of the herbaceous component remains low, although, similar to the overstory cover has increased since 2003.

Roblas Canyon. Similar to other drainages in the Millsite allotment, Roblas Canyon trends from northeast to southwest to its confluence with Queen Creek. It originates below Montana Mountain. Its headwaters lie within the Superior Allotment. All of the 5.6 miles of Roblas Canyon in the Bear Tank and Hewitt Pastures are shown by the NWI maps as intermittent. Field visits in 1998 and 2009 describe very low cover and density of obligate riparian vegetation. In 1998, the monitored reach, went upstream one mile from Roblas Windmill to just below the canyon section. Seep willow and burrobrush, unpalatable shrub species was the most notable riparian vegetation. One deergrass plant was observed. Field notes document cattle and high use of mesquite pods.

In 2009, Roblas Canyon was accessed from the upper end of the pasture below the Preston Well. The well and improvements were not maintained and nonfunctional. The channel was incised and alternated between a wide, shallow “F” and a narrower “B” where more confined by bedrock. The “B” reaches displayed step/pool features and soil banks that supported deergrass. Desert hackberry, seep willow, desert broom and deergrass were present. One dead sapling cottonwood was observed. Use of riparian vegetation was light. Livestock trailing was noted on the adjacent terraces above the stream and the soil banks were highly trampled. Use was very high on the adjacent upland area in the mesquite bosque.

Bear Tank Spring. Bear Tank Spring provides water to an unnamed tributary of Bear Tank Canyon in the southeastern corner of the Bear Tank Pasture. Little has changed at Bear Tank Spring from previous visits. The channel is downcut to bedrock and cattle continue to water at the bedrock pools that always seem to hold surface water.

Bear Tank Spring

The end of a buried pipe is exposed below the tanks, but no other development exists. The floodplain consists of rock and cropped Bermuda grass. There is one, dying, Goodding‟s willow. Other plants present include fountain grass, seep willow, mesquite, petunia, rabbit-foot grass, clover, desert broom and wolfberry. There was one cattail plant and two browsed, small willow seedlings. Cattle sign was present in the channel and on the terrace immediately adjacent. There are plans to fence this spring, but it will remain a key reach until that time.

Environmental Consequences Stream Channel and Riparian Areas

Riparian areas have ecological importance beyond their small percentage of land area. This percentage is even smaller in the arid southwestern United States, and inversely, their importance more critical. Although volumes of literature have been written on riparian systems in the southwest, little actual research has been accomplished (Milchunas 2006). The limited research available shows that grazing has greater effects on southwestern riparian understory plant communities than adjacent upland plant communities. Southwestern riparian plant communities are more sensitive to livestock grazing and more likely to experience reductions in plant species diversity, than plant communities that evolved with ungulate grazing (Milchunas 2006). Clary and Kruse (2003) concur that southwestern riparian systems have not had the intensive study that other regional riparian ecosystems have had. In their review of environmental impacts, management practices and management implications for Southwestern riparian areas, they state the necessity to rely on proven principles and practices from other similar riparian areas to fill the gaps in management applications in the Southwest.

Direct Effects. Riparian areas, with their high species diversity and structural complexity, provide critical terrestrial and aquatic habitat to wildlife species from adjacent upland and riparian area environments. Cattle tend to congregate in many riparian areas. They favor riparian forage and water availability, shade in warm months, and gentle topography. Excessive grazing, trampling and trailing impacts can destabilize and break down stream banks, cause mechanical damage to shrubs and small trees, reduce or eliminate woody seedlings and saplings, expose soils, eliminate or shift native herbaceous species to weedy or exotic species with

reduced root systems, and cause widening or incision of stream channels (Trimble and Mendel 1995, Clary and Kruse 2003). These changes may lead to loss of stream stability and function (Rosgen 1996). Stream channel profile, stream bank stability, streamside vegetation, channel bottom embeddedness, stream sediments, and stream temperature are all aquatic species habitat features that can be directly or indirectly affected by livestock grazing practices. Maintaining native obligate riparian plants is extremely important to many streams because of their resistance to the erosive energy of flowing water (Clary and Kruse 2003). Herbaceous riparian vegetation is especially important to stabilizing stream bank, point bar and floodplain deposits. Development of these features is critical to the channel restoration process (Clary and Kruse 2003). One of the most important factors influencing riparian conditions is utilization (Mosley et al 1999, Clary and Kruse 2003).

Indirect effects. Stream channels and riparian areas can also be affected indirectly by watershed condition and/or stream channel conditions above and below the stream reach of interest. Soil compaction, decreased infiltration, and loss or alteration of upland vegetation can cause increased runoff and higher peak flows, leading to channel adjustments and decrease in stream function (Gori and Backer 1995).

All of the surveyed stream channels and riparian areas on the Millsite Allotment have been assessed as either impaired or unstable condition (Mason and Johnson 1999), or functioning-at-risk or non-functioning (Barrett et al 1993). It is commonly believed that riparian areas have high inherent potential for recovery from disturbance (Milchunas 2006). Both the potential and the time frames required for recovery are dependent on existing condition of the watershed, stream channel, and riparian area (flow regime, channel gradient, dominant channel substrate, watershed area, and type and extent of riparian vegetation), future management, climate, and natural disturbances (Clary and Kruse 2003; Kindschy 1987, 1994). Clary and Webster (1989) recommend that grazing riparian areas in early seral condition be deferred until riparian vegetation re-establishes and ecological status improves.

For the riparian areas and stream channels within the Millsite allotment, recovery and attainment of desired conditions will depend primarily on the effectiveness of the mitigation measures. These measures are listing under Riparian Management, Mitigation, and Monitoring in Chapter 2 (pp. 20 - 21).

Cumulative Effects Common to All Alternatives. The existing condition of streams and riparian areas on the Millsite allotment is the result of the cumulative effects of historic and recent management, natural disturbances, and the interaction between these two agents of change. All of the surveyed stream channels and riparian areas on the Millsite Allotment are in impaired or unstable condition (Mason and Johnson 1999). The primary cause is likely historic grazing. The allotment has been grazed for over 100 years. The 2210 range files document historic overuse of the uplands and concentrated use in the stream bottoms, especially Randolph, Red Tanks, Fraser, Rogers, Bear Tanks, and Hewitt Canyon. Other land uses that have impacted streams and riparian areas on the allotment include off-highway vehicle use, illegal roads and trails, and lack of road maintenance. However, livestock grazing has affected more area within the allotment.

Climate change presents additional considerations. According to the Arizona Department of Water Resources (2009), Arizona is entering its second decade of a statewide drought, which has likely had an effect on the Millsite Allotment. According to NOAA National Climatic Data Center data, there has been a marked upward trend in the globally averaged annual mean surface

temperature since the mid-1970s (Shein 2006). Models used by Seager et al. (2007) to predict how climate change will affect the southwestern United States indicate that this region has begun the transition to a dryer climate which will continue into the 21st century. However, the models are too broad-scale to predict how climate change might affect the monsoons, which contribute 40% of the total annual precipitation received on the Tonto National Forest (Lenart 2005).

Water quality should be protected by implementation of Best Management Practices and Mitigation Measures.

Alternative 1 - No Grazing. The permit would be canceled and cattle would be removed over a five year period.

Direct Effects. Under this alternative the direct effects of grazing would be eliminated and bulrush would be re-introduced optimizing the potential for recovery of stream channels and riparian areas on the Millsite allotment (Clary and Kruse 2003). The potentials for and rates of recovery are variable and difficult to predict. The most rapid recovery can be expected in small watersheds with perennial surface or subsurface flow, an existing source of native riparian herbaceous and woody vegetation, and availability of fine sediments. Recovery of larger watersheds and stream channels usually requires a much longer time frame.

Indirect Effects. According to the Soils Existing Condition and Environmental Consequences report, soils within the allotment are mostly in satisfactory condition. For those areas with soils in impaired and unsatisfactory condition, the No Grazing Alternative usually provides the most rapid increase of upland vegetative cover, shifts in species diversity, and improvement of soil condition.

Cumulative Effects. The potentials and rates of recovery would vary by key reach. With increasing watershed size, the cumulative effects of historic, recent, and on-going management activities, along with altered flood regimes make it difficult to predict whether eliminating the direct effects of cattle grazing would allow riparian vegetation recovery. Where there is potential for recovery of riparian vegetation, eliminating the direct and indirect effects of livestock grazing should allow the most rapid rates of recovery.

Consistency with the Tonto National Forest Plan. The No Grazing Alternative eliminates the direct and indirect effects of cattle grazing to recovering stream channels, riparian areas, and watersheds within the Millsite allotment. With the introduction of bulrush into channels lacking critical native vegetation, this alternative meets the intent of riparian area direction to protect, manage, and restore riparian areas.

Alternative 2 – Current Management, with mitigation measures. This alternative proposes to continue grazing under the current two units; three pasture deferred rotation grazing system. Pasture use would be deferred to decrease duration within each pasture (~ 3 months). Pastures would likely be used more than once annually. New improvements would include five water developments to improve distribution and an exclosure around Bear Tank Spring.

Direct Effects. Under this alternative, livestock would be allowed to continue to regraze pastures within the same year. It is difficult to analyze the effects of this practice because there is currently no data documenting the effects of past regrazing. As such, it is not feasible to speculate how future regrazing provisions would impact riparian resources in this area. The direct effects of regrazing riparian areas are considered to be adverse.

Bear Tank Spring would be fenced within five years. If the potential for recovery of the riparian vegetation and stream channel remain the same during this period, its potential for recovery would be the same as described in Alternative 1.

This alternative proposes to minimize the direct effects of grazing to riparian areas and stream channels through implementation of riparian mitigation measures. Each of the mitigation measures is discussed in turn.

Burro Basin is the only key reach within the Millsite allotment where, given the existing density and cover of deergrass plants, the riparian utilization protocol is considered to be an effective mitigation measure.

For the rest of the key reaches on the allotment, the deergrass plant distribution is very patchy and densities very low, and riparian tree seedling density is low. Densities for both vegetation types are too low for the riparian utilization protocol to be valid. Therefore, until the density of vegetation increases, a 100 percent survey would be conducted in each key reach to monitor utilization levels. Monitoring would also take place at mid season and use levels would be lowered to less than or equal to 30 percent. Monitoring at mid season would allow for early intervention if it is necessary. If use is consistently above utilization limits, optional management to protect riparian areas may include adjusting numbers, fencing riparian areas, and/or changing management prescriptions. Implementation of these measures should allow for riparian vegetation and stream channel recovery.

Once enough riparian vegetation has become re-established in the key reaches, the riparian utilization protocol could then be used as a mitigation measure.

Eliminating trailing through riparian areas is vital to maintaining and/or improving the riparian vegetation and stream channel condition. Limiting trailing impacts may be difficult to achieve in places like lower Millsite, Fraser, Randolph, and Hewitt Canyons and below Byous Spring where the valleys are narrow and side slopes steep.

Alternative waters would be provided in the Woodbury, Red Tanks, Millsite, Bear Tank, Hewitt, and Cottonwood pastures to improve distribution. The addition of alternative waters may draw some cattle away from riparian areas but does not ensure that livestock‟s use of riparian areas would be incidental. The success that alternative waters may have in limiting livestock watering in riparian areas would primarily be a function of herd management, changing cattle behavior, season of use, topography, and forage availability near alternative waters.

The mitigation measure for Alternatives 2 and 4 is to **limit use to shorter duration, dormant season use in the Red Tanks pasture**. Dormant season use could eliminate or minimize use of riparian woody species. Generally, livestock will not browse riparian trees or shrubs once leaves have dropped during the winter and before they break bud in the spring. This period could be very brief at the low elevations in the Red Tanks pasture. Cattle will browse riparian trees and shrubs if other more palatable forage is not easily available. Herbaceous plants may remain palatable in these low elevation key reaches and would likely be grazed.

Re-introducing emergent species, like American bulrush, to sites with perennial surface or near-surface water, could be a critical step in riparian area and stream channel recovery. These plants have a high tolerance for grazing. Introduced plants may be able to persist at key reaches that are managed to a 6-8 inch stubble height. Their potential to expand in an area may be

affected by grazing use. Where bulrush re-introduction is successful, it should facilitate the rebuilding of stream banks. Recovery at grazed sites can be compared with recovery in the Bear Tank Spring exclosure.

Continued **Non-use in Rogers Canyon (North Woodbury pasture)** would continue to eliminate the direct effects of livestock use on riparian vegetation and the stream channel, allowing for the most rapid rate of vegetative response. Clary and Webster (1989) recommend that grazing riparian areas in early seral condition be deferred until riparian vegetation re-establishes and ecological status improves.

Indirect Effects. According to the Soils Existing Condition and Environmental Consequences report, the soils within the allotment are mostly in satisfactory condition. Grazing of uplands with impaired and unsatisfactory condition soils may slow the rates of upland recovery, indirectly slowing the rate of riparian area and stream channel recovery. If management prescriptions are followed and cattle are moved when use guidelines are met, the negative, indirect effects of grazing will be minimized.

Cumulative Effects. Dormant season use in the Red Tanks Pasture may provide for some additional recovery of woody riparian vegetation. Although the re-introduction of American bulrush is an important step toward restoring riparian areas, it is not likely to recover riparian area condition without effective management of livestock grazing. The mitigation measures, as discussed above, should be effective at limiting the adverse effects of grazing within the key reaches, allowing for vegetation and channel recovery, but at a slower rate than all other alternatives, due to regrazing in the same year.

Consistency with the Tonto National Forest Plan. If the mitigation measures discussed above are successful, this alternative should meet the intent of the Forest Plan direction to protect, manage, and restore riparian areas.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion. This alternative proposes to continue yearlong livestock grazing under a one unit; five pasture modified rest rotation grazing system. The Red Tanks pasture (8,367 acres) located in the northwestern portion of the allotment and entirely within the Superstition Wilderness, would be removed from the allotment"s designated acreage. New improvements would include three water developments to improve distribution and an exclosure around Bear Tank Spring.

Direct Effects. This alternative would immediately eliminate the direct effects of cattle grazing in the Red Tanks pasture, where five of the ten key reaches are located. The direct effects of eliminating grazing and re-introducing bulrush to the stream channels and riparian areas within these five key reaches would be the same as for Alternative 1. Bear Tank Spring would be fenced within five years. If the potential for recovery, of the riparian vegetation and stream channel, remain the same during this period, its potential for recovery would be the same as described in Alternative 1.

The adverse effects of regrazing in the same year would be eliminated for the remaining five pastures. A one unit; five pasture modified rest rotation grazing strategy would allow for deferment and periods of complete rest. Riparian area management would primarily be guided by the riparian mitigation measures, which are the same for all grazing alternatives. Neither the grazing strategy (deferred/rest rotation) nor the number of herds is as relevant to riparian area

management as implementation of the mitigation measures. The mitigation measures should allow for riparian vegetation recovery. Re-introduction of American bulrush is an important step toward restoring riparian areas, but is not likely to help recover riparian area condition without effective management of livestock grazing.

Indirect Effects. In the Red Tanks pasture, the indirect effects of this alternative would be the same as those written for the No Grazing alternative. For the remainder of the allotment, the indirect effects would be similar to those described in Alternative 2.

Cumulative Effects. For Bear Tanks Spring, Fraser Canyon, Randolph Spring, Randolph Canyon (above and below Dripping Spring) and Burro Basin, where livestock grazing will be eliminated, the cumulative effects would be the same as described under Alternative 1. For Hewitt Canyon, Byous Spring, Millsite Canyon and Roblas Canyon, the cumulative effects would be the same as for Alternative 2 except for those effects that would be eliminated because of the elimination of regrazing in the same year.

Consistency with the Tonto National Forest Plan. The discussion of Forest Plan consistency is the same as described under Alternative 1 for riparian areas where livestock grazing would be eliminated. For grazed riparian areas, it is the same as for Alternative 2.

Alternative 4 – Proposed Action. This alternative proposes to continue yearlong livestock grazing on the Millsite allotment using a "phase in" approach to move management from the current two units; three pasture rotation to a one unit; six pasture modified rest rotation grazing system. Under this alternative, the current grazing system would continue until all of the proposed improvements, have been installed (~ 5 years). New improvements would include five water developments to improve distribution and an exclosure around Bear Tank Spring.

Direct Effects. Under this alternative, the direct effects of grazing to riparian areas and stream channels would be the same as those discussed under Alternative 2, until all improvements are constructed and pastures are no longer regrazed in the same year. After this time, the direct effects would be the same as Alternative 3, except for the Red Tanks Pasture which is discussed below.

Following the implementation of the one unit; six pasture rotation system, the Red Tanks pasture would only be grazed once, every other year, and grazing would be limited to short duration (~ 2 months), dormant season use. The effects of dormant season grazing are discussed under Alternative 2. Dormant season use, every other year could eliminate or minimize use of riparian woody species, providing for recovery. Although the re-introduction of American bulrush is an important step toward restoring riparian areas, it is not likely to recover riparian area condition without effective management of livestock grazing.

Indirect Effects. Under this alternative, the indirect effects of grazing should be similar to those described for Alternative 2.

Cumulative Effects. The cumulative effects would be the same as described under Alternative 2 until all the planned EQIP improvements are constructed (except for the Red Tanks pasture). Once the improvements are completed, the grazing strategy would shift from a two herd deferred rotation to a one herd rest-rotation. The cumulative effects would then be the same as described under Alternative 3 (except for the Red Tanks pasture). For the Red Tanks pasture, the effects of

grazing would be reduced and the potential for recovery of woody riparian vegetation is increased, but would be slower than under Alternatives 1 and 3.

Consistency with the Tonto National Forest Plan. If the mitigation measures discussed above are successful, this alternative should meet the intent of the Forest Plan direction to protect, manage, and restore riparian areas.

Wildlife

Affected Environment

The various vegetation types found on the allotment support a variety of game and non-game species. Big game found on the allotment include: Desert bighorn sheep, black bear, mule deer, whitetail deer, and javelina. The whitetail inhabit the higher and more brushy areas, while the mule deer use the desert scrub and open chaparral vegetation types. Game birds found on the allotment include, Gambel"s quail, mourning dove, and white-winged dove. Predators such as coyotes, bobcats, and gray fox, are commonly found on the allotment, with mountain lion present, but to a lesser degree. Non-game species include a variety of birds, mammals, reptiles, and amphibians.

Availability of forage, and ground and canopy cover, are essential to sustaining wildlife populations, as is the availability of water. Wildlife not only use "live water" (perennial or intermittent streams), but depend on developed waters (dirt tanks, troughs), especially during times of drought.

Special Status Species are those given status by agencies responsible for managing plants, wildlife, and their associated habitat because of declines in the species" population or habitat. Birds are given provisions under the Migratory Bird Treaty Act. Special Status Species that occur, or have suitable habitat on the allotment and will be considered in this assessment are listed in Table 8 below. Effects to these species have been analyzed through a Biological Evaluation (BE), which is available in the project record (PR Vol. 3-W).

Suitable unoccupied habitat for the Southwestern willow flycatcher (SWFL) occurs within the Whitlow Ranch Flood Control Basin on Queen Creek (T1S, R11E, Section 32). In 2000, approximately .5 miles of fence was constructed to exclude livestock access from flycatcher habitat. Surveys conducted in 1994, 1996, 1998, 2006, and 2009 were unsuccessful in locating flycatchers (PR Vol. 2 – CC, MM; Vol. 3 – E). However, a territory was detected during a 2005 survey conducted by the Arizona Game and Fish Department (PR Vol. 3 – Y).

A population of approximately 150 Arizona hedgehog cacti (AHC) occurs in Roger"s Canyon in the North Woodbury pasture. This pasture was excluded from livestock use in 2000, for protection of the cactus (PR Vol. 2 – AA).

The District initiated consultation with the FWS, pursuant to Section 7 of the Endangered Species Act (16 U.S.C. 1531-1544), as amended, in regard to the effects of the proposed action, on Southwestern willow flycatcher (suitable, unoccupied habitat) and Arizona hedgehog cactus. The FWS concurred (AESO/SE 22410-2010-I-0083) with the Districts determination that the proposed action may affect, but is not likely to adversely affect the Arizona hedgehog cactus or suitable unoccupied habitat for the Southwestern willow flycatcher (PR Vol. 3 – U).

Table 8. Special Status Species

COMMON NAME	SCIENTIFIC NAME	STATUS
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered
Arizona Hedgehog Cactus	*Echinocereus triglochidiatus var. arizonicus*	Endangered
Lowland Leopard Frog	*Rana yavapaiensis*	Sensitive
Pima Indian Mallow	*Abutilon parishii*	Sensitive
Maricopa Tiger Beetle	*Cicindela oregona maricopa*	Sensitive
Greater Western Mastiff Bat	*Eumops perotis californicus*	Sensitive
Spotted Bat	*Euderma maculatum*	Sensitive
California Leaf-nosed Bat	*Macrotus californicus*	Sensitive
Gila Monster	*Heloderma suspectum*	Sensitive
Mapleleaf False Snapdragon	*Mabrya acerifolia*	Sensitive
Desert Bighorn Sheep	*Ovis Canadensis mexicana*	Sensitive
Sonoran Desert Tortoise	*Gopherus agassizii*	Sensitive

Threatened – Federally Listed as Endangered Under ESA
Sensitive – On Regional Forester"s Sensitive Species List (07/21/1999)

Management Indicator Species (MIS) were selected during the Forest planning process to adequately monitor implementation of project actions on wildlife habitat and species diversity. These indicator species reflect general habitat conditions or habitat components that are of value to these and other species with similar habitat needs. Habitats for a large number of the Forest MIS occur on the Millsite allotment. Surveys specific to this allotment are not available. Because most MIS are not rare species and the allotment contains a wide variety of vegetation types, it is assumed that at least some individuals of each MIS are present on the allotment. The MIS analyzed for this project are listed in Table 9. The MIS analysis is available in the Project Record (PR Vol. 3 – AA) and summarized below.

Executive Order 13186, January 10, 2001, directs federal agencies to support migratory bird conservation and to "ensure environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern". Important Bird Areas (IBA) are sites that provide essential habitat for one or more species of bird, including sites for breeding, wintering, and/or migrating birds. No designated IBA"s occur within the action area.

Environmental Effects of Livestock Grazing on Terrestrial and Aquatic Wildlife and/or Habitat

Livestock grazing can affect wildlife species or habitats in several ways. Presence of cattle can cause compaction of soils, which may result in increased runoff and reduced rainfall infiltration. Grazing may also reduce vegetation and litter cover. The maintenance of residual biomass, to ensure plant vigor and ground cover on grazed rangelands, is critical for wildlife habitat and watershed protection throughout the year. Resource recovery following periods of drought, appear to be promoted by the presence of litter that traps seeds and lowers evaporative losses (Milchunas, 2006). It is essential for managers and livestock permittees to recognize the importance of responding to drought through reduced stocking or de-stocking during drought. The Tonto Drought Policy will assist resource managers in minimizing livestock grazing impacts during drought.

Precipitation patterns are an important consideration for both long and short-term goals. Rainfall on the allotment varies and may be highly erratic both within and between years. Growing seasons on the allotment tend to be bimodal.

Riparian and wetland communities represent a very small percentage of the land area in the southwest but are areas of high plant and animal diversity and productivity (Milchunas 2006). Riparian areas and wetlands provide water and cover to animals that may be more associated with adjacent upland communities, including livestock, as well as many species that are riparian obligate species for all or part of their life cycles. These areas are probably more important to animals associated with uplands in arid and semiarid regions because of the refuge they provide from the harsh environment. Livestock grazing in riparian areas has the potential to reduce the establishment of seedling riparian obligate woody species, thus affecting the age class and vertical structure of riparian areas (Kauffman and Krueger 1984). Streamside vegetation is an important component in the establishment of bank formation and channel morphology, as well as reducing sediment load from upland erosion. There is potential for these productive areas to be impacted by livestock to a relatively greater degree than adjacent, less productive upland communities, however, there is also the potential for more rapid recovery (Milchunas 2006).

Direct Effects. Riparian and upland areas provide important terrestrial and aquatic habitat to wildlife species. Excessive grazing and trampling impacts destabilize and break down stream banks which results in negative effects to aquatic wildlife. These effects may be realized through modification of stream morphology and function, increased siltation, and reduction of woody and herbaceous vegetation. During scouring floods, fish populations are more vulnerable to removal without stable banks and associated vegetation in place.

Congregation of livestock and livestock management practices such as herding, may have direct effects to wildlife and/or habitat. Effects may include removal of vegetation, dust accumulation, noise, avoidance areas, and soil compaction. Upland vegetation density and composition may be reduced if livestock grazing and associated activities are not managed to reduce or minimize such affects.

Livestock grazing can directly affect fisheries and wildlife by altering riparian and upland soils and vegetation composition, density and structure, water quality, quantity, temperature and flow patterns, shape and form of the stream channel, and aquatic and terrestrial faunal assemblage composition (Kauffman and Krueger 1984, Fleischner 1994, Trimble and Mendel 1995, Belsky et al. 1999). One of the most important factors influencing riparian conditions is utilization (Mosley et al 1999, Clary and Kruse 2003).

Indirect Effects. Congregation of livestock (herding, stock tank areas, trailering, loading/unloading, maintenance of livestock facilities, branding) may have indirect effects to wildlife or associated habitat when considering grazing alternatives. Effects may include removal of vegetation, dust accumulation, noise, avoidance areas, soil compaction, and watershed effects. Impacts may vary depending upon circumstances associated with the indirect effects. For the most part, effects associated with congregation of livestock are primarily within the uplands.

Hoof action by livestock can impact soils through compaction, especially when soils are wet. Compacted soils in the uplands have lower rates of water infiltration and may result in increased runoff and soil loss resulting in indirect negative effects to riparian aquatic and terrestrial

species. As a result, wildlife habitat components may be affected by increased runoff and soil loss, especially if riparian and upland conditions are not properly functioning (PR Vol. 3 – M).

Utilization of woody and herbaceous vegetation by livestock may result in increased stream temperatures, reduced ground cover and organic litter, which may indirectly affect aquatic and terrestrial wildlife through increased surface runoff and potentially reducing the establishment of additional vegetative cover in the uplands and riparian areas. In addition, habitat available to prey species in the uplands and riparian area may be reduced by livestock grazing, resulting in reduced numbers of prey species and/or increased predation upon those species. Water quality may also be indirectly affected by livestock use in the uplands as a result of decreased infiltration of surface water and livestock fecal accumulation.

Cumulative Effects Common to Grazing Alternatives. Cumulative effects include the direct and indirect effects of the proposed action and alternatives when added to all past, present, and reasonably foreseeable future actions.

Congregation of livestock (herding, stock tank areas, trailering, loading/unloading, maintenance of livestock facilities, branding) may contribute to cumulative effects to wildlife or associated habitat, when considering grazing alternatives. Effects may include removal of vegetation, dust accumulation, noise, avoidance areas, soil compaction, and watershed effects. Impacts may vary depending upon circumstances associated with the cumulative effects. For the most part, effects associated with congregation of livestock are primarily within the uplands.

Cumulative Effects Common to All Alternatives. Motorized and non-motorized recreation, and illegal cross country travel, negatively impact wildlife resources and or habitat through removal, destruction or degradation of herbaceous/woody vegetation and aquatic emergent vegetation and associated stream habitats. Traffic impacts to wildlife may be realized by avoidance of the area by some wildlife due to dust and/or presence of vehicles and people, wildlife/vehicle collisions, and poaching from vehicles. Secondary roads may have similar impacts to wildlife, although traffic volume and speed would generally be lower, impacts to wildlife will still exist but at reduced levels.

Illegal cross country travel also has negative effects to wildlife and habitat through proliferation of wildcat trails, use of motor vehicles through washes, riparian corridors, and uplands. Wildlife habitat becomes fragmented and often damaged for the long term, as a result of illegal, cross country, motorized travel.

In general, the presence of people and associated noise and disturbance of habitat in dispersed areas and on non-motorized trails has negative effects on wildlife. Impacts to wildlife include; total avoidance of areas that regularly receive high recreational use, habitat destruction or modification, and avoidance of critical riparian areas where year-round recreation use occurs.

Maintenance of roads and trails may also have a temporary negative effect on wildlife. Workers, heavy equipment, and noise may lead to wildlife avoidance during maintenance activities. On the Millsite allotment, road maintenance affects to wildlife are expected to be minimal due to the infrequent maintenance cycle (biannually) of FR 172 and FR 650, which are the only maintained roads on the allotment.

Wildfire and suppression activities also negatively affect wildlife and associated habitat by direct loss of habitat to fire or suppression activities (brush removal, line construction, black-line

construction, aerial application of retardant, drafting from streams), and indirect effects such as fire support aircraft noise, sedimentation in aquatic systems and avoidance of areas with fire suppression activities.

Recreational shooting also has negative impacts on wildlife as a result of noise and the presence of people. Trash and debris shooters often leave behind may pose hazards to wildlife and actually attract other shooters, due to available target material. Hunting may have negative impacts on wildlife including; high concentrations of hunters, illegal off-road travel, littering, increased presence of people/vehicles, and poaching.

Consistency with the Forest Plan
Direction for managing wildlife resources and habitats on the Tonto National Forest is found in the Tonto Forest Plan (USDA 1985, 1996).

- The Tonto National Forest Plan recognizes the need for wildlife/fish habitat improvement. Management direction is to: "recognize wildlife and fish habitat elements in all resource planning and management activities to assure coordination that provides for species diversity and greater wildlife and fish populations through improvement of habitat. Ensure that fish and wildlife habitats are managed to maintain viable populations of native vertebrate species. Improve habitat for selected species."

- The management prescription for Management Area 3I states "Manage for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed so as to improve them to a satisfactory or better condition. Improve and manage the included riparian areas to benefit riparian dependent resources.

- The management prescription for Management Area 3B (Wilderness) states "manage for wilderness values, wildlife habitats, and natural ecological processes while allowing livestock grazing and recreation opportunities that are compatible with maintaining these values and processes" (pg. 94).

Environmental Consequences by Alternative

Criteria used to evaluate alternatives. The alternatives are contrasted based on the likelihood of riparian vegetation, and stream channels in the key reaches, attaining the short and long-term desired conditions described in Chapter 1. Threatened, endangered, sensitive, and management indicator species that require riparian and aquatic environments would respond to changes in riparian and aquatic habitats. Similarly, each alternative, and its effects on wildlife species, will be evaluated based on the attainment of short and long-term goals, described in the Soils/Vegetation desired conditions section of this EA. Watershed affects from upland and riparian areas will have either positive or negative impacts to aquatic and terrestrial wildlife species. Short-term desired conditions limit the annual impacts of livestock grazing. Long-term desired condition is measured through effectiveness monitoring. Although upland livestock use levels, and associated wildlife habitat are important to wildlife; riparian and aquatic habitat condition is of higher value due to limited habitat availability and the importance of that habitat to threatened, endangered, and sensitive wildlife and management indicator species (PR Vol. 3 – AA).

Table 9: Tonto National Forest Management Indicator Species for the Millsite Allotment Analysis Area (Eight species).

Habitat Type	Reason for Selection
Chaparral	
Rufous-sided (spotted) towhee	Shrub density
Black-chinned sparrow	Shrub diversity
Desert Grassland	
Horned lark	Vegetation aspect
Savannah sparrow	Grass species diversity
Desert Scrub	
Black-throated sparrow	Shrub diversity
Brown (canyon) Towhee	Ground cover
Riparian (low & high elevation)	
Bell‟s vireo	Well-developed understory
Common black hawk	Riparian streamside

Alternative 1 – No Grazing

Direct and Indirect Effects. The most rapid rates of riparian recovery, from past grazing impacts, normally occur with complete protection from grazing (Clary and Kruse 2003). Riparian areas are generally regarded as having high inherent potential for recovery from disturbance (Milchunas 2006). The potential for recovery is highly variable, dependent on biotic and abiotic factors, including flow regime, channel gradient, dominant channel substrate, past disturbance history, watershed area, and cover and diversity of riparian vegetation (Kindschy 1987).

General Wildlife. With discontinuation of grazing, wildlife habitat conditions would improve. Improvements in the aquatic and riparian habitat would likely occur more rapidly, as compared to the other alternatives. Riparian areas would continue to recover from past grazing. Recruitment of woody and herbaceous riparian species, including deergrass, would increase. It is expected that, over time, structural and age class diversity in riparian areas would improve resulting in increased potential for riparian dependent wildlife species to occur on the allotment.

With the exclusion of livestock grazing, it is expected that, herbaceous plant vigor and diversity in upland key areas, overall watershed and soil conditions across the allotment would continue to improve. Upland habitat for game species such as deer and javelina would generally increase in vigor and density. Small game and non-game species would generally increase over time with an increase in herbaceous cover and probable increase in grass species diversity. Improvements in these resource conditions would be expected to occur more quickly than they would under implementation of any of the grazing alternatives.

One effect of the no grazing alternative to wildlife would be the removal or lack of maintenance of water developments. Developments such as dirt stock tanks, developed springs, and troughs that provide water to livestock also provide water to wildlife. Livestock permittees are responsible for the majority of the cost in developing watering facilities and their maintenance. Under the no grazing alternative, these improvements would likely fall into disrepair. Wildlife

using these waters may have become dependent on them, and these individuals may suffer from declines.

Management Indicator Species. Habitat conditions for these species would be expected to improve with cessation of livestock grazing on the allotment. With an improvement in soil and vegetation condition, increases in high-quality wildlife habitat would likely occur, over time, in all life zones. Improvements to terrestrial habitat are as described under the General Wildlife discussion above. The elimination of livestock from stream courses should result in overall improvements in water quality. As compared to the grazing alternatives, an improvement in water quality and aquatic conditions is anticipated with the elimination of bank trampling and trailing from livestock in riparian areas. Recreational impacts present in many riparian areas and the existing road network will continue to have site-specific detrimental impacts to water quality.

TES Species. The „No Grazing" alternative would result in a "No Effect" determination for suitable/unoccupied SWFL habitat and AHC, as no livestock grazing or livestock management activities would occur within or near their respective habitats. This alternative would promote improved riparian habitat, water quality, aquatic habitat, and upland conditions. Although other factors such as; flooding regime, drought, and recreational impacts play a role in the quality of the habitat for species on the allotment, it is anticipated that removal of grazing from these areas would result in greater improvement of upland and riparian areas to that of the other alternatives. Potential habitat for threatened or endangered species (TES) should improve, which may lead to the establishment of suitable habitat for species. General habitat conditions for sensitive species would also improve with discontinuation of livestock grazing.

Implementation of the „No Grazing" alternative would provide the greatest benefit to TES/Special Status Species, MIS, and general wildlife species. All wildlife populations in the area, including threatened, endangered, and sensitive species dependant on riparian habitat would benefit from improved habitat conditions.

Implementation of Alternative 1 would begin to reverse some of the impacts resulting from past overgrazing practices on allotment.

Cumulative Effects. Actions occurring, or those that may occur, in the project area that may impact wildlife resources or habitats include: motorized and non-motorized recreation, illegal cross country motorized travel, high traffic areas, equestrian use, road maintenance, wildfire and suppression activities, mining, recreational shooting, hunting, presence of people and associated noise and disturbance.

Removal of livestock grazing would reduce impacts to upland and riparian resources and associated species. Riparian resources would likely improve to a greater degree even within the context of other recreational activities that occur within the area. Riparian canopy cover, stream banks, vegetative cover in the uplands and riparian areas would improve under this alternative. Additionally, soil compaction and watershed effects would be reduced under this alternative.

Alternative 2 – Current Management

Direct and Indirect Effects. This alternative would provide the least amount, and slowest recovery of riparian and upland habitat, due to no pasture rest, inadequate deferment, and continual reuse of pastures.

General Wildlife. If authorized numbers remain low, the proposed water developments are installed and intensive management and monitoring ensures adequate distribution; riparian and upland habitat for game and non-game species would likely remain stable, or improve slightly. Short duration, dormant season use of the Red Tanks pasture would likely improve habitat within that pasture. Continued non-use of the North Woodbury pasture would improve riparian and upland habitat in Rogers Canyon. Effects in this pasture would be the same as under alternative 1. Additional water sources would likely benefit wildlife. The installation of a pipe-rail fence around Bear Tank spring would likely improve riparian habitat critical for wildlife.

Management Indicator Species. Habitat conditions for riparian species (Bell's vireo and common black hawk) could show a slight increase in the Red Tanks pasture. Through adaptive management, monitoring, and mitigation measures to minimize the effects of reusing pastures annually, MIS species could experience slight habitat gain, however to a lesser degree than Alternatives 1, 3, or 4. Habitat conditions in the North Woodbury pasture would continue to improve through non-use.

TES Species. Through adaptive management, monitoring, and mitigation measures to minimize the effects of reusing pastures annually, habitat for TES species would likely remain stable or increase slightly, but to a lesser degree than Alternative 1, 3, or 4.

Southwestern Willow Flycatcher – Habitat would continue to be protected through continued exclusion. Without pasture rest and reuse of pastures, upland vegetation and soils of pastures adjacent to Whitlow Ranch Flood Control Basin (Hewitt and Millsite pastures), would not improve as rapidly, or to the degree that they would under Alternative 1 or the other grazing alternatives. Inappropriate grazing of uplands can indirectly affect flycatcher habitat in the watershed. Impacts of inappropriate grazing include removal of vegetation cover which, in addition to compaction, decreases infiltration of the soil and enhances surface runoff. Increased runoff in turn results in increased silt loads, increased turbidity, decreased water quality, increased scouring during high flows, and altered pH levels. All of these impacts can have an indirect adverse effect to riparian areas, including flycatcher habitat (USFS 2005).

Arizona Hedgehog Cactus – The effects of livestock grazing on the Arizona hedgehog cactus are limited primarily to trampling effects. This species tends to grow on steep slopes between granite boulders in areas inaccessible to livestock, but there are some plants that grow in areas where livestock graze. These are the areas of concern for this species. Of the plants found on the Millsite Allotment, more than 95% were in areas inaccessible to livestock. The species is currently only known to occur in the North Woodbury pasture; which would remain in non-use for all proposed grazing alternatives.

Lowland Leopard Frog – Lowland leopard frogs have been recorded in two locations on the allotment; Benson Spring and Rogers Canyon. Benson Spring is excluded (pipe-rail fence) from livestock use, and Roger's Canyon, within the North Woodbury pasture would continue to be excluded from livestock use. Although leopard frogs have only been recorded at these two locations, this species likely occurs within other riparian areas on the allotment. Although the addition of water developments would provide alternate water sources away from riparian areas, no rest, or adequate deferment, would likely limit the amount of riparian recovery. The proposed pipe-rail fence at Bear Tank spring would provide for improvement in riparian habitat.

Pima Indian Mallow – Habitat exists within Rogers Canyon (Superstition Wilderness) in the North Woodbury pasture, however, no formal surveys have been conducted, and this species has not been identified on the allotment. Many of these plants occur in areas inaccessible to livestock and would be unaffected by livestock grazing. Plants found in areas outside of the allotment are generally on steep hillslopes that are not heavily grazed by livestock (Klein et al 2002). Due to this species rarity on the Mesa Ranger District, inaccessibility to livestock, and continued exclusion of the North Woodbury pasture, the effects of all alternatives would be the same.

Maricopa Tiger Beetle - The Maricopa tiger beetle typically inhabits drier desert regions, where it is restricted to the edges of running streams or reservoirs with banks that consist of sand and mud. Maricopa tiger beetles have not been documented on the Millsite Allotment, but may occur in springs and perennial pools in riparian drainages. No formal surveys have been completed. Threats to Maricopa tiger beetles include lowering of the water table and long-term desiccation of stream habitats. All terrain vehicles and grazing can also damage habitat and/or kill individuals, and these activities are particularly damaging to larval habitat. Flash floods can scour available habitats, but individuals are often able to quickly disperse to other suitable habitats (Pearson et al. 2006). This grazing alternative would provide the least amount of protection for riparian habitats; therefore, the least amount of recovery would occur.

Great Western Mastiff Bat – This species is found in lower and upper Sonoran desertscrub near cliffs, preferring rugged rocky canyons with abundant crevices. They prefer crowding into tight crevices a foot or more deep and two inches or more wide. Colonies prefer crevices even deeper, to ten or more feet. Entrances to roost crevices are usually horizontal but facing downward. These bats regularly use roosts allowing them a vertical drop of ten or more feet. Elevation ranges from 240 – 8,475 ft., but are most commonly found at elevations below 4,000 feet (AGFD 2002). No roost sites have been identified and no formal surveys have been completed within the project area. Habitat for this species can be found in the cliffs and crevices throughout the Superstition Mountains and the Millsite allotment, particularly areas within the Red Tanks and North Woodbury pastures. There are no known threats to this species resulting from livestock grazing. Roost sites are generally in cliffs, which are inaccessible to livestock. This species feeds on flying insects, whose numbers are not influenced by livestock grazing or are increased as a result of livestock being present. The effects of all grazing alternatives would be the same.

Spotted Bat – Spotted bats are generally found in dry, rough desertscrub, or ponderosa pine forest. It has been found from low desert in southwestern Arizona to high desert and riparian habitats in northwestern Arizona and Utah. It has also been found in conifer and spruce-fir habitats. It is believed to be an elevational migrant. Although roost site characteristics are poorly known, limited observations suggest that they prefer to roost singly in crevices and cracks in cliff faces. Cliffs and water sources are characteristic of localities where they occur. Habitat for this species occurs throughout the Superstition Mountains and the Millsite allotment on cliff faces with crevices and cracks for roosting, particularly areas within the Red Tanks and North Woodbury pastures (AGFD 2003). Due to this species inaccessibility to livestock, and continued exclusion of the North Woodbury pasture, the effects of all grazing alternatives would be the same.

California Leaf-Nosed Bat – In Arizona, California leaf-nosed bats are year-round residents that do not migrate, though individuals may occupy different roost sites during the year. Day roosts are in mines and caves that have large areas of ceiling and flying space. Roosts are usually within eighty feet of the entrance of the mine or cave. Night roost sites include buildings, bridges, porches, and mines. Population trends of California leaf-nosed bats are unknown. The primary concern for this species is abandonment of roosts and reduced numbers of individuals as a result of human disturbance, habitat loss, degradation, and/or fragmentation (AGFD 2001). Habitat for this species exists throughout the Superstition Mountains. No threats to this species exist as a result of livestock grazing; and roost sites are generally inaccessible to livestock. The effects of all alternatives would be the same.

Gila Monster – In Arizona, Gila monsters occur primarily in the Sonoran Desert, as well as in extreme western portions of the Mohave Desert. Gila monsters are most commonly found above the flats in wetter palo verde-saguaro desert scrub, rocky foothills, bajadas, and canyons. The species occurs less frequently in desert grassland, and they are rare in oak woodlands, but are known to occur at elevations up to 5,500 feet (AGFD 2002, TNF 2000). Potential habitat occurs throughout the allotment, and individuals are known to occur within the project area. Conservative utilization levels, included in all grazing alternatives, are anticipated to maintain or improve habitat for this species. However, habitat improvement under this alternative would not occur as rapidly as under Alternatives 1, 3, and 4.

Mapleleaf False Snapdragon – The maple leaf false snapdragon is a small, perennial vine/forb that produces greenish-white flowers. The mat forming plants grow trailing on the ground to a length of about 10 inches. Geographic distribution of the maple leaf false snapdragon is very restricted as the species is only known to occur in Pinal, Maricopa, and Gila Counties, Arizona. This species is a narrow endemic that has specific habitat requirements because it only grows on rock overhangs, shaded cliffs, and rock ledges from 1,800 to 3,350 feet elevation. Potential habitat for this species occurs throughout portions of the allotment, however, due to its habitat requirements, is inaccessible to livestock. The effects of all alternatives would be the same.

Desert Bighorn Sheep – In 1985, the Arizona Game and Fish Department (AGFD) introduced Desert bighorn sheep into game unit 24B, which encompasses the Millsite allotment. Since that time, aerial population surveys have been conducted every three years. Currently, the population is estimated to include 30 – 40 sheep, with the core herd using portions of the Millsite, Red Tanks, Cottonwood, and Bear Tank pastures (Pers. Comm. Dana McGehee AGFD). With population numbers relatively stable, AGFD has issued one game tag annually, within this game unit, for the past seven years. Competition for forage resources is minimal as Desert bighorn sheep prefer steep, rocky habitat as opposed to the flatter areas (< 40% slope) used by domestic livestock. Sheep and cattle may use the same water sources; however it is likely that sheep would use waters inaccessible to livestock. Additionally, the proposed water developments would provide water for livestock outside of riparian areas; improving habitat for all species including bighorn sheep. Habitat improvement, primarily riparian, under this alternative would not occur as rapidly as under Alternatives 1, 3, and 4.

Sonoran Desert Tortoise – The Sonoran population of desert tortoise primarily inhabits rocky slopes and bajadas of Mojave and Sonoran desertscrub habitats throughout much of southern and western Arizona at elevations ranging from about 500 to 5,300 feet (AGFD 2001c, Van Devender 2002). Sonoran Desert tortoises have been documented as occurring on the allotment,

and suitable habitat does exist. Although desert tortoises preferred rocky, boulder-covered hills and mountains, their forage areas may overlap with areas used by livestock. Therefore, the potential exists for competition for forage between tortoises and livestock; however conservative utilization levels are expected to provide adequate forage for both. Habitat improvement, primarily riparian, under this alternative would not occur as rapidly as under Alternatives 1, 3, and 4.

Cumulative Effects. Based on effects to potential and/or occupied habitat for the aforementioned species, this alternative is unlikely to affect individuals or population viability. Riparian canopy cover, stream banks, vegetative cover in the uplands and riparian areas, soil condition, and watershed effects would improve under this alternative, although at a slower rate than Alternatives 1, 3, or 4.

Wildlife would continue to be disturbed by a variety of human activities in the area. This may increase as the greater Phoenix population continues to grow.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion

Direct and Indirect Effects. Riparian and upland habitat improvement for the Red Tanks pasture would be the same as was described under Alternative 1 (No grazing). Through immediate implementation of a modified rest-rotation grazing strategy for the remaining 5 pastures, improvement in upland and riparian would be expected to occur at a rate greater than Alternative 2, but more slowly than Alternative 1. The North Woodbury pasture would remain in non-use, therefore, upland and riparian habitat improvement will be the same as Alternative 1.

General Wildlife. Development of a modified rest-rotation grazing system, adaptive management, installation of proposed improvements, implementation of mitigation measures and monitoring; riparian and upland habitat for game and non-game species would improve. Continued non-use of the North Woodbury pasture would improve riparian and upland habitat within that pasture. Effects in this pasture would be the same as under alternative 1. Additional water sources would likely benefit wildlife. The installation of a pipe-rail fence around Bear Tank spring would likely improve riparian habitat critical for wildlife.

Management Indicator Species. Improvement in riparian and upland MIS species habitat in the Red Tanks pasture and the North Woodbury pasture would be the same as under Alternative 1. Through adaptive management, installation of proposed improvements, implementation of mitigation measures and monitoring; riparian and upland habitat for selected MIS species would improve.

TES Species. Through implementation of a modified rest-rotation system of management, adaptive management principles, monitoring, mitigation measures, and proposed improvements; habitat for TES species would likely remain stable or increase, but to a lesser degree than Alternative 1 (Except for the Red Tanks pasture), but more than Alternative 2.

The following TES species, analyzed under Alternative 2 above, were determined not to be affected by livestock grazing or livestock management activities, and therefore, will not be included in further analysis: Pima Indian mallow, Great Western mastiff bat, Spotted bat, California leaf-nosed bat, and Mapleleaf false snapdragon.

Southwestern Willow Flycatcher – Habitat would continue to be protected through continued exclusion. With implementation of a modified rest-rotation grazing system, upland vegetation and soils, in pastures adjacent to Whitlow Ranch Flood Control Basin, would improve more rapidly and likely to a greater degree than they would under Alternative 2.

Arizona Hedgehog Cactus – The effects of livestock grazing on the Arizona hedgehog cactus are limited primarily to trampling effects. The species is currently only known to occur in the North Woodbury pasture; which would remain in non-use for all proposed grazing alternatives.

Lowland Leopard Frog – Lowland leopard frogs have been recorded in two locations on the allotment; Benson Spring and Rogers Canyon. Benson Spring is excluded (pipe-rail fence) from livestock use, and Rogers Canyon, within the North Woodbury pasture would continue to be excluded from livestock use. Although leopard frogs haven't been recorded in the canyons of the Red Tanks pasture, habitat does exist, and with the exclusion of grazing, frogs would likely thrive in those riparian areas. Through the implementation of a modified rest-rotation grazing system, mitigation, monitoring, and water developments, riparian areas are expected to show an improvement over current conditions. The proposed pipe-rail fence at Bear Tank spring would provide for improvement in riparian habitat, similar to that of Benson spring.

Maricopa Tiger Beetle – Although this beetle has not been documented on the Millsite allotment, habitat does exist. The exclusion of the Red Tanks pasture would likely benefit this species, and have the same effect as Alternative 1. Through the implementation of a modified rest-rotation grazing system, mitigation, monitoring, and water developments, riparian areas are expected to show an improvement over current conditions. The proposed pipe-rail fence at Bear Tank spring would provide for improvement in riparian habitat, similar to that of Benson spring. This grazing alternative would improve potential habitat more rapidly and to a greater extent than Alternative 2, but likely not as rapidly at Alternative 1.

Gila Monster – Potential habitat occurs throughout the allotment, and individuals are known to occur within the project area. Conservative utilization levels, included in all grazing alternatives, are anticipated to maintain or improve habitat for this species. However, habitat improvement under this alternative would occur more rapidly than under Alternative 2.

Desert Bighorn Sheep – Although competition for forage resources is minimal as Desert bighorn sheep prefer steep, rocky habitat as opposed to the flatter areas (< 40% slope) used by domestic livestock, sheep and cattle may use the same water sources. Therefore, with the exclusion of the Red Tanks pasture, water availability for sheep would increase. The proposed water developments would provide additional waters for livestock outside of riparian areas; improving habitat for all species including bighorn sheep.

Sonoran Desert Tortoise – Sonoran Desert tortoises have been documented as occurring on the allotment, and suitable habitat does exist. Although desert tortoises preferred rocky, boulder-covered hills and mountains, their forage areas may overlap with areas used by livestock. Therefore, the potential exists for competition for forage between tortoises and livestock. Through the implementation of a modified rest-rotation grazing system, mitigation and monitoring upland vegetation and soil conditions are expected to improve. These improvements would occur more rapidly under this alternative than under Alternative 2.

Cumulative Effects. Based on effects to potential and/or occupied habitat for the aforementioned species, this alternative is unlikely to affect individuals or population viability. Riparian canopy cover, stream banks, vegetative cover in the uplands and riparian areas, soil condition, and watershed effects would improve under this alternative, more rapidly than under Alternative 2, but at a slower rate than Alternatives 1 or 4.

Wildlife would continue to be disturbed by a variety of human activities in the area. This may increase as the greater Phoenix population continues to grow.

Alternative 4 – Proposed Action

Direct and Indirect Effects. Through the initial „phase in" period (~5 years) while proposed improvements are being installed, the effects would be the similar, to those described under Alternative 2; with the exception that authorized numbers will remain low during the „phase in" period to mitigate effects, to upland and riparian resources, from reuse of pastures. Following implementation of the one unit; six pasture rotation, effects will be the same as Alternative 3, except for the Red Tanks pasture. Under this alternative, once fully implemented, the Red Tanks pasture would only be used every other year, which would allow upland and riparian resources to improve more rapidly than Alternative 2, but not as rapidly as Alternative 1 or 3. The North Woodbury pasture would remain in non-use, therefore, upland and riparian habitat improvement will be the same as Alternative 1.

General Wildlife. Development of a modified rest-rotation grazing system, adaptive management, installation of proposed improvements, implementation of mitigation measures and monitoring; riparian and upland habitat for game and non-game species would improve. Continued non-use of the North Woodbury pasture would improve riparian and upland habitat within that pasture. Effects in this pasture would be the same as under alternative 1. Additional water sources would likely benefit wildlife. Under this alternative, once fully implemented, the Red Tanks pasture would only be used every other year, which would allow upland and riparian resources to improve more rapidly than Alternative 2, but not as rapidly as Alternative 1 or 3. The installation of a pipe-rail fence around Bear Tank spring would likely improve riparian habitat critical for wildlife.

Management Indicator Species. Improvement in riparian and upland MIS species habitat in the North Woodbury pasture would be the same as under Alternative 1. Through adaptive management, installation of proposed improvements, implementation of mitigation measures and monitoring; riparian and upland habitat for selected MIS species would improve.

TES Species. Through implementation of a six pasture modified rest-rotation system of management, adaptive management principles, monitoring, mitigation measures, and proposed improvements; habitat for TES species would likely remain stable or increase, but to a lesser degree than Alternative 1, more than Alternative 2, and slightly less than Alternative 3 (Red Tanks exclusion).

The following TES species, analyzed under Alternative 2 above, were determined not to be affected by livestock grazing or livestock management activities, and therefore, will not be included in further analysis: Pima Indian mallow, Great Western mastiff bat, Spotted bat, California leaf-nosed bat, and Mapleleaf false snapdragon.

Southwestern Willow Flycatcher – Habitat would continue to be protected through continued exclusion. With implementation of a modified rest-rotation grazing system, upland vegetation and soils, in pastures adjacent to Whitlow Ranch Flood Control Basin would likely improve. Through the initial „phase in" period (~5 years) while proposed improvements are being installed, the effects would be the similar to those described under Alternative 2; with the exception that authorized numbers will remain low during the „phase in" period to mitigate effects, to upland and riparian resources, from reuse of pastures. Following implementation of the one unit; six pasture rotation, effects will be the same as Alternative 3, except for the Red Tanks pasture.

Arizona Hedgehog Cactus – The effects of livestock grazing on the Arizona hedgehog cactus are limited primarily to trampling effects. The species is currently only known to occur in the North Woodbury pasture; which would remain in non-use for all proposed grazing alternatives.

Lowland Leopard Frog – Lowland leopard frogs have been recorded in two locations on the allotment; Benson Spring and Rogers Canyon. Benson Spring is excluded (pipe-rail fence) from livestock use, and Rogers Canyon, within the North Woodbury pasture would continue to be excluded from livestock use. Although leopard frogs haven't been recorded in the canyons of the Red Tanks pasture, habitat does exist. Following implementation of the proposed management system, limiting grazing to once every other year, riparian habitat within this pasture should improve. Additionally, through the implementation of a modified rest-rotation grazing system, mitigation, monitoring, and water developments, riparian areas throughout the allotment are expected to show an improvement over current conditions. The proposed pipe-rail fence at Bear Tank spring would provide for improvement in riparian habitat, similar to that of Benson spring.

Maricopa Tiger Beetle – Although this beetle has not been documented on the Millsite allotment, habitat does exist. Through the implementation of a modified rest-rotation grazing system, mitigation, monitoring, and water developments, riparian areas are expected to show an improvement over current conditions. The proposed pipe-rail fence at Bear Tank spring would provide for improvement in riparian habitat, similar to that of Benson spring.

Gila Monster – Potential habitat occurs throughout the allotment, and individuals are known to occur within the project area. Conservative utilization levels, included in all grazing alternatives, are anticipated to maintain or improve habitat for this species. However, habitat improvement under this alternative would occur more rapidly than under Alternative 2, similar to Alternative 3, and not as rapidly as Alternative 1.

Desert Bighorn Sheep – Although competition for forage resources is minimal as Desert bighorn sheep prefer steep, rocky habitat as opposed to the flatter areas (< 40% slope) used by domestic livestock, sheep and cattle may use the same water sources. Therefore, with the exclusion of the Red Tanks pasture, water availability for sheep would increase. The proposed water developments would provide additional waters for livestock outside of riparian areas; improving habitat for all species including bighorn sheep.

Sonoran Desert Tortoise – Sonoran Desert tortoises have been documented as occurring on the allotment, and suitable habitat does exist. Although desert tortoises preferred rocky, boulder-covered hills and mountains, their forage areas may overlap with areas used by livestock. Therefore, the potential exists for competition for forage between tortoises and livestock.

Through the implementation of a modified rest-rotation grazing system, mitigation and monitoring upland vegetation and soil conditions are expected to improve.

Cumulative Effects. Based on effects to potential and/or occupied habitat for the aforementioned species, this alternative is unlikely to affect individuals or population viability. Riparian canopy cover, stream banks, vegetative cover in the uplands and riparian areas, soil condition, and watershed effects would improve under this alternative, more rapidly than under Alternative 2, but at a slower rate than Alternatives 1 and 3.

Wildlife would continue to be disturbed by a variety of human activities in the area. This may increase as the greater Phoenix population continues to grow.

Recreation

Affected Environment

Recreational activities in and around the Millsite Allotment consist of dispersed camping, hunting, target shooting, off-highway vehicle (OHV) activities, and hiking and equestrian use in the Superstition Wilderness. With such diverse recreational activities, conflicts between user groups often occur. These conflicts occur primarily between the permittee and irresponsible OHV users and target shooters, and between wilderness users and livestock.

Management of OHV use in this area is enforced using the 1990 Resource Access/Travel Management (RA/TM) decision. Roads throughout the area that have been identified and posted open in RA/TM can be accessed by most vehicles, both licensed and unlicensed. With the increasing OHV community and limited signing on the ground, user created routes have also been steadily increasing over the years and conflicts are occurring between OHV users and other forest users. The Forest is currently in the process of designating and updating its motorized vehicle route system (Travel Management). Once completed, travel access maps will be available to the public.

Forest visitors use lands in and around the Millsite Allotment for target shooting. While many visitors are responsible target shooters, many are not; shooting vegetation, including Saguaro"s, and leaving behind trash and targets. Meetings have recently been held between the District Ranger, Law Enforcement Officials, and Queen Valley residents who have concerns regarding target shooting activities, resource destruction, and safety to nearby homes. A decision regarding the availability of future target shooting areas is presently being discussed for future action. The District has had several meetings with the range permittee regarding their concerns for livestock, as well as the vegetation in and around the allotment, because of irresponsible or uninformed recreational target shooters.

Two Outfitter Guides currently hold permits for OHV tours in and through this allotment. Use is low for this activity because of the distance to metropolitan areas. There are two Outfitter Guide permits issued for horseback riding in the Superstition Wilderness Area, and two Outfitter Guide permits for hiking trips. Use is moderate in the winter months, and is low during all other seasons (PR Vol. 2 – FF).

Approximately 14,767 acres of the two northern pastures (Red Tanks and Woodbury pasture) is within the Superstition Wilderness. According to the Superstition Wilderness Implementation Plan the implementation objective for visitor management is to “provide for primitive recreation,

solitude, and physical and mental challenge, and/or inspiration, as long as these activities are consistent with preservation of the Wilderness resource (p. 10)". The Tonto Land Resource Management Plan specifies that range improvements in the Superstitions are minimal and livestock use is within the present grazing capacity. Backpackers, hikers, and equestrian seeking a wilderness experience anticipate untrammeled land that is natural and undeveloped with outstanding opportunity and uniqueness. Within the Millsite allotment, some recreationists are impacted by grazing developments and outgrowths of livestock use in the wilderness such as fences, flies, fouled water holes, and manure. In addition, there is conflict with livestock and visual damage to forage resource near waters.

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects. This alternative could have some socially related effects on those who recreate in this area. Some visitors appreciate the western heritage associated with ranching and enjoy seeing livestock grazing on public land, while others may be impacted by livestock (e.g., hunters, hikers, off-highway vehicle users). In the absence of livestock grazing, land managers may choose to remove range improvements from the allotment, or improvements may fall into disrepair. Removal of these improvements may negatively impact recreational users. Often, equestrian users take advantage of existing corrals and water developments to care for their horses or mules while using National Forest System (NFS) trails. In the absence of these improvements, equestrian use would likely be seasonal, when water is present. Special use permits (SUP) for equestrian guided tours may be negatively impacted due to potential loss of water developments (PR Vol. 3 – BB).

Cumulative Effects. If livestock are not authorized to graze, the quality of experience for hunters may improve, resulting in increased hunting activity in this area. More dispersed camping and OHV use may occur since recreationists would not be encountering livestock during their visit; while equestrian use may decrease due to loss of range improvements. Naturalness would continue to increase as historic effects of livestock grazing become less evident over time. However, an increase in recreational activity increases human impact such as damage to wildlife habitat due to unauthorized route proliferation by off-highway vehicle (OHV) users. The presence of a livestock permittee may decrease the occurrence of illegal activities. Without the permittee on-site, the need for more enforcement on NFS land increases. With the removal of range improvements, vandalism of these facilities would decrease thus reducing the need for continual patrolling and maintenance.

Alternative 2 - Current Management

Direct and Indirect Effects. Under alternative 2, range improvements, such water developments, would be maintained, which would benefit some recreational users. Conflicts may occur between recreational user groups and the range permittee. It is a common perception among hunters that livestock grazing interferes with hunting. Target shooting has a negative impact on the permittee due to illegal shooting of range improvements, trash left behind, safety, and noise. Roads used by both OHV users and livestock increases the potential for safety conflicts. Gates may be left open by users or encounters with livestock could occur.

Grazing livestock in the Wilderness, with no range improvements promotes excessive use near streams thereby increasing the potential for water contamination (i.e., fecal coliform) and trampling of vegetation decreases visual quality which adversely affects recreationists. The recreationist seeking wilderness character sense of remoteness and solitude may be impacted by livestock and outgrowths of livestock use in the wilderness such as fences, flies, fouled water holes, and manure. Equestrian users will continue to use existing range improvements and seasonal use of natural water springs in Wilderness. Visitors would still expect low frequency of contact with other forest users in the Wilderness.

Cumulative Effects. Livestock movement causes trampling effects and trailing. Motorized vehicle users may utilize livestock trails which increases unauthorized route proliferation. The Forest is currently in the process of designating and updating its motorized vehicle route system. Some routes, which are currently listed as „open", may be no longer available to the public in the future, such as the proposed closure of FR1904.

Alternative 3- Wilderness Pasture (Red Tanks) Exclusion

Direct and Indirect Effects. Alternative 3 is expected to enhance nonmotorized backcountry recreational opportunities. With livestock not present in Wilderness, and no trailing through riparian areas, conflict with recreational users will be mitigated. Visitors seeking a wilderness experience for sense of remoteness and solitude will improve. Equestrian users will continue to use existing range improvements, and seasonal use of natural water sources in Wilderness and non-Wilderness areas.

Cumulative Effects. Naturalness in Wilderness would continue to increase as historic effects of livestock grazing become less evident over time, enhancing Wilderness recreation values.

Alternative 4 - Proposed Action

Direct and Indirect Effects. With adequate livestock distribution, scheduled pasture rest, and range improvements such as additional water developments; excessive use near streams is curtailed, thereby decreasing impact to riparian areas. This improves visual quality of Wilderness riparian areas and therefore enhances Wilderness recreation visits. No trailing of livestock through riparian areas would mitigate conflicts with recreational users. Recreational users take advantage of existing corrals and water developments to care for their horses or mules while using NFS trails. The addition of water developments would likely enhance recreational equestrian use.

Recreationists seeking a Wilderness experience will be impacted by grazing in the Wilderness. Sense of remoteness and solitude may be impacted by conflict with livestock and outgrowths of livestock use in the wilderness such as fences, flies, fouled water holes, and manure. Grazing of cattle may negatively affect hunting success. Roads used by both OHV users and livestock increases the potential for safety conflict. Gates may be left open by users or encounters with livestock could occur.

Cumulative Effects. According to the Superstition Wilderness Implementation Plan structural range developments will be made as unobtrusive as possible. Mitigation and monitoring measures would help ensure effects to wilderness values are minimized while still providing reasonable access to the permittee. Opportunities for primitive and unconfined recreation would

remain in most areas of wilderness, but be affected by proximal herding activities in the Millsite allotment.

Heritage

Affected Environment

According to the Tonto NF Archaeologist, the Millsite allotment likely contains hundreds of prehistoric archaeological sites representing the occupation and agricultural use of the area by people related to the Hohokam and Salado archaeological traditions and earlier Archaic hunter-gathers over a period of 8,000 to 10,000 years. There are also historical sites reflecting use by the Apache, Anglo ranchers, stockmen, miners, and prospectors, the Civilian Conservation Corps, and U.S. Forest Service. No traditional cultural properties, native plant gathering areas, or tribal sacred sites are currently known to be located within the Millsite allotment; however, no specific efforts to identify and inventory such areas have been made. It is assumed that some level of effect over time has contributed to the current condition of all sites on the allotment. Site condition assessments for heritage resources are not available for any time prior to the introduction of European livestock species to this area (PR Vol. 3 – CC).

Environmental Consequences

Impacts to heritage resources, especially archaeological sites, can be generally defined as anything that results in the removal of, displacement of, or damage to artifacts, features, and/or stratigraphic deposits of cultural material. In the case of heritage resources, which are considered eligible for inclusion in the National Register of Historic Places, this can also include alterations of a property's setting or context. In the case of traditional cultural properties and sacred places, additional considerations may include alterations in the presence or availability of particular plant species. Heritage resources, depending on their nature and composition, are subject to several different types of impact from activities associated with grazing. Direct impacts from grazing are generally considered to be those resulting from concentrated livestock trampling and inadvertent destruction of heritage resources. Indirect impacts can include erosion and changes in vegetative composition and density that alter the setting and geographic context of sites.

Since site condition assessments for heritage resources are not available for any time prior to the introduction of European livestock species to the Southwest, some level of effect is assumed to have contributed to the current condition of all sites on the allotment. Given the non-renewable nature of heritage resources; prehistoric as well as historic archaeological sites, any portion of a given site either damaged or removed diminishes its cultural and scientific value permanently. Therefore, all effects to heritage resources are considered cumulative.

Alternative 1 – No Grazing
No effect on heritage resources.

Alternative 2 – Current Management
Managed grazing is not considered in and of itself to constitute an effect on heritage resources. Livestock are distributed as evenly as possible across the allotment.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion
Managed grazing is not considered in and of itself to constitute an effect on heritage resources. Livestock are distributed as evenly as possible across the allotment.

Alternative 4 – Proposed Action
Managed grazing is not considered in and of itself to constitute an effect on heritage resources. Livestock are distributed as evenly as possible across the allotment.

Cumulative Effects for Alternatives 1 - 4. Based on a history of observation and consultation with the State Historic Preservation Officer (SHPO), managed grazing is not considered in and of itself to constitute an effect on heritage resources when the grazing strategy is designed to match herd size with capacity and distribute livestock as evenly as possible across the allotment in order to avoid localized concentrations of animals and the resultant impacts to soils and vegetation associated with intense trampling. Changes in grazing strategy are likewise not considered to have an effect provided that whatever new strategy is implemented does not alter these conditions.

The greatest potential for direct adverse effects to heritage resources is associated with the construction of range improvements and the access roads needed to build and maintain them. However, as mentioned in Chapter 2, a Forest archaeologist or para-archaeologist prior to approval would survey any proposed improvement for heritage resources.

Noxious Weeds

Affected Environment

The Millsite Allotment has only partially been surveyed for presence of noxious weeds. Weeds that have been documented on or near the allotment are the following (PR Vol. 2 – PP):

Saharan mustard (*Brassica tournefortii*) – This annual mustard grows during cold winter months, completing its life cycle by very early spring. It grows in disturbed areas along U.S. 60. It has not yet been documented on the Millsite Allotment, but it"s very possible that it just has not been found yet. When mature, the plants break off and tumble, much like tumbleweed (Russian thistle). This is the way seeds are scattered for future generations. Dried plants hang up in washes or under mesquite or palo verde trees, providing a fuel ladder for desert fires to burn hotter and climb into the canopies of these desert trees.

Malta starthistle (*Centaurea melitensis*) – Malta starthistle is an annual forb that germinates in the fall, winter or spring, flowers in the spring, and produces seed and dies by May. Individual plants can have as many as 100 flowers, each one bearing about 60 seeds. Most seed land on the ground near parent plants. Seed dispersal is promoted by animal, human, or vehicular traffic, during early to mid summer months. Plants growing near drainages are able to disperse seed long distances in flowing water. Soil near infestations can be loaded with viable seed; therefore, any activities that transport this soil are likely to spread the infestation. Malta starthistle is spreading along U.S. 60, and is transported from there to remote locations by various means. On the Millsite Allotment, it has been documented at the head of Byous Spring drainage, and in Gonzales and Reymert Washes. This plant is reported to be toxic to horses (Schalau 2005).

Buffelgrass (*Pennisetum ciliare*) – This perennial grass is generally spreading northward from southern Arizona, and toward the Forest from the Phoenix metropolitan area, along U.S. 60. A major infestation is located in the area of Gonzales Pass, in the Hewitt Pasture. This infestation

starts along U.S. 60 and currently extends northward along the ridge north of Gonzales Pass, and also northward along Gonzales Wash from U.S. 60 to Queen‟s Station on Hewitt Station Road. It also occurs in Reymert Wash and Queen Creek in the Hewitt Pasture, and in Bear Tank Canyon in the Bear Tank Pasture, and in patches on steep slopes high above Hewitt Canyon in the Millsite and Cottonwood Pastures. There are probably many other sites buffelgrass is growing on the allotment that have not been surveyed yet.

Seeds from buffelgrass are fluffy, and are dispersed by wind to remote places high on the sides of mountains. They can also be dispersed by flowing water, and spread down washes and canyons. They adhere to animal fur and peoples‟ clothing, so can be spread by humans, livestock, and wildlife. Seeds may become lodged in tires and equipment and may be spread by trucks, cars, ATVs, and heavy equipment. Once a few plants have established, populations grow very rapidly, with plants able to produce seed nearly year-round in the mild winter climate of central Arizona. Each seed head contains at least 100 seeds, and each plant produces many dozens of seed heads in a year.

Buffelgrass has been termed an "ecosystem-changing" plant, as it modifies ecosystem processes in the Sonoran Desert as it spreads. It becomes a dense monotype, with much dead material built up within each plant over years of growth. Its dense roots crowd out native plants, effectively removing soil water that would otherwise be available for trees and cacti. In addition, buildup of fine fuels carries an extremely intense wildfire, with fuel loadings 5 to 20 times those in desert infested by red brome (SWCC 2008). Desert plants are not adapted to wildfire; after buffelgrass has covered desert slopes it will perpetuate a regime of frequent fire frequency that native desert plants are not able to survive.

Fountain grass (*Pennisetum setaceum*) – This perennial grass is used as a landscaping plant, and has escaped from urban lawns and gardens across central Arizona. On the Millsite Allotment, it has been documented growing in Gonzales, Hewitt and Roblas Canyons. Infestations at this time are very small and could be fairly easily eliminated. Like buffelgrass, fountain grass builds up a continuous mat of fine fuels that will carry a very intense wildfire. The fire that fountain grass carries would be in riparian areas where it typically grows. Riparian areas in the Sonoran desert have historically been very fire resistant, due to their location in the midst of an ecosystem that has very sparse vegetation and very long fire return intervals, and the fact that vegetation in the riparian area holds moisture, which makes it inherently resistant to burning.

Salt cedar (*Tamarix* spp.) – Salt cedar often becomes established in wet or dry drainages and at springs or seeps. Its deep taproot will take water that would otherwise be available for native riparian tree species and for free water for domestic stock or wildlife. Like fountain grass, it can serve to introduce fire to a previously fire-resistant ecosystem. Salt cedar communities tend to be monocultures that have deep layers of leaf and branch duff that reach up into the trees. This creates a fuel ladder for fire, which carries very quickly through dense stands of salt cedar. These trees are adapted to fire, and quickly resprout once burned. Salt cedar grows in the area of Whitlow Ranch Flood Control Basin, and probably occurs sporadically in drainages such as Hewitt, Roblas, Gonzales, Millsite, Reymert and Bear Tank Canyons.

Environmental Consequences

Alternative 1 – No Grazing
This alternative would probably result in the least amount of spread of noxious weeds, since one of the vectors of seed movement, domestic livestock, would be removed. This beneficial effect may be offset by the removal of plants and seeds of buffelgrass and fountain grass that would occur if domestic livestock grazing were permitted. Survival of seeds from these species through the digestive system of a cow has not been studied, but these seeds characteristically cling to fur, so they could easily be transported by cattle.

Alternative 2 – Current Management
This is the management under which buffelgrass, fountain grass, and Malta starthistle have gained a foothold on the Millsite Allotment. Livestock will continue to be a vector for movement of invasive species propagules.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion
Likelihood of domestic livestock spreading invasive species known to be present on the allotment into remote wilderness areas is reduced under this alternative. Effects to the remainder of the allotment are the same as for Alternative 2.

Alternative 4 – Proposed Action
Livestock will continue to be a vector for movement of invasive species propagules. Equipment working and ground disturbance in the Hewitt Pasture is likely to create places for easy establishment of buffelgrass and other invasive species, unless mitigation measures are strictly followed. Improved livestock distribution would result in improved cover and density of native plant species, thus reducing open areas and disturbed ground that is conducive to establishment of new weed infestations (PR Vol. 2 – PP).

Socio-Economics

The social environment for this analysis comprises the people living in and adjacent to the Tonto National Forest. Forest resources play an important social role for the people of the Southwest. The goods, services, and uses available from the National Forests represent major components in the lives of many residents within the area of the Tonto National Forest, especially those in rural areas.

Geographically this region has two types of very distinct population centers. There are several small rural communities scattered along and within the boundaries of the Forest. These smaller communities tend to rely at least partially on Forest resources (mining, ranching, and timber) for their economic development. In addition, the Phoenix metropolitan area (Valley) abuts the Forest along its western boundary. The Valley has experienced great population growths in recent years. The influx of people in recent decades has also brought about more diverse views and public opinion regarding appropriate uses of the public lands. The demand for recreational type activities on public lands is greatly increasing. These uses include; Wilderness use, camping, birding, hunting, hiking, target shooting, equestrian, and OHV use.

Few generalizations can be made about the communities across the Southwest. They are as diverse as the people who live there, and due to the increasing desirability of the Southwest as a

living location the diversity is ever increasing. It should not be expected that all residents have the same or even similar points of view on various issues.

Lifestyles include style and perceived "quality of life" for individuals or groups. This may include employment or work patterns, leisure, and recreation behavior.

In rural areas of the Southwest, where sparse populations dominate the landscape, a rural lifestyle exists. Most residents live close to where they work and have a direct or indirect tie to the natural resources for their livelihood. Most rural residents believe resource utilization would be less disruptive to their local communities than most other forms of economic development. Recreational activities generally include hunting, camping and fishing. Rural residents tend to be willing to live at a lower income if the only means of acquiring higher incomes is to live in a highly urbanized area.

Ranching and the grazing of domestic livestock have been a part of the Southwest culture for 400 years. The Spanish introduced sheep and cattle grazing in the Southwest in the late 16th century. The tradition of an open range endured for several hundred years before Anglo-Americans arrived in the Southwest, and when they came, the new arrivals expanded the traditional pastoral practices into modem range-cattle and sheep industries. In the Southwest, the National Forests were of equal or greater importance to the people for their range resources as they were significant for timber, watershed, or mineral resources (Baker, et al. 1988)

The Forest Service benefits from the collection of grazing fees and expends those fees along with appropriated tax dollars to construct or provide materials for range improvements and administer grazing permits.

Alternative 1 – No Grazing

Direct and Indirect Effects. Removal of the livestock could result in an initial reduction in gross economic returns to the permittees, unless the cattle could be placed on private land. The effect of this loss on the permittees will depend on the financial condition of the operation, the dependency of their operation on this particular allotment, and the dependency of the family income on the income derived from this permit.

The Forest Service would lose money through the reduction in grazing fees assessed. The majority of range improvements would be removed (i.e. fences, cattle guards, and gates), however, if some water developments were left to be used as wildlife waters, the Forest Service would be responsible for funding and maintenance requirements. Currently, permittees are responsible for maintenance of all improvements under the terms of their grazing permit.

Businesses that benefit from livestock grazing (feed and material supply stores) could lose revenue generated from the permittee. Businesses that benefit from recreational activity sales (hiking, OHVs) would continue to generate revenue, depending on recreational activity.

Cumulative Effects. This alternative remove the livestock tradition on the allotment.

Alternative 2 – Current Management

Direct and Indirect Effects. This alternative could provide a greater economic return for the permittee than Alternative 1. Annual economic returns would vary depending on the number of livestock authorized in the Annual Operating Instructions, current cattle prices, and the amount of money required for ranching operations (maintenance requirements). The economies of

surrounding communities could benefit through sales and purchases. The Forest Service would continue to collect grazing fees.

Businesses that benefit from livestock grazing (feed and material supply stores) could continue to generate revenue from the permittee. Businesses that benefit from recreational activity sales (hiking, OHVs) would continue to generate revenue, depending on recreational activity.

The permittee would continue to be responsible for maintenance of all range improvements under the terms of their grazing permit.

Cumulative Effects. This alternative would provide for the continuation of ranching tradition and rural lifestyle.

Alternative 3 – Wilderness Pasture (Red Tanks) Exclusion

Direct and Indirect Effects. This alternative could provide a greater economic return for the permittees than Alternative 1. Annual economic returns would vary depending on the number of livestock authorized in the AOI, current cattle prices, and the amount of money required for ranching operations (maintenance requirements). The economies of surrounding communities" could continue to benefit through sales and purchases. The Forest Service would continue to collect grazing fees.

Businesses that benefit from livestock grazing (feed and material supply stores) could continue to generate revenue from the permittee. Businesses that benefit from recreational activity sales (hiking, OHVs) could continue to generate revenue, depending on recreational activity.

The permittee would be responsible for maintenance of all range improvements under the terms of their grazing permit.

Cumulative Effects. This alternative would provide for the continuation of ranching tradition and rural lifestyle.

Alternative 4 - Proposed Action

Direct and Indirect Effects. This alternative could provide a greater economic return for the permittee than Alternative 1. Annual economic returns would vary depending on the number of livestock authorized in the Annual Operating Instructions, current cattle prices, and the amount of money required for ranching operations (maintenance requirements). The economies of surrounding communities would benefit through sales and purchases.

Businesses that benefit from livestock grazing (feed and material supply stores) could continue to generate revenue from the permittee. Businesses that benefit from recreational activity sales (hiking, OHVs) could continue to generate revenue, depending on recreational activity.

The permittee would continue to be responsible for maintenance of all range improvements under the terms of their grazing permit.

Cumulative Effects. This alternative would provide for the continuation of ranching tradition and rural lifestyle.

Environmental Justice

Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Toward attaining EJ for all communities and persons in the United States, Executive Order 12898 (February 11, 1994) directed all Federal agencies to evaluate their proposed actions to determine the potential for disproportionate adverse impacts to minority and low-income populations.

In the memorandum to heads of departments and agencies that accompanied Executive Order 12898, the President specifically recognized the importance of procedures under NEPA for identifying and addressing environmental justice concerns. The memorandum states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by [NEPA]."

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

Air Quality

The project area is in a Class II (rural) air quality management area. Air quality in and around the area is high due to the relative isolation from urban centers, limited access, vegetative ground cover, and the scale of the analysis area. Currently, the air quality in the project area is within the Standards and Guidelines of the Forest Plan.

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

Water Quality

The Arizona Department of Environmental Quality (ADEQ) evaluates the water quality status of waters within the state in a Nonpoint Source Assessment Report (2008). Queen Creek is the only drainage within the allotment that has been evaluated for the 2008 report. The evaluated reach extends from Potts Canyon to Whitlow Canyon. Water quality standards for Queen Creek in this reach are intended to protect the designated uses of aquatic and wildlife-warm water fisheries (A&Ww), full body contact recreation (FBC), fish consumption (FC), and AgL (agricultural livestock watering). Samples collected at Queens Station were "Inconclusive" for all uses due to insufficient sampling events (PR Vol. 2 – Z).

CHAPTER 4 – CONSULTATION AND COORDINATION

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

Interdisciplinary Team Members:

Kelly M. Kessler, Mesa Ranger District, Range/Wildlife Staff, ID Team Leader

Sharon I. Wallace - Mesa Ranger District, Deputy District Ranger, Responsible Official

Arthur L. Wirtz – Mesa Ranger District, District Ranger

Louise Congdon – Cave Creek Ranger District, District Ranger

Norm Ambos – Tonto National Forest, Soil Scientist

Debbie Becker – Mesa Ranger District, Recreation Assistant (Former)

Bryce Botts – Mesa Ranger District, Assistant Fire Management Officer

Charles J. Denton - Tonto National Forest, Ecosystem Group Leader

Patti Fenner – Tonto National Forest, Noxious Weed Coordinator

Steve Germick – Tonto National Forest, Archaeologist

Rocky Gilbert – Mesa Ranger District, Fire Management Officer

Janet Grove – Tonto National Forest, Riparian Ecologist

Mark L. Howe – Tonto National Forest, Archaeologist

Genevieve Johnson - Tonto National Forest, NEPA Coordinator

Gabrielle Kenton – Tonto National Forest, Forest Planner and NEPA Coordinator (Former)

Don Luhrsen – Tonto National Forest, Rangeland Management Specialist (Former)

Lynn Mason – Tonto National Forest, Hydrologist

Kathy Nelson – Tonto National Forest, Natural Resource Specialist

Amy Racki - Mesa Ranger District, Recreation Assistant

Mark Taylor – Tonto National Forest, Minerals Biologist

Fred Wong – Tonto National Forest, Forest Biologist

Scott Wood - Tonto National Forest, Forest Archaeologist

Federal, State, and Local Agencies:

Jim Sprinkle, Gila County Cooperative Extension, University of Arizona

Arizona Department of Environmental Quality

Natural Resources Conservation Service

Arizona Game and Fish Department

US Fish and Wildlife Service

Tribes:

Fort McDowell Yavapai Nation

Yavapai – Prescott Tribe

Yavapai – Apache nation

Tonto – Apache Tribe

San Carlos Apache Tribe

White Mountain Apache Tribe

Salt River Pima-Maricopa Indian Tribe

The Hopi Tribe

Zuni Pueblo

Others:

George and Lynn Martin, Millsite Allotment Permittees

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DEFINITIONS

Adaptive Management: A formal, systematic, and rigorous approach to learning from the outcomes of management actions, accommodating change, and improving management.

Animal Unit Month (AUM): The amount of forage required by an animal unit for one month, often calculated as 26 lbs. of forage per day by dry weight. The term is an expression of grazing impact and is related to forage removed. When estimating stocking rates for grazing allotments; express the amount of forage available in AUMs of forage. This gives an idea of how many animals of a certain class or kind can graze. A cow/calf pair requires and average of 1.32 AUMs of forage for one month, a dry cow (no calf) 1 AUM, a yearling steer or heifer is .7 AUM. An AUM is the proper basis for documenting estimated grazing capacities and estimating and describing grazing impacts.

Conservative Use: Forage utilization is maintained between 30-40% of annual forage production by weight in pasture key areas. Qualitative indicators of conservative use can be described by the following; forage plants have abundant seed stalks; areas more than a mile from water show little use; about one-third to one-half primary forage plants show grazing on key areas (Holechek and Galt 1999).

Deferment: The delay of grazing to achieve a specific management objective. A strategy aimed at providing time for plant reproduction, establishment of new plants, restoration of plant vigor, a return to environmental conditions appropriate for grazing, or the accumulation of forage for later use.

Deferred Rotation Grazing Strategy: Grazing system in which the same pasture is not grazed at the same time during the growing season in consecutive years (deferment).

Deferred Rest-Rotation Grazing Strategy: A grazing system in which the same pasture is not grazed at the same time during the growing season in consecutive years (deferment), with a rest period also added in which the pasture is not grazed at all during the growing season.

Desired Conditions: Descriptions of the social, economic, and ecological attributes that characterize or exemplify the desired outcome of land management. They are aspirations, and are likely to vary both in time and space. Adapted from: *Foundations of Forest Planning: Volume 1(Version 2.0) Model of a Forest Plan*. USDA Forest Service, January 2005

Desired Plant Community is determined through the interdisciplinary planning process based on desired conditions for vegetation within a planning unit. The desired community may be a lower successional stage within a potential natural community that is a forested type in order to maximize forage output. Ecological Site Descriptions for certain range sites may describe the desired plant community. (R3 Rangeland Analysis and Management Training Guide, 1997)

Ecological Type is a category of lands with a distinctive (i.e., mappable) combination of landscape elements. The elements making up an ecological type are climate, geology, geomorphology, soils, and potential natural vegetation. Ecological types differ from each other in their ability to produce vegetation and respond to management and natural disturbances. (Terrestrial Ecological Unit Inventory Technical Guide: Landscape and Land Unit Scales, USDA Forest Service, Gen. Tech. Report WO-68, 2005)

Ecological Units are map units designed to identify land and water areas at different levels of resolution based on similar capabilities and potentials for response to management and natural disturbance. These capabilities and potentials derive from multiple elements: climate, geomorphology, geology, soils and potential natural vegetation. Ecological units should, by design, be rather stable. They may, however, be refined or updated as better information becomes available. (Terrestrial Ecological Unit Inventory Technical Guide: Landscape and Land Unit Scales, USDA Forest Service, Gen Tech Report WO-68, 2005)

Effective Ground Cover is a measure of the percentage of ground area covered by live basal vegetation or persistent litter. These serve to protect the soil surface from accelerated erosion. It is a Tonto Forest Plan guideline to "maintain a minimum of 30% effective groundcover for watershed protection and forage production".

Frequency (as a management tool): refers to the number of times forage plants are defoliated during the grazing period. Reed Floyd, Roy Roath, and Dave Bradford. 1999. The Grazing Response Index: A Simple and Effective Method to Evaluate Grazing Impacts. *Rangelands* 21(4): 3-6.

Frequency (as a measurement for trend): The ratio between the number of sample units that contain a species and the total number of sample units.

Grazing Intensity: The degree of herbage removed through grazing and trampling by livestock. Grazing intensity may be described in terms herbage removed during the grazing and/or growing period or as a utilization level at the end of the growing period. It is important to clearly define how intensity is being viewed and described. Removal of leaf material, when the plant is actively growing can affect root growth which in turn affects future leaf growth. Sufficient leaf area is essential to support plant functions through photosynthesis. Heavy to severe intensity or utilization can affect current plant development and growth, as well as growth during subsequent growing seasons.

Light to Moderate Grazing Intensity: Based on review of numerous grazing intensity studies, Holechek (1999, 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%-40% of key species in key areas would be used to monitor use in all pastures, which, combined with growing season rest or deferment, should ensure pasture-wide average use of less than 40%. Grazing intensity can be measured before and during the growing season. Grazing intensity can be utilized to manage livestock so that expectations of end of growing season utilization measurements will not be exceeded.

Grazing Occurrence is how often a given area is grazed. How often a pasture is exposed to grazing or rested from grazing provides for different responses within the plant community due to differing opportunities for plant recovery.

Grazing Period is defined as the length of time grazing livestock or wildlife occupy a specific land area. The length of time a pasture is exposed to grazing affects many variables such as potential for regrowth of plant material, soil impacts and animal behavior. The grazing period

influences the intensity of grazing and the frequency of grazing. It can also influence items tied to animal behavior such as trailing, and trampling such as between loafing and watering areas.

Head Month is defined as one month‟s use and occupancy of the range by one animal.

Key Areas: A relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing. Key areas should be located within a single ecological site or plant community, be responsive to management actions and be indicative of the ecological site or plant community they are intended to represent (Society for Range Management, 1998). Key areas will normally be ¼ to 1 mile from water, located on productive soils with level to intermediate slopes, and be readily accessible for grazing. Size of key forage monitoring areas may be 20-500 acres. In some situations such as high mountain meadows with perennial streams, key areas may be closer than ¼-mile from water and less than 20 acres (Tonto Forest Plan, p. 42-1).

Key Species: (1) Forage species whose use serves as an indicator to the degree of use of associated species. (2) Species, which must, because of their importance be considered in the management program.

Modified Rest-Rotation Management system that incorporates yearlong rest for a selected pasture annually, and which provides for a systematic rotation of the deferment among pastures.

Parker Three Step Method: A method for determining range condition used by Region 3 of the Forest Service. The method is outlined in R3 Forest Service Handbook 2209.21. The vegetative rating shown by this method is a commodity rating based on the value of the land for cattle grazing. The more plant species present that cattle prefer to graze, the higher the vegetation condition portion of the score. It is not a measure of ecological status or similarity with site potential.

Range Condition: A subjective expression of the status or health of the vegetation and soil relative to their combined potential to produce a sound and stable biotic community. Soundness and stability are evaluated relative to a standard that encompasses the composition, density, and vigor of the vegetation and physical characteristics of the soil. Condition classes may be classified as excellent, good, fair, poor, and very poor (pg. 42-1 Tonto Forest Plan).

Resource Management Objectives: Concise statements of measurable, time specific outcomes intended to achieve desired conditions. The objectives for a plan are the means of measuring progress toward achieving or maintaining desired conditions. Adapted from: *Foundations of Forest Planning: Volume 1(Version 2.0) Model of a Forest Plan*. USDA Forest Service, January 2005.

Riparian Area: The interface between terrestrial and aquatic ecosystems that make up a mosaic of landforms, communities, and environments within the larger landscape (Gregory et al. 1991; Whitney 1998).

Satisfactory Range Condition: Occurs when an existing plant community exhibits moderate similarity (34-66%) to the **Desired Plant Community** (DPC), or if there is less than moderate similarity, the trend is towards achieving the Desired Plant Community. Trends away from DPC can be interpreted as unsatisfactory range. A Parker Three Step vegetation and soil stability rating that is fair or better with a stable or upward trend is also considered satisfactory range.

Ratings less than fair with an upward trend are moving towards this objective (R3 Rangeland Analysis and Management Training Guide, 1997).

Satisfactory Watershed Condition: Can be evaluated using the Parker Three Step soil stability rating, which includes an erosion hazard component and a subjective evaluation of current erosion. A soil stability score that rates fair or better is considered satisfactory, or an upward trend towards a fair rating. Satisfactory watershed condition can be visualized as an area with minimal sheet erosion, good groundcover from live vegetation and litter, and bare spaces generally small and not coalescing, or without distinguishable runoff pattern (R3 Forest Service Handbook 2209.21, Ch. 40, 1988).

Seasonal Utilization: The amount of utilization that has occurred before the end of the growing season. Interagency Technical Reference 1734-3, page 1.

Soil Condition: An evaluation of soil quality based on an interpretation of factors which affect vital soil functions. These functions are; the ability of the soil to hold and release water (hydrologic function), the ability of the soil to resist erosion and degradation (soil stability), and the ability of the soil to accept, hold and release nutrients (nutrient cycling). Categories of soil condition are satisfactory, impaired, and unsatisfactory.

Satisfactory - The soil indicators (hydrologic function, soil stability, and nutrient cycling) signify that soil function is being sustained and the soil is functioning properly and normally. The ability of the soil to maintain resource values and sustain outputs is high.

Impaired - The soil indicators (hydrologic function, soil stability, and nutrient cycling) signify a reduction of soil function. The ability of the soil to function properly has been reduced and/or there exists an increased vulnerability to degradation. An impaired category should signal land managers that there is a need to further investigate the ecosystem to determine the cause and degree of decline in soil functions. Changes in management practices or other preventative actions may be appropriate.

Unsatisfactory - The soil indicators (hydrologic function, soil stability, and nutrient cycling) signify that loss of soil function has occurred. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs, and recover from impacts. Past and/or current management activities have resulted in a loss of soil function. Existing management activities need to be evaluated to determine if the current management activity is contributing to the loss of soil function. In some cases, current management activities may not have caused the loss of soil function, but may be preventing recovery of functions. In many places soils may not fully recover their function in a reasonable period of time. Decades or centuries may be required for full recovery.

Soil Horizons:

O Horizon - The top, organic layer of soil, made up mostly of leaf litter and humus (decomposed organic matter).
A Horizon - The layer called topsoil; it is found below the O horizon and above the E horizon. Seeds germinate and plant roots grow in this dark-colored layer. It is made up of humus (decomposed organic matter) mixed with mineral particles.
E Horizon - This eluviation (leaching) layer is light in color; this layer is beneath the A Horizon and above the B Horizon. It is made up mostly of sand and silt, having lost most of its minerals

and clay as water drips through the soil (in the process of eluviation).
B Horizon - Also called the subsoil - this layer is beneath the E Horizon and above the C Horizon. It contains clay and mineral deposits (like iron, aluminum oxides, and calcium carbonate) that it receives from layers above it when mineralized water drips from the soil above.
C Horizon - Also called regolith: the layer beneath the B Horizon and above the R Horizon. It consists of slightly broken-up bedrock. Plant roots do not penetrate into this layer; very little organic material is found in this layer.

Soil Quality Monitoring: Soil condition is an evaluation of soil quality based on an interpretation of factors that affect vital soil functions. These functions are: The ability of the soil to hold and release water (hydrologic function), the ability of the soil to resist erosion and degradation (soil stability), and the ability of the soil to accept, hold, and release nutrients (nutrient cycling). The rationale and procedure for monitoring soil quality is located in FSH 2509.18 supplement of the Forest Service Manual. Soils are evaluated and assigned a soil condition category, which is a reflection of the status of soil function. Categories of soil condition are satisfactory, impaired, and unsatisfactory. The following is a brief description of each soil condition category:

Stream Types:

B - "B" type streams are moderately entrenched, containing narrow floodplains, and have a moderate gradient (2-4%).

C - "C" type streams are not entrenched and have very wide floodplains, which are able to dissipate flood flows and support extensive riparian areas. They have a low gradient (0-2%) and display the typical riffle/pool sequence of a meandering stream. "C" type streams are also sensitive to any disturbance and riparian vegetation is very important for the stability of these streams.

D - "D" type streams evolve from a more stable stream type due to some natural or management caused disturbance but widen rather than downcutting. They straighten, steepen and become braided. Braided streams have more than one channel and may change main channels with each high flow. This results in a loss of riparian vegetation and an unstable floodplain.

F - "F" type streams are highly entrenched (downcut), with little or no floodplain to dissipate flood flows, consequently, high flows are concentrated in the stream channel rather than in overbank flow which results in streambank erosion and loss of riparian vegetation. They usually evolve from a more stable stream type due to some natural or management caused disturbance. "F" type streams have a high width/depth ratio (wide and shallow) and lack the stream power, or energy, necessary to move the sediment though the system, causing aggrading. These stream types are generally unstable and extremely sensitive to disturbance.

G - "G" type streams are unstable, moderately steep (2-4%), entrenched gullies with no access to a floodplain. They evolve from a more stable stream type due to some natural or management caused disturbance. A little “c” indicates the slope is less than 2%.

The numbers 1-6 indicate the dominant sediment size, 1=bedrock, 2=boulder (256-2048mm), 3=cobble (64-256mm), 4=gravel (2-64mm), 5=sand (.062-2mm), and 6=silt (<.062mm).

Timing: The time of season grazing occurs relative to the phenological stage of plant development, such as early growth period, reproductive period, or dormant period. Disturbance, such as that from grazing, may provide differing responses within the plant depending upon the stage of development.

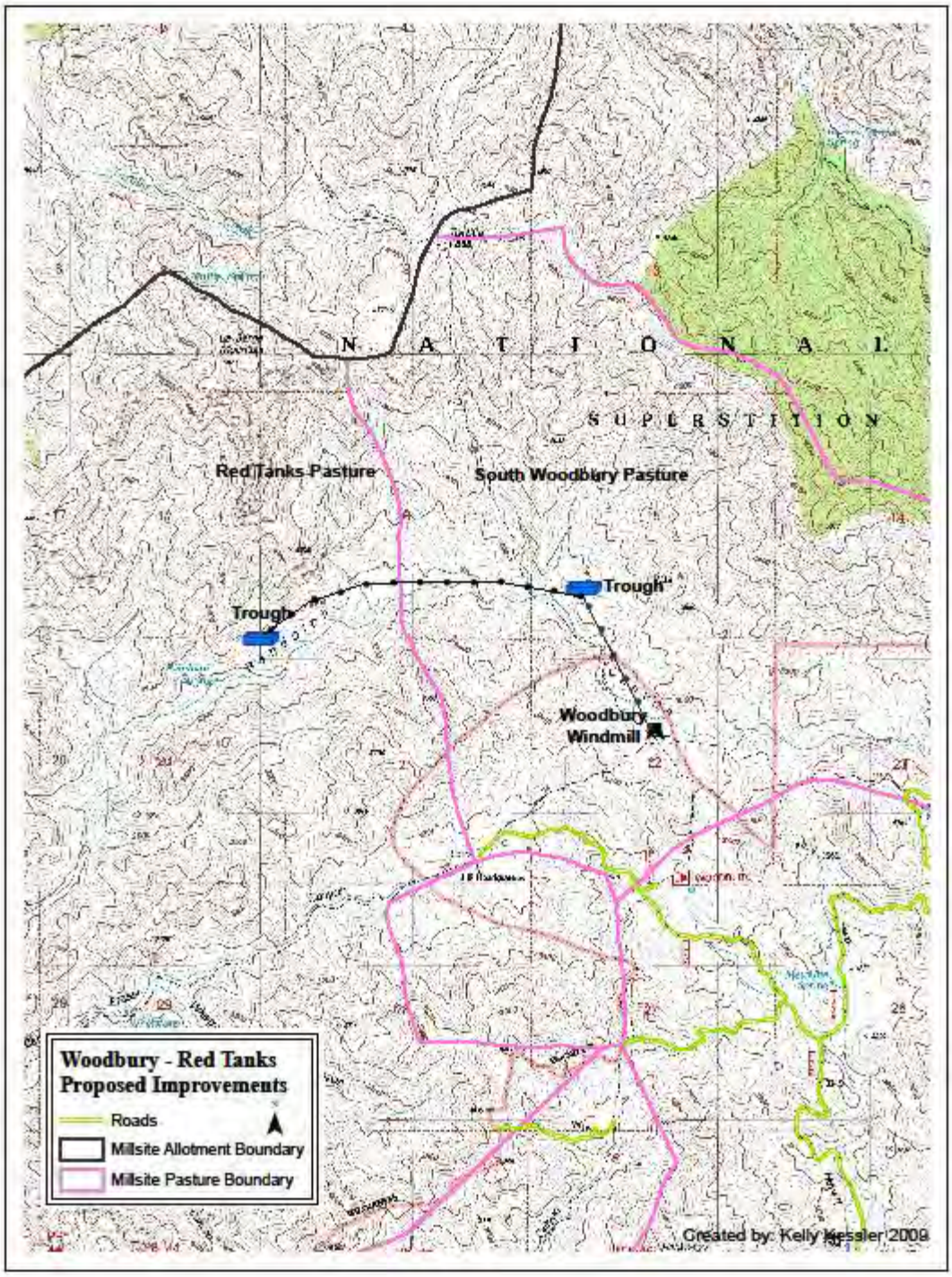
Trend: The direction of change in an attribute as observed over time.

Utilization: The proportion or degree of the current year‟s forage production that is consumed or destroyed by animals (including insects). The term may refer either to a single plant species, a group of species, or to the vegetation community as a whole. Interagency Technical Reference 1734-3, page 133.

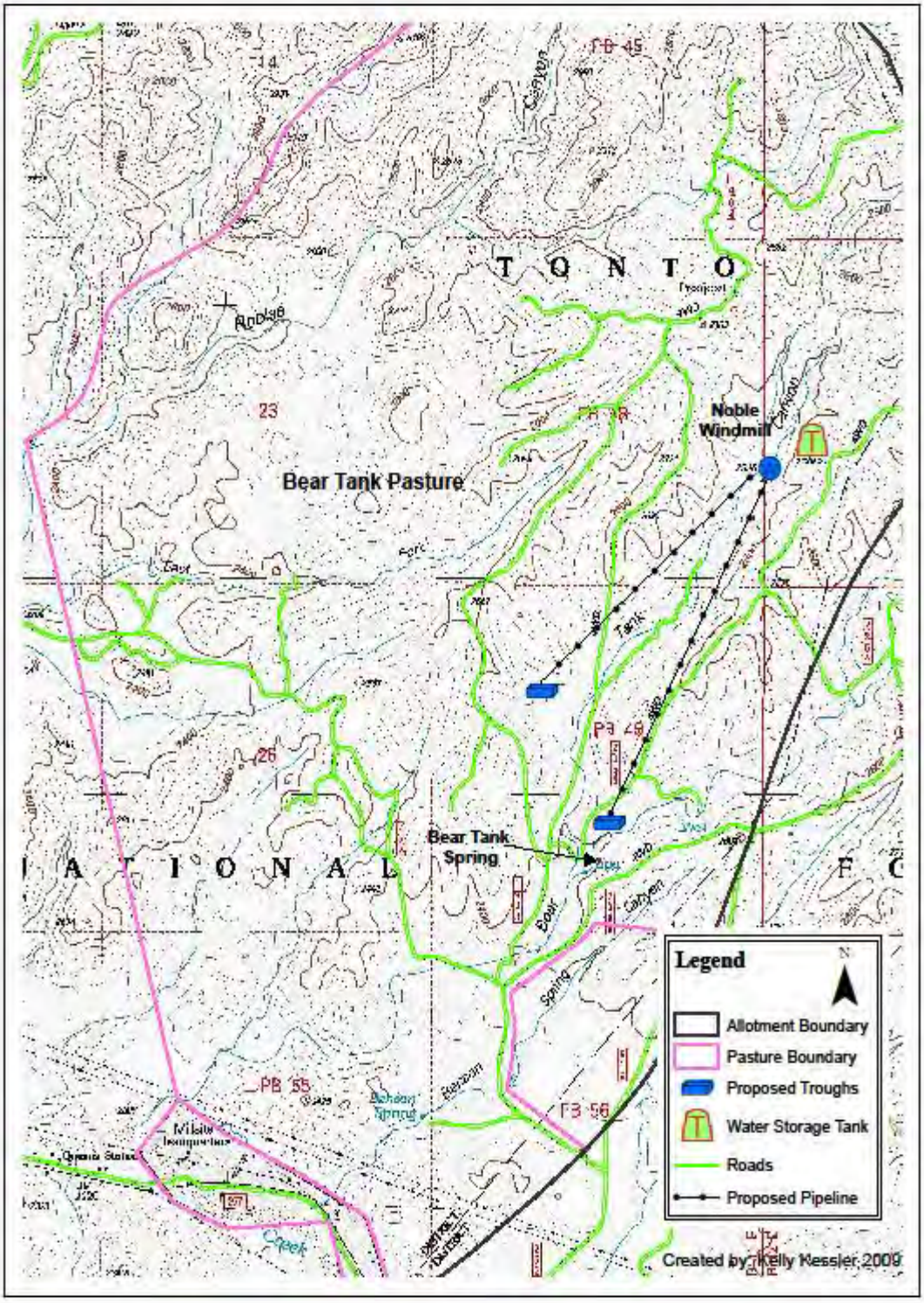
Watershed Condition: A measure of the ability of a watershed to provide a sustained and orderly flow of water while maintaining soil productivity (pg. 234 Tonto Forest Plan).

APPENDIX A

Woodbury/Red Tanks Pipeline and Trough Project



Bear Tank Pasture Pipeline and Trough Project



Cottonwood Pasture – Byous Spring Pipeline and Trough Project