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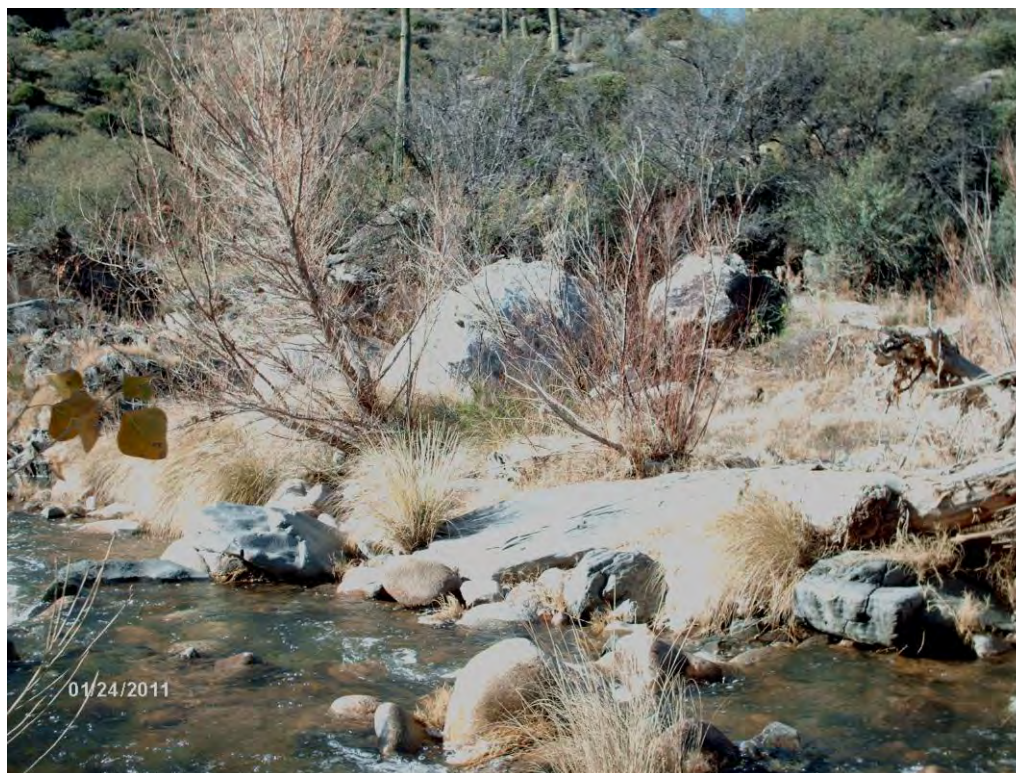
September
2011



Environmental Assessment

Horsethief Grazing Allotment Management

**Bradshaw Ranger District, Prescott National Forest
Yavapai County, Arizona**



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CHAPTER 1 – PURPOSE OF & NEED FOR ACTION

Introduction

The Prescott National Forest Interdisciplinary Range Analysis Team has conducted an environmental analysis and prepared this Environmental Assessment (EA) documentation in order to describe alternatives considered for management of the Horsethief Grazing Allotment on the Bradshaw Ranger District and the potential effects associated with each alternative. The document is provided for public review and comment and for review and consideration by the decision maker when making the decision. The analysis has been conducted in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations.

The EA is based upon background information about the allotment including current and past surveys and monitoring data, the desired condition of resources on the allotment derived from direction and guidelines in the Prescott NF Land and Resource Management Plan (1987), as amended (Forest Plan), as well as from resource specialists' knowledge of the allotment. This information, provided in Chapter 1, forms the basis for the Forest Service's Proposed Action and the current analysis. Chapter 2 provides detailed descriptions of the Forest Service's Proposed Action Alternative for management of the allotment and the No Action (No Permit Issued/No Grazing) Alternative. At the end of Chapter 2 is a summary table of anticipated effects to each resource area by alternative. Chapter 3 provides a more detailed account of the affected environment for each resource, current resource conditions, and anticipated effects of implementing the alternatives. Chapter 4 provides a list of preparers for the EA, as well as a summary of agencies, individuals, and organizations that were contacted while conducting public outreach. Supporting documents, including resource specialists' reports containing details of the existing condition and resource effects, are included in the project record maintained in the Bradshaw Ranger District Office of the Prescott National Forest, Prescott, Arizona.

Background

The Horsethief Allotment is located on the Bradshaw Ranger District of the Prescott National Forest (PNF) and represents the project area for this environmental analysis, an area of approximately 20,200 acres. The allotment is located in the southeast corner of the Bradshaw Ranger District and the Prescott National Forest, approximately 10 miles south of Mayer, Arizona.

The topography of the allotment averages from 2,900 feet along Rattlesnake Canyon to 6,500 feet at the southern most point of the crest of the Bradshaw Mountains. The allotment is located on the eastern slopes of the Bradshaw Mountains. The primary riparian drainages within the allotment are Poland Creek, Turkey Creek, and Castle Creek. Poland and Turkey Creeks converge to form Black Canyon. Castle Creek is a tributary that flows into Black Canyon Creek.

Precipitation in this area of the forest is bi-modal, with monsoon events occurring during the summer and a second period of precipitation occurring during the winter months. Annual precipitation across the allotment is highly variable from year to year and from lower elevations to higher elevations. The average annual precipitation ranges from approximately 14 inches at the lowest elevations to 29 inches at the highest.

The prominent ecotype occurring on the allotment is Sonoran desert shrub and chaparral in the lower elevations. Saguaro cactus, paloverde, mesquite, catclaw, and grasslands dominate the lower elevations. Higher elevations favor chaparral plant communities that include shrub live oak, mountain mahogany, and Manzanita with pinion and juniper on the southern slopes. Ponderosa pine and isolated pockets of Douglas fir are found at the highest elevations on the allotment, in the mountainous terrain included within the Castle Creek Wilderness. The topography in the higher elevations is very steep with precipitous slopes and deep canyons. These slopes break off into a gentler gradient forming benches at the lower elevations. Approximately half of the allotment is located within the Castle Creek Wilderness, which was established in 1984.

Under the current term grazing permit the allotment authorization is “not to exceed 3,180 Animal Months (AM’s), annually and the maximum number of livestock will not exceed 651 head at any one time”. (An AM is defined here as a month’s tenure upon the range by one animal. This is not synonymous with animal-unit month (AUM). An AUM is defined as the measure of the average amount of forage used by one cow-calf pair over the course of one month.) The maximum season of use on this allotment is November 15th to May 31st, or 6.5 months, annually. Livestock grazing has generally been a yearling steer operation during the dormant season. There are no pasture division fences on this allotment and livestock are generally stocked and rotated on a combination of natural geographic boundaries and available water. It has been approximately 10 years since this allotment was last stocked with cattle.

This analysis is required to ensure that livestock grazing on this allotment is consistent with the goals and objectives, and the standards and guidelines of the Prescott National Forest Land and Resource Management Plan (1987, as amended; Forest Plan).

Noxious weed surveys have not been conducted specifically on this allotment; however, salt cedar is known to be present in Turkey Creek, Black Canyon, and Castle Creek. Treatment of noxious weeds is addressed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mohave and Yavapai Counties, Arizona and is managed under the PNF’s noxious weeds program and will not be further addressed in this proposed action.

The Prescott National Forest designated a system of roads and trails that are open to motor vehicle use in 1989 through Forest Plan Amendment #4. Motor vehicle use off the designated road system by the permit holder to conduct activities associated with administration of the term grazing permit is allowed under the terms and conditions of the term grazing permit.

Purpose of and Need for Action _____

The purpose of and need for this proposed action is to continue to authorize livestock grazing on the Horsethief Allotment in a manner consistent with the Forest Plan while meeting resource management objectives and by applying adaptive management principles. Continuation of the livestock grazing authorization, under the described proposed action, is needed for the Horsethief Allotment because:

- Where consistent with other multiple use goals and objectives, there is Congressional direction to provide for livestock grazing on suitable lands under the Multiple Use Sustained Yield Act of 1960, the Wilderness Act of 1964, the Forest and Rangeland Renewable Resources Planning Act of 1974, and the Federal Land Policy and Management Act of 1976, as amended.

- It is Forest Service policy to continue to make contributions to economic and social well-being by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (FSM 2202.1).
- The Horsethief Allotment is scheduled for an environmental analysis of grazing management practices at this time in order to comply with section 504 of the Emergency Supplemental Appropriations and Rescissions Act of 1995, as amended (the Burns Amendment, P.L. 104-19).
- 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 222.2 (c)).
- The lands making up the Horsethief Allotment are identified as suitable for domestic livestock grazing in the Forest Plan and continued domestic livestock grazing is consistent with the goals, objectives, standards, and guidelines of the Forest Plan.
- There is a need to provide for management flexibility in order to address changing ecosystem conditions, site-specific concerns and desired future conditions provided by the Forest Plan, as amended.

Desired Conditions & Resource Objectives_____

The desired conditions and resource objectives for resources and infrastructure on this grazing allotment, based on the Forest Plan and the work of the Interdisciplinary Analysis Team, include:

- rangeland management that can respond to local or national demands for livestock production while maintaining air, soil and water resources at or above minimum local, State or Federal standards (Forest Plan, pg. 11);
- range administration that provides for the maintenance of satisfactory rangeland management status with a static or upward apparent trend (Forest Plan, pg. 32);
- management of the grazing operations using a system that is responsive to changing climatic or environmental conditions;
- the maintenance of vegetation with mid- to high similarity to the potential natural plant community (PNC) providing for ecological functionality and resiliency following disturbance while sustaining long-term productivity of the land;
- the installation and maintenance of structural improvements, such as water-supply systems, that enhance management control and flexibility and allow for effective distribution of forage use;
- the maintenance of soils in satisfactory condition over the long-term with improvement in areas departing from satisfactory condition where livestock grazing is affecting the condition;
- the maintenance of satisfactory conditions for water resources that meet total maximum daily load (TMDL) and other State water quality objectives;
- the maintenance of functioning spring-fed riparian systems, and saturated soils where potential exists, that support vegetation within site potential and provide habitat for riparian-dependent plants and animals while providing water sources for wildlife and livestock needs;

- the maintenance of fully functional riparian systems supported by herbaceous and multi-age woody vegetation, within site potential, that provides for geomorphically stable stream channels and banks and habitat for riparian-dependent plants and animals. Functional riparian systems support water quality and both hydrogeomorphic and biological attributes and processes;
- protection and preservation of important historic and cultural sites; and
- the maintenance of suitable habitats for Management Indicator Species, Migratory Bird Treaty Act species, federally Threatened and Endangered species, Forest Service Sensitive species, and for indigenous plant and animal species.

Forest Plan Direction

The Prescott Forest Plan provides the following guidance, management direction and standards and guidelines for management activities:

All Resources:

- The forest is managed with a primary emphasis on healthy, robust environments with productive soils, clean air and water, and diverse populations of flora and fauna. (pg. 11)
- Cross-country travel by any vehicle is prohibited, with the following exception(s): Approved resource management activities (employees/permittees) (pg. 19).
- Implement appropriate [access restriction] measures to ensure that significant long-term resource damage does not occur (page 20).
- Management projects within riparian areas will be in accordance with legal requirements regarding flood plains, wetlands, wild and scenic rivers, cultural and other resources and will be in accordance with standards and guidelines identified in the Southwestern Regional Guide. (pg. 30)

Range Management:

- Provide forage to grazing and browsing animals to the extent benefits are relatively commensurate with costs without impairing land productivity, in accordance with management area objectives. (pg. 12)
- Identify key ungulate forage monitoring areas. These key areas will normally be one-quarter to 1 mile from water, located on productive soils on level to intermediate slopes, and be readily accessible for grazing. Size of the key forage monitoring areas could be 20 to 500 acres. In some situations such as high mountain meadows with perennial streams, key areas may be closer than one-quarter mile from water and less than 20 acres. Within key forage monitoring areas, select appropriate key species to monitor average allowable use. (pg. 155, Prescott Forest Plan, as amended, and *Record of Decision for Amendment of Forest Plans*, USFS Southwestern Region, 6/96)
- Manage to bring all grazing allotments to satisfactory management by the end of the first decade (1986-1995). Satisfactory management occurs on allotments where management actions are proceeding according to a schedule (allotment management plan), which leads to fair or better range condition with an upward trend. (pg. 32)
- Manage livestock grazing to achieve soil and water protection objectives. Make use of cost effective range improvements and management techniques. (pg. 32)

- Control livestock grazing through management and/or fencing to allow for and favor adequate establishment of riparian vegetation and elimination of overuse. (pg. 32)
- Implement grazing systems and/or methods that will advance the ecological objectives for riparian dependent resources, and require sufficient recovery rest to meet the physiological needs of the plants and plant associations. (pg. 35)
- Proper allowable use within riparian areas will not exceed 20 percent on woody species. (pg. 35)
- Salting within a quarter mile of riparian areas for the purpose of management of livestock is prohibited. This includes the use of salt to gather livestock. (pg. 35)

Soils, Watershed and Riparian Areas:

- Protect and improve the soil resource. (pg. 13)
- Restore all lands to satisfactory watershed condition. (pg. 14)
- Give riparian-dependent resources preference over other resources. (pg. 14)
- Improve all riparian areas and maintain in satisfactory condition. (pg. 14)
- Maintain riparian communities by providing water for wildlife and livestock away from sensitive areas. (pg. 31)
- Livestock will be utilized to achieve soil and water protection objectives when:
 1. The ability of livestock to achieve these objectives has been substantiated by verifiable monitoring and/or independent research;
 2. Use of livestock is the most cost-effective means of achieving these objectives; and
 3. Use of livestock will not lead to unacceptable levels of conflict with other resources or management area direction. (pg. 34)
- Minimize impacts to soil and water resources in all ground-disturbing activities. Where disturbance cannot be avoided, provide stabilization and revegetation as part of the project. (pg. 39)
- Through the use of best management practices (BMPs), the adverse effect of planned activities will be mitigated and site productivity maintained. (pg. 40)
- Meet the following riparian standards in the Southwestern Regional Guide for 80 percent of riparian areas by the year 2030: (pg. 30)
 - Maintain at least 80 percent of the potential overstory crown closure of obligate riparian species.
 - Manage resources to create or maintain at least three age classes of woody riparian species with at least 10 percent of the woody plant cover in sprouts, seedlings and saplings where site potential exists.
 - Maintain at least 80 percent of streambank linear distance in stable condition.
 - Retain snags in riparian areas that are not a safety hazard.
- Projects impacting riparian areas will be designed to protect the productivity and diversity of riparian-dependent resources. Emphasize protection of soil, water, vegetation, wildlife and fish resources. (pg. 30)

- Riparian-dependent resources will have preference over other resources. Other resource uses and activities may occur to the extent that they support the objective of riparian enhancement. (pg. 30)
- Construct adequate exclosures to protect key riparian areas from livestock grazing where rest rotation or time control grazing fails to provide adequate protection to the riparian areas. (pg. 31)
- Manage the ground surface layer to maintain satisfactory soil conditions (*i.e.*, to minimize soil compaction) and to maintain hydrologic and nutrient cycles. (pg. 145)

Wildlife, Rare Plant, Fish & Aquatic Species Management:

- Manage for a diverse, well distributed pattern of habitats for wildlife populations and fish species. (pg. 13)
- All water developments will consider small game and nongame needs and escape devices. (pg. 27)
- All fencing will be to wildlife standards and consider local species' needs. (pg. 27)

Heritage Resources:

- The forest will comply with the National Historic Preservation Act, Executive Order 11593, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the Programmatic Agreement regarding cultural resources protection and responsibilities executed by the New Mexico, Arizona, Texas and Oklahoma State Historic Preservation Officers (SHPO), the advisory Council on Historic Preservation, and the USDA Forest Service, Southwestern Region. (pg. 21)

Public Involvement _____

Notice of the intention to initiate the present analysis of the proposed action for this allotment was provided in the Schedule of Proposed Actions (SOPA) as of April 2010 at <http://www.fs.fed.us/sopa/>. A letter dated 7/27/2010 describing the proposed action for management of this allotment was sent to the permit holder of the allotment under consideration, to adjacent allotment permit holders, and to members of the public, non-profit groups, and other entities who have expressed interest in livestock grazing activities. It was also sent to State and Federal government entities and to six Native American Tribes interested in activities in the area inviting them to provide information regarding concerns or opportunities related to the proposal.

Scoping Response / Issue Identification _____

The purpose of scoping is to provide an opportunity for the public to share concerns or issues they may have regarding an action being proposed by the Forest Service. Issues are defined as concerns about the effects of a proposed action that are not addressed by the project design or alternatives to the proposed action. The subject of an issue must be within the scope of the proposed action and relevant to the decision to be made; not already decided by law, regulation, or higher-level decisions; and must be supported by scientific or factual evidence. Concerns or issues that meet these criteria may be determined to be key issues and may drive the development of alternative actions for analysis if they have not been resolved or already addressed in an alternative.

One letter was received in response to the scoping period for this project that began on July 27, 2010. The comments in this letter were supportive of a reduction in the permitted livestock number, and the continuation of winter-season only grazing. The commenter questioned whether the allotment should be retired from grazing since there are still resource concerns in uplands and riparian areas even though the allotment has not been grazed for 10 years. The content of the scoping response letter was broken down into individual statements of concern that were then responded to by agency personnel (Project Record, PR #30). The Deciding Official reviewed the content analysis from scoping and the agency responses and determined whether the comments would lead to the development of other project alternatives.

No responses received during the scoping period raised concerns that will not be addressed through implementation of the proposed action within the framework of the direction, standards and guidelines of the Prescott Forest Plan. One of the alternatives being analyzed is the No Grazing option, which addresses the concern raised in the scoping comment letter advising that the allotment should be retired from grazing.

Permit and Consultation Requirements

Consultation with the Arizona State Historic Preservation Office, in compliance with the National Historic Preservation Act of 1966, will be completed before a decision is made regarding this allotment. Consultation with the Hopi, Hualapai, Tonto Apache, and Yavapai Prescott Tribes, and the Fort McDowell Yavapai and Yavapai-Apache Nations was conducted through project scoping and continued coordination.

Consultation with the US Fish and Wildlife Service (FWS) is not being conducted because there will be no effects to Federally listed species (Endangered, Threatened, Proposed, or Candidate) or their designated Critical Habitats by implementing this project. The Wildlife, Fish, and Rare Plant specialist report in the project record offers further documentation of this determination.

The selected alternative for management of this allotment will be implemented through Allotment Management Plans (AMPs) and Annual Operating Instructions (AOIs), issued by the District Ranger, under a Term Grazing Permit issued for up to 10 years. Additional permits may be issued as long as desirable resource conditions continue to be maintained or are moving toward desired conditions.

Decision to be Made – Decision Framework

The Bradshaw District Ranger is the responsible official who will decide, based upon the Purpose and Need for this action, the information provided in this EA, the project record, and other considerations, whether to continue livestock grazing on the Horsethief Allotment; if so, under what conditions; and whether new improvements including fences will be constructed. The decision will also include a determination of consistency with the Forest Plan, National Forest Management Act, National Environmental Policy Act, and other applicable laws, regulations and executive orders.

In addition to this decision, the Ranger will make a finding on the significance of the environmental effects anticipated from the implementation of the selected action and whether an environmental impact statement (EIS) will need to be prepared.

Future Review of the Decision

Adaptive management, as described in this document, is based on the cycle of implementation of a course of action, monitoring of conditions and results, and adjustment of management as needed to continue to steer a stated course. Monitoring of adaptive management is designed to answer the question “Is acceptable progress being made towards attainment of resource management objectives and thus desired conditions?” Changes in management actions are considered and implemented as appropriate when monitoring indicates that current actions are not being effective in reaching defined objectives. Through the implementation of a NEPA decision that includes adaptive management principles and which identifies an array of possible management practices, the grazing permit, Allotment Management Plan (AMP) and/or Annual Operating Instructions (AOI) may be administratively modified or re-issued over time, based on monitoring, as long as the modified permit, AMP, and/or AOI are within the bounds of the original adaptive management decision and supporting NEPA analysis and documentation. (FSH 2209.13, Section 92.23b)

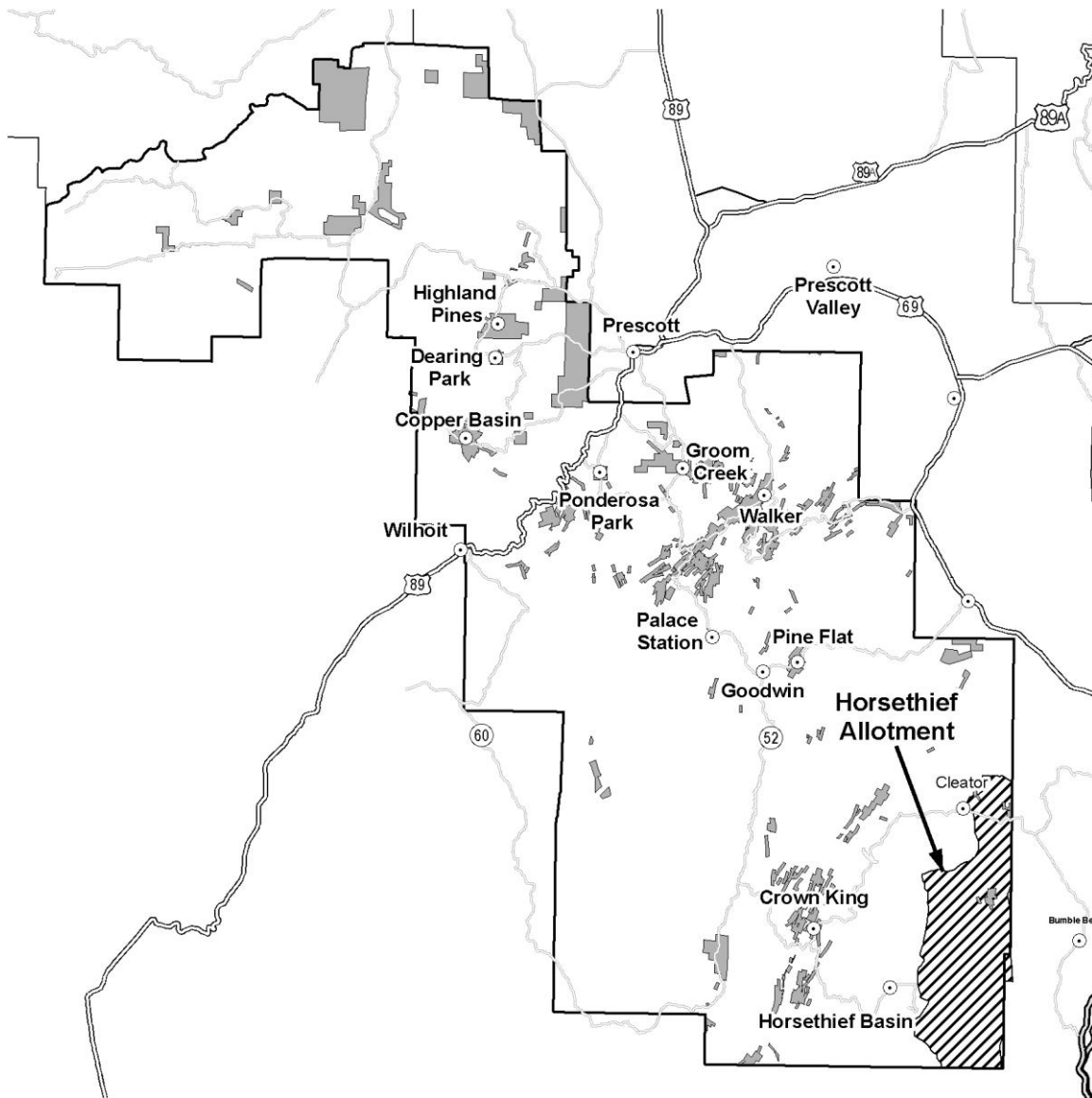
A project-level, NEPA-based decision, such as the decision to be made based upon this analysis, remains valid as long as the authorized activity complies with laws, regulations, and the Forest Plan, and is within the scope of the decision. Reviews of existing project-level decisions must be conducted on an interval of at least 3-5 years to determine if the grazing activity, permit(s), AMP, and AOIs are consistent and within the bounds of the existing NEPA documentation; if that analysis and documentation continue to remain valid; or if new information exists that requires some further analysis and potential modification of the activity. If the responsible official determines that correction, supplementation, or revision is not necessary, implementation of existing decisions shall continue. The findings of the review shall be documented in the program or project file. (FSH 2209.13, Sec. 96)

CHAPTER 2 – Proposed Action and Alternatives

This chapter describes the alternatives considered for the management of the Horsethief Allotment. The alternative descriptions provide the basis for a comparison of alternatives and define the differences between actions which would be taken with each. Monitoring to be conducted is also described.

A map showing the location of the allotment is provided here. A detailed map of the allotment showing pastures and proposed improvements is provided in Appendix 1.

Vicinity Map – Horsethief Allotment



Departure between Existing and Desired Resource Conditions

A comparison of existing resource conditions with desired conditions as stated in Chapter 1 forms the basis for determining a course of resource management actions. If existing conditions are the same as desired conditions, there is no need for a change from current livestock management. If existing conditions and desired conditions are not the same, there is a need for change. The representative map units are Terrestrial Ecosystem Survey map units (TES) 275 and TES 360. There is a need to improve the cover of perennial grasses at some locations in TES 275 to achieve mid to high similarity of plant cover and species composition as compared to site potential for the map unit. A livestock enclosure will be constructed in TES 275 once grazing resumes. The achievable level of improvement in TES 275 will be determined from comparison with the grazing enclosure study site levels for vegetative cover and spatial distribution. There was an apparent downward trend in vegetation in TES 275 at the time of sampling, and an upward trend towards site potential is desired. The spatial distribution of vegetation needs improvement so that it provides adequate protection from soil erosion. The other representative map unit, TES 360, was seeded with a non-native grass species following a wildfire, which will have long term impacts to the species composition. The cover from perennial grasses at TES 360 is currently meeting desired vegetative conditions, but this unit should be managed to allow for an increase in native grass species where possible, to achieve mid to high similarity with the site potential.

Resource Management Objectives:

Resource management objectives are concise statements of measurable, time-specific outcomes intended to achieve desired conditions. Management objectives are the means of measuring progress toward achieving or maintaining desired conditions. The following management objectives were developed to measure progress towards meeting desired conditions:

Vegetation:

- In TES map units 275 and 360 manage for an increase in graminoid cover and plant composition reflective of mid to high similarity with site potential. Site potential for TES 275 will be demonstrated within the constructed enclosure.

Soil:

- In TES map unit 275 manage for an increase of graminoid cover and improve vegetation spatial distribution to a level commensurate with the site potential as shown within the grazing enclosure.

Riparian:

- Lower Turkey Creek - Detect establishment and increase of perennial herbaceous vegetation on the seasonal greenline; woody species recruitment; and indicators of increased bank and channel stability.
- Castle Creek and Black Canyon Creek – Maintain the naturally establishing perennial herbaceous vegetation on the seasonal greenline and the naturally establishing woody riparian recruitment.

Where desired resource conditions are not being met, site-specific resource protection measures were developed as part of the proposed action that are intended to lead towards improvement and achievement of management objectives.

Attainability of Resource Management Objectives:

The time frame associated with attainment of the management objectives listed above is the 10-year term of the grazing permit. Monitoring of short-term indicators and effectiveness monitoring will be conducted during the 10-year term of the permit that will inform managers to make needed adjustments in livestock management in order to make progress towards achieving desired conditions. The ID Team developed the management objectives and time frames to achieve them considering the best available science as it pertains to the potential for resource improvement that could be realized by changing grazing management only. There is some uncertainty as to whether TES 275 can improve towards attainment of desired conditions by improved grazing management alone. The allotment has not been authorized for grazing since 1996 and there are still areas needing improvement. Recurrent wildfire over the past 3 decades has influenced the vegetation and soils on the allotment. The non-native winter annuals that are found in TES 275 including red brome grass and filaree, will continue to be present and may increase fire frequency in the Sonoran desert vegetation type. Future wildfire could alter vegetation and soils. Allowing some winter grazing when these annuals are present may reduce fuel-loading and fire frequency. To determine what level of improvement can be expected in TES 275 by improved grazing management alone, a fenced enclosure will be built to preserve an ungrazed area in TES 275 for comparative purposes. This fence would not be built until livestock are once again returned to the allotment.

Alternatives Studied in Detail

Alternative 1 – Proposed Action

The following Proposed Action has been developed to meet the project's purpose and need for action. The Proposed Action consists of the following components: stocking rate; adaptive management; best management practices; resource protection measures; authorization; structural range improvements; and monitoring. The Proposed Action follows current guidance from Forest Service Handbook 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decision-making).

Stocking Rate

The estimated grazing capacity on the Horsethief Allotment (Project Record #19) from the historical actual use of livestock grazing records, and application of calculations based upon Holechek (1988), is variable and would support a range of livestock numbers based on fluctuating conditions. Estimates were made on the allotment as a whole and also by considering only the acreage outside the wilderness. Animal Units¹ ranged from 74 Animal Units (~ 450 AUM) in the non-wilderness areas for 6 months, to 145 Animal Units (883 AUM) over the entire allotment for 6 months. Converting the AUM values to yearling cattle equivalence allows for a range from 106 to 207 yearlings for 6 months (a yearling is equivalent to 0.7 AUMs). The proposed upper level stocking rate (883 AUM) is a 60% reduction from the current permitted livestock number.

¹ Animal Units and Animal Months used in these calculations are based upon the Society for Range Management (1974) definition: An animal unit is one mature (1000lb) cow. This animal would be expected to consume 2.6% of its body weight per day or 26 lbs.

This range of variability is consistent with the legacy analysis data. The current term grazing permit for the allotment allows for use not to exceed 3,180 Animal Months (AMs) annually, and the maximum number of livestock will not exceed 651 head at any one time. There is currently permitted seasonal use from November 15th to May 31st, or 6.5 months. In terms of cattle numbers, the current term permit allows for up to 489 yearlings to graze for 6.5 months, or 530 yearlings for 6 months. As stated previously, the allotment has been in non-use status since 1997. In the years prior to that, from 1984-1996, the average number of yearlings that were stocked is about 203 yearlings for 6 months, or 1215 AMs. This average level of stocking over the 13-year period is commensurate with the proposed level of stocking. It is important to note that Forest Service Actual Use data in Animal Months (AM) is not synonymous with the Animal Unit Month (AUM) made from calculations based on the consumption of forage therefore only rough comparisons are warranted with AUM's estimated through calculations. As with any capacity estimate, monitoring over time will be necessary to validate the proposed stocking rate.

Adaptive Management

The Proposed Action includes the application of adaptive management principles. Adaptive management is designed to provide sufficient flexibility to allow livestock management to address changes in climatic conditions, seasonal fluctuations in forage production and other dynamic influences on the ecosystem in order to effectively make progress toward or maintain desired conditions of the rangeland and other resources. Adaptive management will also include the implementation of resource protection measures described below.

Under the adaptive management approach, regular/annual monitoring of short-term indicators may suggest the need for administrative changes in livestock management. The need for adaptation would be based on the magnitude or repeated re-occurrence of deviations from guidelines provided, or due to indications of a lack of progress toward desired resource conditions. The timing of such management changes would reflect the urgency of the need for adaptation. Annual Operating Instructions and the Allotment Management Plan may be modified as appropriate to adapt management within the parameters of this proposed action.

If monitoring indicates that progress toward desired conditions is not being achieved on the allotment, management will be modified in cooperation with the permittee. Modifications may include adjustments in timing, intensity and duration of grazing. Timing is the time of year the livestock are present in a pasture. Intensity is the degree to which forage is removed through grazing and trampling by livestock. Duration is the length of time livestock are present in a given pasture.

These modifications would be made through administrative decisions such as: the specific number of head stocked on the allotment annually or in a particular season; the class of animals stocked (cow/calf pairs vs. yearlings, steers or heifers, etc.); specific dates of grazing; livestock herd movement; and/or periods of rest, deferment or non-use of portions or all of the allotment for an appropriate period of time, as conditions warrant. Such changes will not result in exceeding the AUMs authorized for livestock use included in this proposed action.

Future proposals to use other resource management tools such as prescribed fire or mechanical vegetation treatments will be subject to additional project-specific analysis under the National Environmental Policy Act. Adaptation of livestock management may be applied to accommodate use of these vegetation management tools.

Best Management Practices

Best Management Practices (BMPs) are a practice or combination of practices determined to be the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals, and are developed to comply with the Clean Water Act (FSH 2509.22_10.5). The Interdisciplinary Team followed the guidance in the Southwest Region Forest Service Handbook 2509.22, Chapter 20, in the formulation of the following resource protection measures related to range management that also function as BMPs to address water quality and watershed concerns. These resource protection measures will be implemented in order to comply with the Clean Water Act.

Resource Protection Measures

Resource protection measures are incorporated into the project as design features to protect forest resources such as soil, water, vegetation, riparian habitats, and wildlife, as well as to maintain or make progress toward desired conditions.

Allotment-wide Measures: On those portions of the allotment where no specific resource concerns were identified by the Interdisciplinary (ID) Team, livestock will be managed with the objective of maintaining or improving the condition of rangeland resources through the use of grazing intensity guidelines. Holechek and Galt (2000², 2004³) provide a comprehensive review of studies related to residual leaf lengths on southwestern forage species and growth forms as indicators of grazing intensity. They concluded that grazing at moderate or conservative intensities will generally result in maintaining or improving rangeland conditions over time.

Grazing intensity guidelines will be applied across the allotment to provide rangeland managers with information needed to adapt management through adjustments, as may be needed, on an annual basis. Examples of appropriate grazing intensity and forage use guidelines for areas of the allotment that are generally described to be in satisfactory condition include:

1. Conservative grazing intensity (31-40% use) on key herbaceous species during the spring and summer growing periods (typically April 1 to September 30); this proposal would allow grazing mainly in the dormant season, from September through April only;
2. Moderate grazing intensity (41-50% use) on key herbaceous species during the dormant season;
3. Moderate grazing intensity (50-60% leaders browsed) on key upland woody species;
4. Minimum stubble height on key riparian herbaceous species, four to six inches where sedges and rushes are key and eight inches where deergrass is key;
5. Up to 20% use on key woody species within riparian areas.

Grazing intensity will be determined using key herbaceous and browse species within key areas. Guidelines would be adjusted if periodic monitoring indicates that site-specific measures, described below, are not resulting in desired effects.

Site-specific Measures: Through the allotment analysis process undertaken by the ID Team, certain areas have been identified where the current condition of soils and herbaceous components are in less than the desired condition. Management objectives for vegetation, soil, and riparian areas will be achieved by limiting grazing intensity at less than functional sites, through the application of:

² Holechek, J.L. and D. Galt. 2000. Grazing Intensity Guidelines. *Rangelands* 22 (3):11-14.

³ Holechek, J. and D. Galt. 2004. More on Stubble Height Guidelines. *Rangelands* 26 (4):3-7.

1. a conservative grazing intensity guideline (31-40% use) during the dormant season on impaired soils and to discourage any concentrated livestock use on TES map unit 275;
2. maintain minimum stubble heights on key herbaceous species at riparian and spring areas in partially functional status, eight inches where sedges and rushes are key and 12 inches where deergrass is key;
3. incidental use only⁴, regardless of season, at any riparian and spring areas in non-functional status; no springs or riparian areas are currently identified as non-functional.
4. defer livestock grazing annually during the growing season (generally May – August);
5. evaluate the need for livestock deferment or management adjustments to provide for woody species establishment at times when woody recruitment occurs within Castle Creek, Turkey Creek, and/or Black Canyon Creek;
6. livestock enclosure fencing may be constructed at spring/seep riparian areas if desired conditions are not achieved through management of livestock grazing. Enclosure fencing will be designed and constructed to protect riparian vegetation while still providing for livestock water.

In the event that the above resource protection measures do not accomplish site-specific resource objectives, additional optional measures may be implemented. These optional measures will be designed to address site-specific resource concerns and may include, but are not limited to, such things as temporary fencing, additional livestock enclosures, water pipelines, storage and troughs; reconstruction of existing spring improvements, reconstruction of non-functional improvements and construction of new improvements such as spring boxes, drift fences, and water gaps.

Authorization

The Bradshaw District Ranger proposes to continue to authorize livestock grazing on the Horsethief Allotment under the following terms:

- ✚ A term grazing permit will be issued providing for livestock use over a range of Animal Unit Months from 450 to 883 AUMs for up to 182 days between the months of September and April. (An AUM is defined as the average forage consumed by one cow/calf pair over a period of one month.) As an example, this would provide for livestock numbers to range from 106 to 207 head of cattle, yearlings, for six months.
- ✚ Livestock will be managed using natural geographic boundaries, barriers, and available water sources.
- ✚ Range improvements will be maintained in a functioning condition in order to facilitate livestock management.

The term grazing permit will be issued for up to ten years. The permit will authorize livestock use within parameters identified in this proposal, and subsequent permits may be issued as long

⁴ Incidental Use targets the lower range of the light use (0-30%) category in all seasons by applying such practices as herding or by limiting where livestock attractants such as salt or water are placed relative to the area of concern. Adaptive management methods and practices to achieve this will be based on site-specific allotment management scenarios.

as resources continue to move further toward desired conditions or are being maintained in satisfactory condition, as appropriate.

Structural Range Improvements

Construction of New Range Improvements: The proposed action includes construction of the following structural improvements; see the map in appendix 1 for the location of the following improvements:

1. Reconstruct 3 to 4 miles of the west allotment boundary fence within the Castle Creek Wilderness (#002C14).
2. Establish a reference soil and vegetation monitoring enclosure in TES 275 to determine if site specific management objectives are feasible and being met.

Maintenance of Range Improvements: The Term Grazing Permit includes a list of all improvements which the permittee will continue to maintain at a level that effectively provides for their intended uses and purposes. Range improvements will be inspected periodically during the term of the permit to document condition. Annual Operating Instructions (AOIs) will identify range improvements in need of maintenance. Existing improvements may be replaced when their conditions warrant.

Access to Improvements: Authorization for cross-country motorized travel is provided for the permittee to administer the livestock operation and maintain improvements under the terms and conditions of the Term Grazing Permit.

Annual authorization for actions implementing management direction in the Allotment Management Plan will be included in the Annual Operating Instructions, such as a description of the anticipated level of cross- county travel, travel needed for improvement maintenance, new improvement construction or reconstruction of existing improvements.

All authorizations for cross-country motorized travel are subject to existing regulations intended to protect natural and/or heritage resources. Cross-country travel is not allowed when such travel would cause unacceptable resource damage.

Monitoring

Three types of monitoring will be used - implementation monitoring, periodic monitoring of short-term indicators of resource conditions, and effectiveness monitoring.

Implementation Monitoring: This monitoring will be conducted on an annual basis and will include such things as livestock actual use (# of head, # of months) and scheduled and unscheduled inspections to ensure that all livestock and grazing management measures stipulated in permits, AMPs and AOIs are being implemented (e.g. cattle numbers, on/off dates, rotation schedules, maintenance of improvements, mitigation measures).

Periodic Monitoring of Short-term Indicators of Resource Conditions: Short-term indicators of resource conditions such as forage utilization, residual forage, species composition, plant cover, frequency or density, and/or vegetative ground cover will be monitored on the allotment at key areas and at areas identified with site-specific resource concerns. Methods will include generally accepted monitoring protocols.

The purpose of periodic monitoring of short-term indicators is to determine:

1. If individual plants have had an opportunity to recover, grow and reproduce following grazing impacts.
2. If sufficient residual forage remains at the end of the growing season to provide for other resource values or requirements such as soil productivity, wildlife habitat, and dormant season use.
3. If maintenance or improvement of rangeland conditions are indicated.
4. If management adjustments are warranted for the following season to provide for the physiological needs of primary forage species and other resources identified as concerns.
5. If soils and riparian areas are maintaining or moving toward desired conditions.
6. If critical areas are moving toward desired conditions.

Meeting guidelines established for short-term indicators is not a management objective; rather, guidelines are one of the indicators or tools managers use to guide management. These point-in-time monitoring measurements provide information about current resource conditions and apparent trend. When and where resource condition-indicators on an allotment are obviously better than those called for under management guidelines, actual measurements may or may not be recorded every year for all key areas; however, at a minimum, observed general forage conditions at the end of each growing season will be documented in the allotment file by rangeland managers. Grazing intensity guidelines may be revised upward or downward as conditions warrant and as monitoring indicates the status of progress toward desired conditions.

Effectiveness Monitoring: Monitoring, according to a Monitoring Plan to be established in the Allotment Management Plan, to evaluate the success of management in achieving the desired objectives will occur within key and critical areas or on permanent transects at an interval of 10 years or less. Initial baseline information will be collected on this allotment. Effectiveness monitoring may also occur if data and observations from monitoring of short-term indicators suggest a need for additional information.

Both qualitative and quantitative monitoring methods will be used in accordance with the Interagency Technical Reference, Region 3 Rangeland Analysis and Management Training Guide, and the Region 3 Allotment Analysis Handbook.

Alternative 2 – No Action/No Grazing Alternative_____

Alternative 2 is the No Action/No Grazing Alternative required by FSH 2209.13 Chapter 90. Under Alternative 2, livestock grazing on the Horsethief Allotment would be discontinued and the Term Grazing permit would be cancelled after a 2-year notification to the permit holder (FSM 2231.62d/FSH 2209.13-16.24).

Authorization

Under this alternative, livestock grazing would not be authorized.

New Range Improvements

Under this alternative, no new range improvements would be constructed on the allotment.

Maintenance of Existing Range Improvements

Under this alternative, maintenance of range improvements normally assigned to the permit holder would no longer occur.

Cancellation of the Grazing Permit

After cancellation of the Term Grazing Permit, existing structural improvements that contribute to resource protection or that are important to other resources and functions, such as water sources for wildlife populations or fire control, would remain but would not be maintained unless this activity were funded under another resource area on the Prescott NF or by a cooperating partner. Removal of improvements losing their functionality would have to be authorized under a future NEPA decision if new ground disturbance were anticipated. Where allotment boundary fences are necessary, the maintenance of these fences could be reassigned to adjacent grazing permit holders in order to maintain the integrity of the boundaries of adjacent allotments.

The cancellation of the term permit under this alternative does not represent an official administrative closing of the allotment; rather it would represent the suspension of grazing on this allotment for an undetermined amount of time, until or unless a different decision is made. This alternative could be selected by the responsible official in situations of compelling resource concerns where higher resource values may be at risk and conflict directly with livestock grazing management.

Comparison of Alternatives and Effects for Horsethief Allotment

| Horsethief Allotment | Alternative 1 Proposed Action | Alternative 2 No Action/ No Grazing |
|---|---|--|
| Authorization (AUMs, Season of Use & Term) | Seasonal grazing, from 450 to 883 AUMs for up to 182 days between the months of September and April. As an example, this would provide for livestock numbers to range from 106 to 207 head of cattle, yearlings, for six months. Permit term is 10 years. | N/A |
| Grazing Intensity | Conservative to Moderate, except in areas of concern where site-specific measures apply; riparian herbaceous stubble-height guidelines and 20% woody biomass utilization limits apply | N/A |
| New Improvements | <p>Reconstruct 3 to 4 miles of the west allotment boundary fence within the Castle Creek Wilderness.</p> <p>Establish a reference soil and vegetation monitoring enclosure to determine if site specific management objectives are feasible and being met in areas of concern.</p> <p>Livestock enclosure fencing may be constructed at springs/seep riparian areas if desired conditions are not achieved through management (resource protection measure)</p> | None |
| Maintenance of Improvements | Maintenance assigned to the permittee during term of permit | Maintenance of range improvements discontinued |
| Monitoring | Monitoring of implementation and effectiveness of Adaptive Management during term of permit | Monitoring of livestock use and effects discontinued |

| Horsethief Allotment | Alternative 1 Proposed Action | Alternative 2 No Action/ No Grazing |
|--|---|--|
| Vegetation Effects | <p>Management flexibility with adaptive management related to the timing, intensity, and frequency of grazing is responsive to plant physiological needs. Dormant season grazing provides growing season rest every year, while providing for use of non-native winter annuals when they are abundant. Upper limit of stocking is reduced by 60% from current level to coincide with actual forage production capabilities of the landscape.</p> <p>Riparian vegetation is managed to retain stubble of herbaceous vegetation necessary to protect stream banks. Woody riparian vegetation is managed at 20% use to ensure reproductive capability and plant health. Riparian vegetation fluctuates with climatic events and periodic flooding of varying intensity that can remove vegetation.</p> | <p>Livestock use discontinued. Areas that are dominated by non-native grasses will continue as such even in the absence of livestock grazing. May be increased fire susceptibility in the absence of grazing in those years where non-native winter annuals (red brome, filaree) are abundant. Frequent recurrent fire has the potential to expose soil to erosion and cause shifts in vegetation composition to early seral species such as annual grasses and forbs.</p> <p>Vegetation in riparian areas not grazed but fluctuates with climate and subject to flooding events that return vegetation to early seral stages.</p> |
| Watershed/Soil Effects | <p>Satisfactory soil conditions would be maintained by employing adaptive management measures. Soils in less than satisfactory soil conditions would improve within their ecological capability through the application of resource protection measures designed to improve vegetation conditions.</p> | <p>Satisfactory soil conditions would be maintained. Soil conditions in less than satisfactory soil condition would improve within their ecological capability.</p> |
| Wildlife/Rare Plant/Aquatic Species Effects | <p>Since the allotment does not contain known populations of Threatened or Endangered species, and potential habitat is lacking, there will be no effects to Federally listed species (Endangered, Threatened, Proposed, or Candidate) or their designated Critical Habitats.</p> | <p>May provide more rapid movement toward desired habitat conditions in both uplands and riparian areas, although TES 275 has been slow to improve in absence of grazing due to recurrent wildfires and pervasive non-native plants; water availability may slightly decrease as water source improvements age without</p> |

| Horsethief Allotment | Alternative 1 Proposed Action | Alternative 2 No Action/ No Grazing |
|---|---|--|
| | <p>Riparian and upland areas desired conditions will be improved through conservative or moderate use guidelines and continuation of dormant-season (winter) grazing. Some impacts on Management Indicator Species (MIS) habitat, but no effect to trend of MIS species forest-wide. Effects to Regional Forester sensitive species may impact individuals but are not significant and would not result in a trend toward federal listing. Some impacts to Priority species of migratory birds but would not have a measurable negative effect to their populations. No impacts to snags, Important Bird Areas or Overwintering Areas. Meets desired condition for plant and animal species and their habitats.</p> | <p>maintenance; any potential impacts to Forest Service sensitive species, Management Indicator Species and migratory birds from the presence of livestock will no longer occur.</p> <p>Meets desired condition for plant and animal species and their habitats.</p> |
| Archeological Effects | No adverse effects on heritage resources | No effects on heritage resources. |
| Recreational Effects | No adverse effects on recreational opportunities | No effects on recreational opportunities |
| Compliance w/ Forest Plan and Federal Regulations 36 CFR 222.2 [c] | Yes, through application of grazing management, Forest Plan goals for resource management met over time. Consistent with policy to manage forage-producing federal lands for livestock grazing. | Yes, achieves Forest Plan resource management goals. Not consistent with direction to manage forage-producing lands for livestock grazing. |

CHAPTER 3 – Existing Condition & Environmental Effects

A summary of the existing resource conditions and environmental effects of management alternatives is provided in this chapter. Each resource specialist has considered the direct and indirect effects that would be expected to occur from implementation of the alternatives addressed in this EA. They have also considered the past, present and future activities, listed in the table below, that may be affecting resources in the cumulative effects analysis area as defined for each resource. Cumulative effects result from the addition of the direct and indirect effects on each resource to the effects of these past, present and reasonably foreseeable future actions. The summation of these effects is reviewed in order to determine if all the effects, when considered collectively, accumulate to a significant level. The resource specialist's reports, included in the project record, contain details of these considerations.

The following table summarizes the past, present and future activities within the Black Canyon 5th level watershed. The Soil and Watershed Cumulative Effects report (PR #28) further relates some of these activities to the three 6th level watersheds that make up the project area (Black Canyon Creek, Lower Turkey Creek, and Poland Creek 6th level watersheds). For certain resources, the cumulative effects area of consideration is the allotment boundary. The map in Appendix 5 defines both the 6th and 5th level watersheds as they relate to the project area.

Past, Present and Future Activities Table Horsethief Allotment – Black Canyon Creek 5th Code Watershed

| Type of Activity | Past Activities/Events | Present Activities | Future Activities |
|---|--|---|---|
| Wildfire Suppression | Historic activity throughout watershed. Wildfire acres from 2006-2008: 11,775 | Less than 1 acre in 2011 | unknown |
| Timber and vegetation treatment including tree planning. | 2004-2010: 436 acres | None planned | None planned |
| Rx Burns | RX burns acres from 2003-2010: 8,491. | Ash Creek RX burn approx. 3,500 acres | Horsethief RX burns approx. 1,200 acres |
| Livestock Grazing | Past allotment management on 7 active allotments on NFS lands; Crown King and Lane Mtn Watershed not grazed since 1990's and 1975, respectively; livestock grazing on other land ownerships. | 7 allotments managed to standards and 2 areas presently closed to grazing; Crown King Allotment and Lane Mountain Watershed | Continuing management on active allotments and 2 areas remain closed to grazing |

| Type of Activity | Past Activities/Events | Present Activities | Future Activities |
|---|--|---|---|
| Water Supply Improvements | Developed livestock waters include stock tanks, springs, wells, pipelines and troughs; water developments and uses on private lands | Continuation of uses | No new developments planned on allotment; unknown developments on private land |
| Recreational Activities | Camping in 7 PNF developed campgrounds, dispersed camping, hiking, trailheads, recreational placer mining, OHV, day-use areas, hunting, and sight-seeing | Continuation of developed and dispersed camping and other recreational uses | No new developments planned |
| Wilderness Areas | Castle Creek Wilderness designated in 1984 | Continuation of uses | Potential wilderness area identified in Forest Plan revision – Castle Creek contiguous is 4,925 acres and occurs entirely within the Horsethief Allotment |
| Roads, Utility ROWs, Land Development , Special Use Permitted and Land Exchanges | 249 miles of road on Prescott National Forest plus 144 miles on other ownerships. Road maintenance. Utility ROW maintenance, communication special uses, gravel pits, private land fencing and access through NF | Continuation of uses | None planned |
| Mining | 63 mines (on all included land ownerships). Both placer and lode mining dating from mid 1860's | 108 current and pending | 197 continuation of current and pending plus unknown status |

Rangeland Vegetation

Existing Condition:

The Terrestrial Ecosystem Survey of the Prescott National Forest and its associated Ecological Classification is used in describing the vegetative condition on the Horsethief Allotment. Process and methodology are described in "Field Process for Assessing Rangeland Conditions as Part of Rangeland NEPA Analysis on the Prescott National Forest (PR #20). The R3 Rangeland Analysis and Management Training Guide provides guidance in the use of Desired Vegetation Status (DVS) to determine Rangeland Management Status (RMS); RMS is the allotment managements' success in meeting resource objectives. For this project, the DVS was determined to be the Potential Natural Community (PNC) for those map units not influenced by fire-rehab seeding. For fire-influenced map units, the DVS was determined from PNC but related to structural community types for potential amounts of grass, shrubs, and trees. The

desired conditions developed by the Interdisciplinary Team and the District Ranger reflect this determination. Since the allotment has not been stocked with cattle for nearly 15 years, the term Rangeland Management Status is not applicable to express whether livestock management is achieving the goals for rangeland condition. There has been no active management from 1997 to present.

Current conditions for vegetation are a result of past management activities, proliferation of non-native vegetation, recurrent wildfire, and climate. There has been a shift from perennial grasses to woody shrubs, half-shrubs, and forbs, as evidenced by the vegetation condition data collected between 1959 and 1981. A widespread influence was the 28,000-acre wildfire that consumed the lower three-quarters of the allotment in 1979; recurrent fires have been commonplace, including the 2006 Tiger Fire that consumed over 5,000 acres on the allotment. Historic grazing practices and fires may have influenced the reduction of native desirable grass species, which in turn may have exacerbated the spread of annual grasses and forbs that now dominate the uplands in the upper third of the allotment. Field inspections conducted in 2011 noted that the non-native annual grass, red brome, accounted for most of the available herbaceous forage in the desert shrub plant community. Post-fire rehabilitation efforts through the years have introduced non-native perennial grasses to the allotment, such as Lehman's lovegrass, that have become locally dominant in some areas. Climatic conditions over the past decade can be characterized as having periods of recurrent drought conditions.

For the purpose of these analyses, it is not practical to individually analyze each map unit occurring within an allotment or project area. To facilitate a meaningful analysis, representative map units are selected within the allotment. The areas selected for analysis are based on the key area concept; "the area is a portion of range which, because of its location, grazing or browsing value, and/or use serves as a indicative sample of range conditions, trend or degree of seasonal use" (SRM 1989). The Terrestrial Ecosystem Survey (TES) Units selected for analysis based on the aforementioned concept are TES 275 and 360.

TES 275 is described as a hot steppe shrubland characteristic of the Sonoran Desert. The dominant vegetation includes palo verde and mesquite trees. The potential natural community (PNC) structure would have 10% grass cover, 21% shrub cover, and 12% tree cover compared to the sampled area that had 2-3% grass cover, 7-10% shrub cover, and 29% tree cover. It was noted during field sampling that the sampled unit exhibited much plant variability as is typical of this community type. The apparent trend for TES 275 in the sampled area was downward at the time of field sampling, which was based on observations that grass cover and species richness in the sampled area was less than site potential, and there was a lack of noticeable reproduction on grasses. Plant vigor was considered to be fair, with apparent drought stress noted on some grass species.

TES 360 is a hot steppe shrubland with vegetation varying by slope aspect from shrub-dominated on north-facing slopes to grass-dominated on south-facing slopes. Field notes for the sampled area in TES 360 noted that the site does not fit any of the community types described, and that the ecological type (ET) at PNC possibly describes the area best. The community structure of the sampled area is 9.5% grass cover, 33.5% shrub cover, and 0% tree cover. The PNC for north-facing slopes (ET2) in MU 360 would be expected to have 15% grass cover, 53% shrub cover, and 0% tree cover. The overall similarity between the sampled vegetation and PNC is 41%, while the grasses show only 10% similarity to PNC for grass species composition. The dominant grass species that would be expected at PNC are black grama, sideoats grama, and threawn. The sampled area had 8.5% cover from Lehman's lovegrass, a perennial non-native grass that was seeded in the area as part of watershed rehabilitation efforts post-fire. The

DVS for this site is to achieve mid to high similarity to PNC for overall grass cover, realizing that the non-native perennial grass species is likely to persist for many years or decades. The overall grass cover of 9.5% shows mid to high similarity to the PNC grass cover of 15%. The apparent trend at this site was static. It was noted that observations of native grasses such as sideoats grama, blue grama, and cane beardgrass were made in varying degrees throughout the sampled area, and variability was high.

Summary of Vegetation Status/Condition of the Horsethief Allotment:

| Allotment Pasture / TES Unit | Approximate Vegetation Status | Apparent Trend | Rangeland Management Status (RMS) | Soil Condition |
|------------------------------|-------------------------------|----------------|-----------------------------------|----------------|
| 275 | Mid Similarity to PNC | Downward | N/A | Impaired |
| 360 | Mid Similarity to DVS | Static | N/A | Satisfactory |

Direct & Indirect Effects on Vegetation:

The Range/Vegetation Specialist’s Report (PR #23) addresses the direct, indirect and cumulative effects of each alternative analyzed by the Interdisciplinary Team. A summary of the effects is provided here, with further details found in the complete report.

Alternative 1 - Proposed Action

Grazing by cattle can directly affect upland plants by reducing plant height, total canopy cover, and ground cover. The degree of these effects is influenced by utilization guidelines and timing of use. Over time, if grazing intensity is too high, indirect effects can occur such as a loss of plant species and a resultant shift in composition to less-preferred forage plants, and total forage production can be reduced. Repeated grazing impacts without allowing plants adequate time for regrowth exposes the soil to potential erosive forces from water and wind. Range research supports the concept that forage plant health and productivity, and overall ecological condition of rangelands can be improved or maintained through properly managed livestock grazing (Holecheck, et al. 1999). The conservative utilization guidelines as prescribed for this project during the growing season have been shown to increase forage production and improve vegetation composition (Holecheck et al. 2004). Adequate precipitation is essential to achieving optimal plant vigor and production. Grazing will continue to be managed allowing for seasonal use during the dormant season. Rest during the growing season allows key forage species the opportunity to realize maximum production, store carbohydrates in the roots, and produce seed for reproduction.

The application of the prescribed grazing intensities (general allotment wide and site specific) as proposed will realize success in meeting the desired conditions for upland vegetation although the timeframe for achieving this may be decades or more for TES 275. Although the allotment has not been authorized for grazing for 15 years, the amount of grass cover and grass species composition at the sample site was below PNC level and the apparent trend was downward. Drought conditions were affecting some grasses at the time of sampling. The existing tree cover at the sample site is 29% palo verde, whereas the PNC community would have only 12% tree cover. This departure may be affecting the amount of grass cover that is achievable at this site. The predominance of annual non-native grasses such as red brome in TES 275 may cause fine fuels to accumulate in years with wet winters. The fine fuel accumulation could increase fire danger, leading to more recurrent fire in TES 275 (a Sonoran desert plant community) that is not

adapted to frequent fires. Species shifts as a result of frequent fire interval are an effect that is independent of the influence of grazing, since non-native annual grasses are already well established. Grazing the annual vegetation when it is abundant may reduce fuel build up and prevent some fire-related effects to vegetation in TES 275.

In TES 360 there exists a stable state recognized by the dominance of the non-native perennial grass species, Lehman's lovegrass. This grass species was seeded post-fire as part of past fire rehabilitation efforts and its presence will persist with or without cattle grazing.

The management objective for TES 275 is to manage for an increase in graminoid cover and composition. This would be achievable in years when average or better precipitation occurs, realizing that natural cycles of recurrent drought can affect the observed vegetation condition from year to year. Incremental increases in plant cover, plant vigor, and species composition are indicators of upward trends in vegetation condition and apparent trend, and would show that the area is moving towards desired vegetation condition. The management objective for TES 360 is to manage for an increase in graminoid cover and composition. The current amount of grass cover at the TES 360 site shows mid to high similarity to the site potential for the amount of perennial grass cover, although species composition is not similar due to the presence of non-native Lehman's lovegrass. Maintaining or improving the current amount of perennial grass cover, while retaining and possibly improving the species composition for native grasses, indicates management success in meeting desired vegetation condition at TES 360. The implementation of all the grazing elements of the proposed action should realize attainment of the management objectives, or progress towards attainment, within the span of the 10 year term grazing permit.

The proposed action calls for a maximum stocking level of 883 AUMs, equivalent to 207 yearlings for 6 months, while the current term permit allows for up to 530 yearlings for 6 months. The reduction in the upper limit for stocking is over 60% less than current permitted numbers. Range inspection reports in district 2210 files document that the allotment lacks water at certain times of the year, range improvements are in poor condition, and forage may have been lacking at times in the past. These factors support the need for a reduction in permitted use from current levels.

Alternative 2 – No Action/No Grazing Alternative

The application of no managed grazing will realize success in moving towards desired vegetation condition objectives in TES 275 and TES 360, although the timeframe for achieving desired conditions may be decades or more for TES 275 where perennial grasses are currently limited and non-native annual grasses such as red brome are dominant. In TES 360 Lehman's lovegrass is expected to persist where it has been seeded following wildfire events. The management objective for TES 275 is to manage for an increase in graminoid cover and composition. The management objective for TES 360 is to manage for an increase in graminoid cover and composition. Key areas in both TES 275 and TES 360 have not been grazed for about 15 years, and still show evidence of resource concerns. This demonstrates that these areas can be slow to change from relatively stable states such as shrub-dominated Sonoran desert with winter annual grasses (TES 275) and non-native grass dominated upland slopes (TES 360). Without grazing there is likely to continue to be upward trends in plant vigor and herbaceous cover, but it will be dependent on precipitation within normal range, and whether there is recurrence of large wildfires. Without any livestock grazing in TES 275, there may be periodic accumulation of fine fuels from non-native annual grasses such as red brome. This may lead to increased fire frequency that can cause species composition shifts in Sonoran desert plant communities away from native desert shrubs and trees that are not fire-adapted.

Range Improvement Effects

Alternative 1: Reconstruction of 3-4 miles of allotment boundary fence will aid in grazing management by allowing cattle to use the west part of the allotment that now lacks a boundary fence. Without this fence in place, cattle must be managed using natural barriers, herding, and water sources to keep them within the allotment boundaries. The area west of the allotment adjacent to the fence to be built is the Lane Mountain Watershed that has been closed to grazing since 1975. The construction of enclosure fencing at springs/seeps may or may not be necessary, depending on the results of monitoring. The small enclosure fence will be built in TES 275 at a chosen representative location.

Disturbance to vegetation from fence construction activities will be short-term in nature and localized. Fence construction may require some minor hand-clearing of vegetation. Fence construction within the wilderness will be done using only non-mechanized equipment unless approval is obtained from the Regional Forester for mechanized equipment use in the wilderness. To determine the proper tool usage when building a fence in wilderness areas, a Minimum Requirements Decision Guide document is prepared. Future maintenance activities on existing range improvements may be affected by potential wilderness designation of 4,925 acres that is east of the current Castle Creek Wilderness. If the area becomes wilderness, the use of mechanized equipment will be restricted unless approval is obtained from the Regional Forester.

Alternative 2: No fencing would be constructed either within or outside the wilderness area, so no disturbance to vegetation would occur from construction activities. With the elimination of grazing, range improvements that currently are in place (see Appendix 3) may need to be removed. Removal of existing range improvements may cause localized disturbance and damage to vegetation, the effects of which will be minor and short-lived.

Cumulative Effects on Range Vegetation Resources

The cumulative effects analysis area considered for effects on range/vegetation resources consists of the Horsethief Allotment project area. The past and present activities and events that have affected the vegetation include livestock and wildlife grazing, introductions of non-native plants, past wildfires and prescribed fire, mining, vegetation/timber treatments, recreational activities, and roads. These activities may affect vegetation in ways similar to livestock grazing through removal of plant canopy cover. Indirectly these activities may affect vegetative productivity by causing soil compaction that leads to reduced water infiltration and then to reduced plant growth. Removal of vegetation can expose the soil to erosion and thereby reduce long-term productive potential for vegetation. Introductions of non-native plants can cause species shifts away from native plant communities through direct competition or by altering fire regimes.

The effects of these other activities, when added to livestock grazing and management as described under the proposed action, do not change the anticipated effects over-all with regard to the apparent trend of the desired vegetation status. The impacts created through livestock grazing, fence construction, and the adaptive management described for the action alternative, when added to the other past, present and future activities on the allotment, do not together accumulate to levels that are considered to be significant for the vegetative resources.

Economic Analysis

The Range Economic Analysis Report (PR #21) was prepared to compare the economic impacts of the proposed action and the no grazing alternative on the local economy and effects to all the partners that are involved in the implementation of the proposed action, including the Forest Service, the grazing permittee, and outside partners. The analysis was conducted using the Quicksilver software program. Although projections from the Quicksilver model are precise in measurement, they are best used as an indicator of change rather than a precise measurement.

The project area is contained within Yavapai County, Arizona. The county receives payment from the Federal government in two ways: (1) Payments in Lieu of Taxes (PILT), and (2) Secure Rural Schools and Community Self Determination Act of 2000 (SRSCSD). Prior to passage of SRSCSD and adoption of this method of payment by Yavapai County, the county would instead receive 25% of the revenues generated from Forest Service System lands, including grazing fees. Funding through this act provides for stable revenue to Yavapai County independent of fluctuations in grazing fee revenues from public land.

The costs of implementing the project that are borne by the Forest Service include the cost of permit administration, monitoring, and providing some materials for structural range improvements. Monetary benefit to the Forest Service is in the form of grazing fees collected. The costs borne by other partners include funding some of the structural range improvements that will be reconstructed as part of the proposed action. The costs incurred by the permittee include the cost of hired labor to manage the herd, structural improvement maintenance and construction, range improvement surveys, and monitoring of range resources to comply with grazing instructions. The benefits gained by the permittee include revenue from the sale of yearlings, and the added value that the public rangeland provides to the overall ranching operation. Other intangible benefits were not considered in the analysis, such as water sources maintained by the permittee providing for improved wildlife habitat and perhaps greater numbers of game animals. When considering all partners, the benefit to cost ratio of the proposed action was 5.5:1 when stocked at the lower range (106 yearlings) and 9.5:1 when stocked at the higher range (207 yearlings), indicating a higher value of benefits than costs, overall, when stocked at either level. Since no dollar figures were placed on benefits under the no grazing alternative, there was not a benefit/cost ratio assigned in this analysis.

Effects to the Local Economy:

Since funding to Yavapai County does not depend on the collection of a portion of the Federal grazing fees, neither alternative would have an effect on Federal receipts to the county. Under the no grazing alternative, all jobs directly associated with livestock grazing on the Horsethief Allotment would be eliminated. Some of the jobs indirectly associated with livestock grazing on the allotment may also be eliminated; however, most indirect jobs will likely be maintained because the need for ranching supplies and services will continue to be filled by other ranches and individuals/ businesses from the surrounding communities.

Soils

Existing Condition:

Terrestrial Ecosystem Survey map units were used as the basis to assess soil and rangeland conditions. Field inventories and assessments of soil and rangeland condition were conducted

on the same TES map unit and vegetation community typing was correlated with soil conditions. Representative TES map units were selected to display the effects of livestock grazing.

Soil quality standards were analyzed using the USFS Southwest Region 3 Soil Condition Evaluation protocol (USDA FS 1999). The Prescott National Forest Terrestrial Ecosystem Survey (TES) was used as the basis for this analysis and is defined as the systematic analysis, description, classification (soil/vegetation), mapping and interpretation of terrestrial ecosystems (Robertson 2000). TES was used to determine if the soil resources were functioning within their ecological capability.

Soil condition is an evaluation of soil quality or the capacity of the soil to function within ecosystem boundaries to sustain biologic productivity, maintain environmental quality, and promote plant and animal health (USDA FS 1999). The soil condition rating procedure evaluates soil quality based on an interpretation of factors that affect three primary soil functions. The primary soil functions evaluated are soil stability, soil hydrology, and nutrient cycling (USDA FS 1999). These functions are interrelated.

There are three soil condition categories which defines how the soil is functioning. The soil condition categories are satisfactory, impaired, and unsatisfactory. The definitions for the soil condition rating are as follows (USDA FS 1999):

- **Satisfactory.** Indicators signify that soil function is being sustained and soil is functioning properly and normally. The ability of the soil to maintain resource values and sustain outputs is high.
- **Impaired.** Indicators signify a reduction in soil function. The ability of the soil to function properly and normally has been reduced and/or there exists an increased vulnerability to degradation. An impaired category indicates there is a need to investigate the ecosystem to determine the cause and degree of decline in soil functions. Changes in land management practices or other preventative measures may be appropriate.
- **Unsatisfactory.** Indicators signify that a loss of soil function has occurred. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs or recover from impacts. Unsatisfactory soils are candidates for improved management practices or restoration designed to recover soil functions.

The following table displays the soil condition rating for each representative map unit that was analyzed.

| Soil Existing Condition | | | | | |
|-------------------------|-----------------------------|---|-------|------|--------------------|
| TES Map Unit | Acres | Percent of Allotment | | | TES Soil Condition |
| 275 | 1898 | 9% | | | Impaired |
| Soil Surface Components | | Litter 1" | Basal | Soil | Rock |
| Natural | | 10 | 8 | 35 | 50 |
| Existing | | ~20 | 1 | 33 | 46 |
| Community Type | Soil Condition Field Verify | Soil Condition Rationale | | | |
| CT1.1 | Impaired | Vegetative ground cover levels are generally similar or above potential primarily from annual cover. Vegetation spatial distribution is unevenly distributed across the landscape. However, graminoid cover is low and infrequent as compared to potential. The soil structure is generally commensurate with inherent characteristics with some localized signs of compaction. Signs of accelerated erosion and soil loss as indicated by widespread sheet erosion, soil depositional patterns across the landscape, and some localized rilling. | | | |
| Grazing Influence | | | | | |
| Past historic | | | | | |

| TES Map Unit | | Acres | Percent of Allotment | | TES Soil Condition | |
|--------------------------|-----------------------------|--|----------------------|-------|--------------------|------|
| 360.2 | | 3262 | 16% | | Impaired | |
| Soil Surface Components | | | Litter 1" | Basal | Soil | Rock |
| Natural | | | 20 | 5 | 20 | 55 |
| Existing | | | 22 | 8 | 34 | 36 |
| Community Type | Soil Condition Field Verify | Soil Condition Rationale | | | | |
| ET2 | Satisfactory | Vegetative ground cover is similar to potential and the vegetative cover is distributed well across the site resulting in stable soil conditions. The favorable soil structure and soil organic matter has contributed to an optimal hydrologic and nutrient cycling function. | | | | |
| Grazing Influence | | | | | | |
| No | | Some areas exposed to moderate – severe burn severity from previous wildfires are experiencing soil instability and accelerated runoff. | | | | |

TES 275 soil conditions are impaired. Low graminoid cover and poor vegetation spatial distribution along with localized compaction has accelerated runoff, caused soil instability, and reduced the nutrient cycling function. Improving graminoid cover would improve vegetative ground cover distribution across the landscape, promote favorable soil structure and infiltration, reduce accelerated runoff and soil loss, and improve nutrient cycling. Field sampled soil quality indicators of TES 360 suggest soil conditions are satisfactory with stable soils and optimal hydrologic and nutrient cycling function

Direct & Indirect Effects on Soils:

The effects analysis predicts a soil condition trend and does not necessarily predict a change in soil condition class. There are many factors that influence soil condition processes and changes in soil function are very variable and could take up to 100 years. Livestock grazing influences soil resources and ecological processes through defoliation, trampling, and nutrient redistribution (Pieper 1988, Heitschmidt 1990). This influences soil productivity mainly through the modification of soil hydrologic properties which consequently influences soil stability and nutrient cycling (Hart 1993).

Alternative 1 - Proposed Action

For all the TES map units, the predominantly winter seasonal use would allow optimal herbaceous biomass production during the growing season for organic matter accumulation and further vegetation recruitment. This would enhance soil structure; improve and maintain soil hydrologic processes; promote nutrient cycling; and improve soil stability. In addition, the growing season rest would also allow soils that are compacted to improve due to periods of no load bearing stress (e.g. hoof impact), wet-dry cycles, and increased biotic activity associated with the growing season. Proposed maximum stocking level is over 60% reduction from current permitted livestock number.

TES 360 would remain in satisfactory soil condition because Best Management Practices would continue to be employed. Grazing intensity guidelines would continue to be employed and be commensurate with soil conditions. This will allow sufficient residual biomass for vegetation ground cover retention and protection of the soil resources as described in Alternative 2, but to a lesser extent.

Impaired soil conditions of TES 275 would improve within its ecological attainability (as shown by comparison with the ungrazed study plot) in unison with livestock grazing but not to the extent as described in Alternative 2. The conservative livestock use guidelines (31-40%), as applied during the dormant season grazing period, would be favorable for attainable soil condition recovery. No livestock use from May through August would assist in alleviating localized compaction and promote recruitment of graminoid cover. This would subsequently improve

vegetation ground cover spatial distribution and nutrient cycling, improve soil structure and infiltration, and decrease accelerated runoff and soil loss.

Alternative 2 – No Action/No Grazing Alternative

TES 360 would remain in satisfactory soil condition because no livestock grazing would occur. Additional vegetation ground cover would be retained on site for nutrient cycling, favorable soil structure and infiltration, and soil stability.

TES 275 impaired soil conditions would improve within its ecological capability because livestock grazing would not occur. Livestock grazing would not limit graminoid recruitment nor would load bearing stresses influence soil structure. Additional vegetation biomass and organic matter would be retained on site resulting in an improvement in vegetation ground cover spatial distribution and nutrient cycling, promote of favorable soil structure and infiltration, and decrease accelerated runoff and soil loss. Recovery rates and extent would be limited due to inherent climatic and ecological variables.

Range Improvements

The direct effects of the physical impact associated with range improvement installation and maintenance has the potential to decrease and damage protective vegetative ground cover, cause soil displacement, and compaction. This effect would be limited to a small, localized area associated with the construction activity. For fence construction activities, ground disturbance includes digging post holes and pounding metal posts. The footprint of disturbance for a typical fence is 3-6 feet wide. Soil and plants may be disturbed by workers walking the fenceline during construction, or using pack animals to haul fence materials, but this type of disturbance should recover within 1-2 growing seasons.

Range Improvement Effects

Alternative 1, Proposed Action:

The installation and maintenance of range improvements has the potential to damage the soil resources but these adverse effects would be largely mitigated by implementing Best Management Practices (BMP). Range improvement soil and water conservation practices, identified in the BMPs, provide guidance on site evaluation, site preparation, and erosion control measures as a means to minimize soil damage to productivity.

Alternative 2, No Grazing:

There would be no impacts to the soil resources from range improvement installation and maintenance because livestock grazing would not occur. However, the removal of range improvements has the potential to negatively impact the soil resources but these impacts would be largely mitigated by implementing BMPs. Range improvement soil and water conservation practices, identified in the BMPs, provide guidance on site evaluation, site preparation, and erosion control measures as a means to minimize soil damage to productivity.

Cumulative Effects on Soil Resources

The Soil and Watershed Cumulative Effects – Horsethief Livestock Grazing Project report (PR #28) discusses the cumulative effects of the Horsethief Livestock Grazing Project when added to other past, present, and future action(s), regardless of what entity is or has undertaken the action(s) that impacts soil resources cumulatively. The cumulative effects analysis area when considering impacts to soil condition is the Horsethief Allotment, while cumulative effects to the watershed are analyzed on the basis of the 5th and 6th code watershed(s) containing the project

area. Activities and uses that can impact soil condition include roads, recreation, livestock grazing, fire and fuels treatments, vegetation treatment and timber harvest, and mining. These activities may remove vegetation and expose bare soil to erosion; compact the soil surface and reduce water infiltration; alter water drainage patterns and accelerate erosion; mechanically disturb the soil organic layer and structural properties; influence vegetation composition, cover, and structure so as to indirectly affect soil nutrient cycling. Vegetation and fuels treatments may initially have negative impacts to the soil, vegetation, and watershed resources by causing mechanical disturbance to the vegetation; displacing protective litter and vegetative groundcover; and creating soil compaction. However, these treatments could result in a positive influence in the long term by improving herbaceous response, plant vigor, and vegetative groundcover. Most activities that have occurred or are planned are localized in nature, with impacts realized over a small spatial scale when compared to the allotment or watershed area in which they occur. A considerable portion of the allotment and watershed includes the Castle Creek Wilderness area, where the use of mechanized equipment that may impact soil structure and function is prohibited. The various activities that have occurred within the cumulative effects analysis area have caused some impacts to soil and watershed condition; however, the effects of the grazing activities associated with the proposed action are not expected to increase any undesirable effects from past activities. The proposed action should allow for the allotment to progress towards attainment of desired conditions for soil and watershed condition.

Water and Riparian Areas

Existing Condition:

The major drainages within the allotment include Turkey Creek and Poland Creek, which join to form Black Canyon Creek. The lower 6.75 miles of Turkey Creek, the lower 1.25 miles of Poland Creek and the upper 3 miles of Black Canyon Creek are within the allotment. After leaving the allotment and Prescott National Forest, Black Canyon Creek then flows for approximately 18 miles to its confluence with the Agua Fria River at Black Canyon City. The majority of that mileage is ephemeral, meaning it flows only in response to storm events or snow melt. Several creeks with smaller watersheds and lesser flows are also present in the allotment. Those with inventoried riparian features from the National Wetlands Inventory (NWI) include – from north to south -- Bill Arp Creek, Dead Cow Gulch, Castle Creek, Tiger Creek, and North Fork of Rock Creek.

Approximately 95 acres of wetland/riparian systems (polygons) delineated by US Fish & Wildlife Service and included in the National Wetlands Inventory are located within the allotment. The linear coverage analysis resulted in approximately 12 miles of streamcourses where riparian or wetland vegetation is inventoried, but the spatial extent of these resources is too narrow to be included in the polygon coverage. In addition to the riparian and wetland resources, a number of springs are present within the allotment. Prescott National Forest records indicate that 14 of the 26 inventoried springs are listed as range improvements, meaning that some development has been made to facilitate provision of water for livestock. There are four inventoried wells. One, a flowing artesian well in Turkey Creek, results in streamflow for quite some distance downstream.

Neither the National Hydrologic Dataset (NHD) nor the Arizona Department of Water Resources database (ADWR) includes any perennial stream mileage within the allotment. However, segments of several are intermittent, meaning they usually flow for several months each year as opposed to ephemeral which flow only in response to storm or snowmelt events. Short

segments immediately downstream from springs are intermittent and ephemeral but support riparian vegetation; this is particularly the case for Turkey Creek.

Riparian/wetland areas are properly functioning when adequate vegetation, physical channel features and debris is present to 1) develop root masses that stabilize streambanks against cutting action, 2) dissipate energies associated with stream flow, 3) filter sediment, capture bedload, and aid floodplain development; and 4) improve flood-water retention and ground water discharge. Riparian areas are influenced by both natural conditions of geology, landform and climate plus historic and recent disturbance events.

Turkey Creek was assessed as a mixture of conditions by reaches ranging from Proper Functioning Condition in the upper portions to Functional – At Risk, without apparent trend, in the lower. The assessed condition varied with landform position and stream gradient. The upper portions are the most stable while the lower end of the reach closest to the confluence with Poland Creek exhibited some lateral cutting into terraces along with mid-channel deposition. Black Canyon Creek and Castle Creek were both assessed as Functional – At Risk, without apparent trend. Recent large fires in the watershed have added to the naturally high peak flows and sediment bedloads, resulting in channel scouring and reduced herbaceous vegetation along the streambanks. Recruitment of woody riparian species – cottonwood and willow – was also limited. In reaches accessible by ATV's localized effects of recreational mining of streambank sediments was also observed. Effects of this use were also documented in PFC assessments done in 2002. Poland Creek, visited in May 2011, was assessed as Functional – At Risk, with apparent upward trend due to recruitment of cottonwood and seepwillow seedlings.

Predictions of the global climate models suggest warmer temperatures and slightly reduced total precipitation, with a high incidence of both droughts and floods (Arizona Climate Change Advisory Group. 2006). Current trends of a reduced proportion of winter precipitation being snowfall, with earlier spring melt, are predicted to continue and possibly increase in effect. This may result in reduced ground water recharge to maintain springs and less reliable discharge from the springs. This has significance not only from an ecological standpoint, but also from the reliability for livestock water and flexibility for adaptive management.

Water Quality:

Every two years, Arizona Department of Environmental Quality (ADEQ) is required by the federal Clean Water Act to conduct a comprehensive analysis of water quality data associated with Arizona's surface waters to determine whether state surface water quality standards are being met and designated uses are being supported. This report is submitted to the U.S. Environmental Protection Agency (EPA) for approval.

Under Section 303(d) of the Clean Water Act (CWA), states, territories, and authorized tribes are required to develop lists of impaired waters every two years. Impaired waters are those that do not meet applicable water quality standards. The CWA further requires jurisdictions to establish a priority ranking for waters on the Section 303(d) list and develop Total Maximum Daily Loads (TMDL) for them. A TMDL establishes the maximum amount of a pollutant allowed in the water while maintaining all of its designated beneficial uses. Arizona is required by law to identify polluted waters and to develop TMDLs to help address these problems.

The lower 21 miles of Turkey Creek (including its length through the allotment) has been assessed as impaired due to exceedances of both copper and lead, as a result of inactive and abandoned historic mines. A TMDL was approved in 2006 for the Golden Belt and Golden

Turkey Mines and their tailings and a remediation project was subsequently implemented. No other watercourses within or downstream from the allotment were assessed as impaired.

Because of the historic mining activities and their known and expected effects on downstream water quality a considerable amount of data collection has occurred over the years. During the period the U.S Geological Survey operated a stream gauging station within the allotment they collected a total of 72 water quality samples between 1980 and 1984 with varying parameters monitored. As a part of their TMDL analysis ADEQ summarized past studies and conducted a detailed study on Turkey Creek. Data has been collected from 13 individual sites within and just upstream from the allotment. The most sites and most samples taken are in the vicinity of the Golden Belt and Golden Turkey mine and tailings complex. However, two sites upstream from the mines and five downstream provide information relevant to the allotment.

The designated uses for Turkey Creek which are relevant to the analysis include warmwater aquatic community, full body contact, livestock watering and fish consumption. Copper, lead and mercury have standards for aquatic life based on the concentration dissolved in the water, while for other designated uses the total amount in the water (including that attached to suspended sediment) is evaluated. The aquatic life standards are different between chronic (long term exposure) and acute. Acute is related to toxicity which stimulates a rapid response. In aquatic toxicity tests an effect observed in 96 hours or less is considered acute (ADEQ 2003 and ADEQ 2009). Thus the allowable standard for chronic exposure is much less than for acute. In addition the aquatic life standards for dissolved copper and lead vary with water hardness.

A summary of existing condition by constituent:

Mercury – Most stringent standard is that for fish consumption. Majority of samples tested with detection limit of 500 micrograms/liter ($\mu\text{g/l}$); however standards for total mercury ranged from 0.6 $\mu\text{g/l}$ for fish consumption (2003 standards) to 10 $\mu\text{g/l}$ for livestock drinking water to 280 $\mu\text{g/l}$ for full body contact. For warmwater aquatic the standard for dissolved is 2.4 $\mu\text{g/l}$ for acute and 0.01 $\mu\text{g/l}$ for chronic. The only sample tested at the U.S.G.S. gage site was 0.2 $\mu\text{g/l}$ dissolved and 2.7 $\mu\text{g/l}$ total. Five individual samples collected in the vicinity of the Golden Belt and Golden Turkey mine tailings found total mercury at concentrations varying from 0.76 to 9.8 $\mu\text{g/l}$ (these sites had no other tests with detection limits less than 500 $\mu\text{g/l}$). Dissolved mercury was tested in only a few samples in the upper portion of the allotment.

Copper – Present primarily in association with suspended sediment and measured as total copper, but some dissolved also measured. A few samples during monsoon flows -- both in upper and lower portions of stream within allotment -- exceeded warmwater aquatic standards for dissolved copper, primarily at chronic criteria. The detection limits for dissolved copper covered the experienced range of hardness for acute criteria but several samples at the lower hardness levels had detection limits below the associated standard for chronic criteria.

Lead – Primarily associated with suspended sediment, most of it originating upstream from allotment and identified in a number of tributaries having historic mine activity. Measurements of dissolved lead found no exceedances of standards for warmwater aquatic, either acute or chronic. Two samples during winter flows and one during monsoons exceeded standards for livestock drinking water of 100 $\mu\text{g/l}$. Several samples in locations from upper to lower part of allotment had total lead exceeding full body contact standards of 15 $\mu\text{g/l}$ (which are identical with partial body contact standards). Lead is accumulative in the system so the standard for livestock drinking water is based on ingestion over a prolonged period.

Direct & Indirect Effects on Water and Riparian Areas

Livestock are naturally drawn to riparian areas, where they often tend to congregate. The availability of water, lush forage, shade in warm months, and relatively gentle topography are attractants. In addition, riparian areas are often used as travel routes between grazing areas. Excessive grazing and/or trampling/trailing can cause sufficient bank shear to break down stream banks, reduce or eliminate woody seedlings and saplings, reduce herbaceous ground cover and expose soils. Subsequent effects can include introduction and favoring of non-native herbaceous species with root systems less effective at holding streambanks and above ground foliage less effective in trapping overbank sediment. This can contribute to a hydrogeomorphic result of either widening or incision of stream channels. Herbaceous riparian vegetation is especially important to stabilizing stream bank, point bar and floodplain deposits, critical to the channel restoration process (Clary and Kruse 2003).

Livestock can impact water quality directly through their waste and indirectly by effects on soil stability and vegetative protection effectiveness. Removing streamside vegetation through herbivory can expose stream banks to the erosive forces of water, creating an indirect effect of adding sediment to the water and increasing turbidity. This effect is mitigated by retaining adequate vegetative cover and stubble height. Livestock waste of fecal material and urine can affect both biological and chemical water quality parameters. Nutrients (primarily nitrogen and phosphorus) at levels above natural backgrounds can affect dissolved oxygen levels and composition of invertebrate species (EPA 2003). Biological contaminants reported include *E. coli* and *Cryptosporidium* among others (Belsky, et al 1999). The presence of dense, vigorous herbaceous vegetation can reduce the impacts by incorporation into the nutrient cycle and trapping/holding waste materials and preventing washing into the stream from areas above the high water line.

Effects Common to All Alternatives:

Neither alternative is expected to affect water yield. Research in Arizona on water yield as affected by management activities has found temporary increases in water yield from vegetative overstory (e.g., ponderosa pine or interior chaparral) removal or significant modification (Baker 1999). Neither the proposed action nor the no grazing alternative will modify the vegetative overstory.

Alternative 1 - Proposed Action

Alternative 1 utilizes adaptive management with the flexibility to adjust to variable climatic conditions, using monitoring as a feedback on the combined effect of livestock management and environmental variables. This flexibility is particularly important in light of the high degree of variability of seasonal and annual precipitation and its effects on both the upland vegetation providing soil and watershed protection and to the riparian vegetation along streamcourses. Because it has been a number of years since livestock have been authorized to use the allotment, monitoring of representative riparian areas, including springs, and appropriate application of resource protection guidelines will be an integral part of resuming livestock grazing.

Livestock use and concentration in riparian areas is commonly related to 1) access to water; 2) shade for temperature relief; 3) availability of green forage; and 4) low gradient terrain and travelways. The combination of season of use – generally cool season – and class of livestock (yearlings) will reduce the use and the tendency for concentration in riparian areas. The primary reasons include:

- 1) Surface water is generally more widely distributed during the winter months due to the winter precipitation season and reduced evapotranspiration losses. In addition water requirements are reduced at lower ambient temperatures.
- 2) During winter months drainage of cool air into stream bottoms results in lower temperatures than on slopes for much of the day. Furthermore, the ambient temperatures are much cooler and the need for shade is much less than in the late spring and summer months.
- 3) The permitted grazing period is primarily in the dormant season.
- 4) Yearlings will range much further and into more rugged terrain than cow-calf pairs.

There is limited research in the Southwest on stubble heights needed for effective function and improvement of function, both for obligate herbaceous species and those which are facultative but still important for bank stability and riparian ecosystem function. Available data has been summarized by Subirge (2008). Clary and Leininger (2000) discuss stubble height and recommend 4 inches as a "starting point". Much of the available research was conducted in systems with perennial streams in more humid regions than the Southwest. In a later presentation Clary and Kruse (2003) point out that 6-8 inches of residual height may be required to reduce browsing on willows or to indirectly limit trampling impact to vulnerable streambanks. Application of the stubble height guidelines for herbaceous vegetation in riparian areas will allow the reaches with sediment trapping species (e.g., rushes, sedges and deergrass) along the greenline to continue to entrap sediment and gradually build streambanks; thus adding to their soil water storage capacity and vegetative production potential.

Construction of Improvements - Effects of the constructed improvements will be localized and temporary. Reconstruction of the west boundary fence will be in the Castle Creek Wilderness and motorized access will not be available, thus there will be no soil impacts from vehicular travel. Use of UTV's for access and delivery of fencing materials for the soil and vegetation reference enclosure in TES 275 will cause relatively little surface soil disturbance due to the low bearing weight and the amount of rock on the soil surface. No new road construction is required for maintenance and reconstruction of existing water development facilities. The Best Management Practice of confining vehicular access to times when soils are not saturated will limit effects.

Water Quality - Because the stream system does not have continuous perennial flow to the Agua Fria River there will be no change to its downstream water quality at base flow conditions. The Agua Fria is not currently assessed as impaired. Although Turkey Creek is currently assessed as impaired for lead and copper, the recent remediation project at the tailings of the Golden Belt and Golden Turkey mines was designed to address this condition and reduce the accessibility of these metals to the streamcourse and preliminary monitoring suggests this is occurring for copper and to some degree for lead.

Effects to within allotment water quality are primarily associated with sediment and turbidity during storm runoff and the associated heavy metals and their effects on both on-site and downstream uses. Livestock use can affect streambank stability, herbaceous riparian vegetation and the interrelationship of sediment mobilization, movement, and entrapment. There is a slight risk of increased sediment availability due to bank trampling and/or streambottom sediment loosening by watering livestock in locations not protected by gravel and cobble armoring or by dense hydrophytic herbaceous vegetation. The segment of Turkey Creek adjacent to and just downstream from the remediated mine tailings of the Golden Belt and Golden Turkey mines is a high priority due to its having the highest measured concentration of metals in its streambottom sediments. Although ADEQ's initial monitoring indicates reduced copper and lead reaching the stream, this area of stream bottom sediments may still retain high

concentrations of these metals. Prior to resuming grazing an evaluation will be made, in coordination with ADEQ, to determine if there is a need for implementation of adaptive management measures such as fencing this portion of streamcourse and/or providing livestock water outside the floodplain.

Although there have been some samples in Turkey Creek which exceed the standard for lead for livestock drinking water it is not expected to have a significant effect on permitted livestock. Detectable lead at or approaching the standard was found in association with suspended sediment (measured as total lead with dissolved lead not detected) and that occurred in only a small percent of samples during the winter season proposed for grazing. Because lead is accumulative the drinking water standards are based on the effects of ingestion over a prolonged period of time. Toxicology studies indicate effects of daily ingestion of several milligrams per kilogram of body weight over a multi-month period can be tolerated with the majority commonly coming from forage or feed (Olkowski 2010). Ingestion of 10 gallons of water at the standard of 100 µg/l would amount to an intake of approximately 4 milligrams of lead. In a steer or yearling weighting 275 to 400 kilograms it would equate to an intake of 0.015 to 0.01 mg/kg of body weight from water, or at least two orders of magnitude lower than the total levels found to be tolerable. The low frequency of drinking Turkey Creek water when high levels of lead are present, the tolerable level of intake even on a prolonged basis, and the fact that these are yearlings and not pregnant or lactating cows, result in the conclusion that livestock drinking from Turkey Creek would not create an animal health issue.

Alternative 2 – No Action/No Grazing Alternative

No permit would be issued and cattle would not be authorized to graze. The No Grazing Alternative eliminates the direct effects of livestock grazing to the upland watershed areas and to stream courses and riparian areas in the Horsethief Allotment. The slight risk of trampling affecting bank stability and mobilizing some sediment with potential metals would be eliminated, and there would be no need to potentially fence areas of concern to exclude livestock. However, the effects of other channel and bank disturbing actions such as recreational mining and OHV use in accessible portions would still occur. There would be no construction of range improvements.

Downstream water quality effects would be generally similar to Alternative 1.

Cumulative Effects on Water and Riparian Areas

In this analysis, watersheds are used as the basis to evaluate the cumulative effects of projects on watershed condition, riparian ecosystems, and water quality/quantity. The cumulative effects analysis area for the Horsethief Livestock Grazing Project includes the three 6th level watersheds shown on the map in Appendix 5. Activities within these 6th level watersheds that may affect watershed condition, water quality, and riparian resources include roads, recreation, livestock grazing, fire and fuels treatments, vegetation treatment and timber harvest, and mining. These activities may reduce vegetative groundcover, expose soil to erosion, increase sedimentation, and impact water quality if not properly implemented using Best Management Practices. The Soil and Watershed Cumulative Effects report (PR # 28) contains a complete discussion of the effects of activities within the watersheds.

Water Quantity and Timing

Because there are no direct or indirect effects to water quantity from the project there would be no cumulative effects. The minimal effects to low flows and peak flow volumes through some increased building of streambanks and increased bank storage will be very localized and the

primary benefits will be local enhanced riparian and aquatic habitat. Downstream effects below the project area are expected to be negligible.

Water Quality

The Lower Turkey Creek 6th level watershed has the highest percentage of private land and the greatest proportion of impaired soils within the Prescott National Forest as well as the segment of Turkey Creek assessed as impaired for copper and lead -- 2008 Status of Ambient Surface Water in Arizona, Arizona's Integrated 305(b) report and 303(d) Listing Report (ADEQ 2008). The TMDL report (ADEQ 2006) indicates that these pollutants were highly concentrated in the tailings of the Golden Belt and Golden Turkey mine tailings for which a remediation project was recently completed. However, they are also found in stream sediments upstream from the allotment, particularly in tributary drainages such as Bear Canyon. The report states that whether the source is natural geologic or due to historic and/or current upstream mining activities is not known. The effects of the remediation are currently being monitored by ADEQ. Initial results suggest a reduction in copper within the stream. They also suggest a reduction in lead downstream; however, upstream sources are still present creating some water quality exceedances (ADEQ 2008b, ADEQ water quality data).

The Poland Creek 6th level watershed has the least area of impaired soils and the highest percentage of higher elevation conifers – ponderosa pine and mixed conifer. However, it also has the largest number of historic and current and pending mining operations including both mines and historic small mills. Tailings from the French Lily Mine were recently remediated in order to reduce effects on water quality. Poland Creek was not assessed in the most recent ADEQ assessment (ADEQ 2008).

The Black Canyon Creek (local drainage) 6th level watershed has experienced wildfires over much of its area within the Prescott National Forest over the last 30 years including some portions burning more than once. However, soil condition assessment of the NF portion rated 77 percent as satisfactory and TES 360 found in this watershed was assessed in satisfactory soil and watershed condition. Black Canyon Creek is formed by the confluence of Turkey and Poland Creeks and its water quality will benefit from the remediation projects in those two watersheds. This segment of Black Canyon Creek was not assessed in the most recent ADEQ assessment (2008).

Conclusion

In summary, the proposed project would not contribute to creating a significant cumulative effect. Although a portion of Turkey Creek which passes through the allotment has been assessed as impaired because of the presence of metals related to mining activities, a remediation project has been implemented to remove these tailings from close proximity to flowing water. Initial monitoring by ADEQ indicates that it is reducing the amount of pollutants reaching the stream during high flows and moving downstream with its sediment load. The activities affiliated with the Horsethief Allotment would not significantly add to the cumulative watershed effects of the other listed actions because of the resource protection features and implementation of soil and water conservation practices (BMPs); the large size of the watershed compared to the small size of the allotment, and because sources of existing impairments in the upstream watershed are not related to products of this proposal. This project would neither reduce nor add to current impairments nor would it create future impairments.

Wildlife, Aquatic Species, and Rare Plants _____

Wildlife Habitat:

Four primary ecotypes occur on the allotment: desert scrub, 46%; chaparral, 41%; ponderosa pine, 12%; riparian, 1%. Arizona’s Heritage Data Management System (HDMS) information for the forest was queried for Threatened (T), Endangered (E), and Sensitive species occurrences within and adjacent to the project area.

Federally listed Threatened or Endangered plants and animals, species proposed for listing, candidates for listing, and critical habitat:

No Federally-listed Threatened or Endangered species occur on the allotment, but there were recorded occurrences within 5 miles of the allotment boundary on both the Heritage Data Management System (HDMS) data layers as well as Prescott National Forest wildlife observations. By far the majority of these occurrences are due to a known Mexican spotted owl nest territory within 3.5 miles of the western allotment boundary.

Regional Forester Sensitive Animal Species:

Regional Forester sensitive species are defined as “those plant and animal species identified by a regional forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution (FSM 2670.5(19)).” Sensitive plants were surveyed within and adjacent to the allotment in 2002-2003 by M Baker (2003). Fish and aquatic occurrences were also identified from various sources (Desert Fishes Team 2004, Emmons and others 2010).

Management Indicator Species:

Forest level habitat and population trends for management indicator species (MIS) were discussed in “Forest Level Analysis of Management Indicator Species for the Prescott National Forest” (USDA Forest Service 2010) and excerpted for the following MIS analyzed in the project area. The MIS known to occur within the project area are mule deer, pygmy nuthatch, hairy woodpecker, Abert’s squirrel, spotted towhee, and macroinvertebrates. MIS for which potential habitat occurs and the species could be found in the allotment are Northern goshawk, turkey, and Lucy’s warbler.

Migratory Birds

In accordance with the Migratory Bird Treaty Act, Executive Order 13186, and the Memorandum of Understanding with the U.S. Fish and Wildlife Service signed December 2008, this project was evaluated for its effects on migratory birds. Advice from the Regional Office is to analyze effects in the following manner: (1) effects to Highest Priority Birds listed by Partners in Flight (PIF); (2) effects to Important Bird Areas (IBAs); (3) effects to important over-wintering areas.

| Partners in Flight Priority Bird Species | Habitat (from AZ PIF statewide plan) |
|--|--|
| Black-chinned sparrow | Chaparral |
| Virginia’s warbler | Chaparral |
| Guildded flicker | Sonoran desert scrub (desert shrub on PNF ecotype layer) |
| Purple martin | Sonoran desert scrub (desert shrub on PNF ecotype layer); and pine habitat |
| Olive-sided flycatcher | Ponderosa pine |
| Cordilleran flycatcher | Ponderosa pine |

Important Bird Areas

There are no designated IBAs found within or near the allotment. Therefore, no IBAs are affected by either alternative.

Overwintering Areas

Many important overwintering areas in Arizona are large wetlands; none of this habitat is present in the analysis area. The project area provides limited wintering habitat for migrant bird species. However, this area is not recognized as an important over wintering area because significant concentrations of birds are not known to occur here nor do unique or a high diversity of birds winter here.

Direct & Indirect Effects on Wildlife, Aquatics, and Rare Plants:

Livestock grazing can affect wildlife and their habitat through direct competition for forage, alteration of wildlife habitat structural components, trampling of nests or young, or disturbance and displacement of individuals due to the presence of livestock. The proposed action would authorize dormant season grazing (September through April) only, at a level that represents a 60% reduction from current permitted levels. Forage use would be kept at conservative (31-40%) to moderate (41-50%) levels in those areas frequented by livestock, with growing season rest every year. This should result in improvement in vegetation in areas needing improvement. About 2/3 of the allotment acreage is on slopes greater than 31%, and would be subject to less frequent livestock use than flatter areas. Dormant-season grazing from September to April will lessen impacts of livestock to the riparian systems. Cattle tend to congregate in these areas during the extreme heat of summer; and removing grazing during the highest temperatures will improve distribution across the landscape. Utilization of woody species (cottonwoods, willows) in riparian areas not to exceed 20% will allow for recruitment and provide bank stability as well as important habitat for native wildlife species.

Regional Forester Sensitive Animal Species:

Summary of effects for Region 3 Forest Service sensitive species for the Horsethief Livestock Grazing Project

| Species Name | Status | Alternative 1 Proposed Action | Alternative 2 No Action |
|-------------------------------|-----------|-------------------------------|-------------------------|
| Northern goshawk | Sensitive | MIIH ¹ | No Impact |
| Abert's towhee | Sensitive | MIIH | No Impact |
| Peregrine falcon | Sensitive | MIIH | No Impact |
| Western red bat | Sensitive | MIIH | No Impact |
| Pale Townsend's big-eared bat | Sensitive | MIIH | No Impact |
| Pocket free-tailed bat | Sensitive | MIIH | No Impact |
| Sonoran desert tortoise | Sensitive | MIIH | No Impact |
| Metcalf's tick-trefoil | Sensitive | MIIH | No Impact |
| Broad-leafed lupine | Sensitive | MIIH | No Impact |
| Mt. Dellenbaugh sandwort | Sensitive | MIIH | No Impact |
| Eastwood alum root | Sensitive | MIIH | No Impact |
| Arizona toad | Sensitive | MIIH | No Impact |
| Lowland leopard frog | Sensitive | MIIH | No Impact |

Longfin dace | Sensitive | MIIH | No Impact |
 MIIH = May impact individuals or habitat but is not likely to result in a trend towards federal listing or loss of viability for the species.

Management Indicator Species:

Summary of effects on management indicator species (MIS) analyzed on the Horsethief Allotment by alternative

| Species – Indicator habitat | Proposed Action Alternative 1 | | No Action Alternative 2 | |
|--|--|---|---|---|
| | Project Level Effects | Forest-wide Trends | Project Level Effects | Forest-wide Trends |
| Mule Deer – early seral pinyon juniper & chaparral | No change to habitat quantity of early seral stage of pinyon-juniper and chaparral vegetation. May increase habitat quality slightly due to construction and maintenance of water developments. | No effect to forestwide habitat or population trends. | No change to habitat quantity of early seral stage of pinyon-juniper and chaparral vegetation. Habitat quality would not change continuing the current existing condition. | No effect to forestwide habitat or population trends. |
| Abert’s squirrel-early seral ponderosa pine | No change to habitat quantity of early seral stage of ponderosa pine vegetation. No change to habitat quality of early seral ponderosa pine | No effect to forestwide habitat or population trends | No change to habitat quantity of early seral stage of ponderosa pine vegetation. Habitat quality would not change continuing the current existing condition. | No effect to forestwide habitat or population trends. |
| Northern goshawk-late seral ponderosa pine | No change to habitat quantity of late seral stage of ponderosa pine vegetation. Only slight impact to habitat quality from dormant season grazing | No effect to forestwide habitat or population trends | No change to habitat quantity of late seral stage of ponderosa pine vegetation. Habitat quality would not change continuing the current existing condition. | No effect to forestwide habitat or population trends. |
| Pygmy nuthatch-late seral ponderosa pine | No change to habitat quantity of late seral stage of ponderosa pine vegetation. No change to habitat quality of late seral stage ponderosa pine | No effect to forestwide habitat or population trends | No change to habitat quantity of late seral stage of ponderosa pine vegetation. Habitat quality would not change continuing the current existing condition. | No effect to forestwide habitat or population trends. |
| Turkey- late seral ponderosa pine | No change to habitat quantity of late seral stage of ponderosa pine vegetation. Only slight impact to habitat quality from dormant season grazing | No effect to forestwide habitat or population trends | No change to habitat quantity of late seral stage of ponderosa pine vegetation. Habitat quality would not change continuing the current existing condition. | No effect to forestwide habitat or population trends. |

Summary of effects on management indicator species (MIS) analyzed on the Horsethief Allotment by alternative

| Species – Indicator habitat | Proposed Action Alternative 1 | | No Action Alternative 2 | |
|--|--|---|--|---|
| | Project Level Effects | Forest-wide Trends | Project Level Effects | Forest-wide Trends |
| Hairy woodpecker-snag component of ponderosa pine | No change in habitat quantity of snag component in the ponderosa pine vegetation type. Habitat quality would not change as the hairy woodpecker nests and forages in the snag component (dead & dying ponderosa pines), which would not be impacted by this alternative. | No effect to forestwide habitat or population trends. | No change in habitat quantity of snag component in the ponderosa pine vegetation type. Habitat quality would not change continuing the current existing condition. | No effect to forestwide habitat or population trends. |
| Spotted Towhee – late seral chaparral | No change in habitat quantity of late-seral chaparral. Habitat quality may be impacted with short-term impact from seasonal, rotational grazing system. Soil DFCs are to improve vegetative ground cover. No direct impacts to ground nesting since grazing occurs fall/winter | No effect to forestwide habitat or population trends. | No change in habitat quantity of late-seral chaparral. Habitat quality may improve with an increase of insect species diversity and additional vegetative cover for nests; ground nests will not be trampled by livestock. | No effect to forestwide habitat or population trends. |
| Lucy’s warbler – late seral riparian Macroinvertebrates aquatic habitat late seral riparian | No change in habitat quantity of late-seral riparian habitat or aquatic habitat. With the resource protection measures, habitat quality for these MIS would improve. | No effect to forestwide habitat or population trends. | No change in habitat quantity of late-seral riparian habitat or aquatic habitat. Most rapid improvement in riparian and aquatic habitat quality. | No effect to forestwide habitat or population trends. |

Migratory Birds: A reduction in herbaceous vegetation can expose nests resulting in an increased chance for nest predation, nest parasitism, exposure to elements, and nest failure. There is potential for direct disturbances to nests or loss of eggs/unfledged chicks due to livestock trampling, primarily to ground nesting birds (e.g., spotted towhee and Virginia warbler); this potential should be slight as cattle will be removed before most individual birds are nesting. Some reduction of prey abundance associated with the grazing due to habitat changes may also occur. Potential for nest parasitism from cowbirds may increase slightly for those species that are commonly used as hosts (e.g., Virginia’s warbler and Lucy’s warbler).

The unintentional take from these effects are expected to be infrequent and are not projected to rise to a level that affects the total population size for any species. Grazing could affect habitat structure and composition of prey cover, as well as the availability and diversity of prey in certain areas of the allotment. None of the proposed action would impact any snag retention (used by cavity nesting and bark foraging species) within the project area. Managing to moderate use levels during the dormant season should ensure that habitat structure and composition of prey cover are maintained during the breeding season.

There are no designated Important Bird Areas or Overwintering Areas within or near the allotment; therefore none would be affected by either alternative.

Cumulative Effects on Wildlife, Aquatics, and Rare Plants

Projects considered for cumulative effects to wildlife and their habitat are those projects that have the potential to modify or remove vegetation, directly disturb animals by human presence or use of machinery, harm animals directly, or cause habitat fragmentation. The cumulative effects analysis area for the Horsethief Livestock Grazing Project includes the three 6th level HUC watersheds that comprise the allotment. Activities within the cumulative effects analysis area that could impact wildlife or habitat include: wildfire suppression and prescribed burning; timber and fuelwood sales; vegetation treatments; livestock grazing; water supply improvements; recreational activities; roads, utilities, and land exchanges; mining. Vegetation treatments and livestock grazing can modify vegetation structure and alter habitat. Wildfire and prescribed burning will also remove vegetation, and can cause increased human-induced disturbance during fire suppression, post-fire rehabilitation, and prescribed fire implementation. Large woody debris that may serve as habitat can be consumed during wildfire or prescribed burning. Managed activities such as vegetation treatments and prescribed burning activities are designed and implemented with wildlife needs in mind, using Best Management Practices to minimize negative impacts to soil, vegetation, and water quality. Recreational activities and roads can alter vegetation over small areas, but will mainly impact wildlife through disturbance and displacement. Water developments have indiscernible impacts to physical structure of habitat, but may improve quality of habitat by increasing water availability. Mining activities can disrupt physical structure of aquatic habitat, increase sediment load, and displace animals, although these impacts are on a relatively small scale when compared to the total size of the project area. The impacts created through livestock grazing and the adaptive management associated with Alternative 1, when added to the other past, present, and future activities in the cumulative effects analysis area, do not together accumulate to levels that are considered to be significant for wildlife, fish, or rare plant resources or their habitats.

Recreation

Existing Condition:

Two campgrounds, Hazlett Hollow and Turney Gulch are in the Horsethief Basin Recreation Area and part of the developed recreation program. These campgrounds are within 2 miles of the allotment boundary. Horsethief Lake is in the Horsethief Basin Recreation Area and is popular for fishing and boating. The lake is about 3 miles from the allotment boundary. The allotment is adjacent to private land on the east and south side. The surrounding USFS area on the west and north side of the allotment is open (unless posted “closed”) for dispersed recreation activities such as: camping, hiking, horseback riding, hunting, mountain biking, target shooting, and motorized recreation on designated roads and trails. Castle Creek Wilderness is part of, and adjacent to the allotment. No motorized or mechanical transportation equipment is allowed in wilderness. Visitation of general forest areas in the Prescott National Forest has

increased by about 23% from 2002 to 2008. Castle Creek is one of the 8 wilderness areas located on the Prescott National Forest. Wilderness use on the forest has increased by 156% from 2002 to 2008. (USDA Forest Service National Visitor Use Monitoring Results for the Prescott National Forest, October 2008). There are 4 designated trails in the project area. There is 0.48 mile of Trail #31- East Fort, 1.7 miles of Trail #236 - Willow Creek, 6.5 miles of Trail #239 - Castle Creek and 5 1/4 miles of Trail #240 -Twin Peaks in the project area. All these trails are within Castle Creek Wilderness, hence the trails are non-motorized (hiking and/or horseback riding only).

The Trails, Wilderness, and Dispersed Recreation Manager and the wilderness ranger and other recreation employees that have been through most of the project area have noticed that fences that were established for grazing purposes have been burned by wildfires in the area or have fallen down from non-use and are seen by visitors in the area. For visual purposes and wilderness values, fences that are not needed should be removed, or if needed, should be maintained and repaired to serve the intended purpose.

The Recreation Opportunity Spectrum (ROS) is a land classification system that categorizes national forest land into six classes, each class being defined by its setting and by the probable recreation experiences and activities it offers. Within the boundaries of the Horsethief Grazing Allotment there are 4 ROS categories: Semi-Primitive Motorized (1,085 acres), Roaded Natural (5,210 acres) Semi-Primitive Non-Motorized (3,000) and Primitive (11,000 acres). Semi-Primitive Motorized means that a moderate probability for experiencing solitude, closeness to nature and tranquility in a predominately natural appearing environment is likely to occur for visitors that recreate in this category. Roaded Natural category means a visitor may have an opportunity to affiliate with other users in developed sites but there is some chance for privacy. Semi-Primitive Non-Motorized category means that there is a high probability for solitude and experiencing closeness to nature and there may be some evidence of other visitors. Castle Creek Wilderness, like all wilderness areas, is classified as Primitive: where the visitor has a very high probability of solitude and little evidence of other visitors in the area.

Inventoried Roadless Areas:

There are no inventoried roadless areas in the allotment.

Wild and Scenic Rivers:

A 40 mile section of the Verde River has been classified as a Wild and Scenic River (W&SR). The Horsethief Grazing Allotment is about 30 miles from the section of the Verde River that is designated as a Wild and Scenic River (W&SR) and re-authorizing grazing in this allotment would not affect the W&SR characteristics in this section of the Verde River.

Direct & Indirect Effects on Recreation:

The determination of effects of each alternative was made using professional judgment and information gleaned from site visits and communication with Forest recreation personnel. Forest personnel familiar with the project area indicate that the area is remote and used infrequently for hiking, bicycling, horseback riding and other recreation activities.

Alternative 1 - Proposed Action

Livestock would only be in the allotment September through April so recreationists may or may not notice cattle when they are using the project area for recreational activities. Most visitors recreate in the project area usually from April through July and September through October. Allowing 106 to 207 head of cattle, yearlings, for six months (September through April) would

not have any adverse impacts on recreationists in the area. Cattle may be encountered when hiking trails and cow droppings may be noticed on trails. The Recreation Opportunity Spectrum (ROS) would not be affected and the area would be classified as it is currently.

Alternative 2 – No Action/No Grazing Alternative

Recreationists would not notice that the area was no longer used to graze cattle. As previously stated, the allotment has not had livestock on it since 1996. No cattle would be encountered when hiking trails and signs of grazing (e.g., cattle droppings) would not be found in some areas that recreationists frequent. The recreation opportunity spectrum (ROS) would not change the current classifications if there were no cattle within the project area.

Cumulative Effects on Recreation Resources

The Forest Plan revision currently underway identifies potential wilderness areas that may be considered for designation by Congress. This planning effort identifies 4,925 acres east of the current Castle Creek Wilderness as a potential wilderness area. This potential wilderness area is completely within the boundaries of the Horsethief Allotment. If a wilderness designation occurs in the future, there will be implications to the ROS designation, and there would be restrictions to mechanized equipment use in any area that is designated as wilderness. Since grazing is a current ongoing use, if the potential area becomes Congressionally-designated wilderness this use would remain. The effects of continuation of grazing on the Horsethief Allotment when added to all past, present and reasonably foreseeable actions that have taken/will take place within the Horsethief Grazing Allotment would not affect visitors experience when recreating in this area.

Heritage

Existing Condition:

Based on the PNF heritage resource atlas and files, heritage specialists and para-archaeologists have conducted 34 heritage resource inventories within the allotment. Based on the surveys that occurred between 1985 and 2006, 65 acres have been intensively inventoried for heritage resources. There have been 13 heritage sites identified as a result of field surveys, both historic and prehistoric. The heritage reports are on file in the Forest Heritage Resource Section at the PNF Supervisor's Office.

Direct & Indirect Effects on Heritage Resources:

Alternative 1 - Proposed Action

It has been documented in the PNF range files that this area of the Bradshaw Ranger District has been grazed by livestock for over 100 years and at numbers higher than current levels. The Forest Service's permit for livestock grazing does not recommend changing to a more intensive grazing system nor does it recommend increasing the number of livestock. The term grazing permit will be issued for 182 days between the months of September through April. Livestock numbers would range from 106 to 207 head of cattle, yearlings, for 6 months which is a 60% reduction over current permitted levels. No range improvements are scheduled to be implemented within the next 2 years. In the future, when range improvements or other ground disturbing management practices are necessary, the Forest Service will complete the appropriate heritage surveys and/or reports as outlined in our Region 3 Programmatic Agreement Regarding Historic Property Protection and Responsibilities and be in compliance with all applicable provisions of Section 106 of the NHPA. A heritage resource specialist recently inspected 9 of the 13 known sites and it was determined that grazing has not adversely

affected the sites. Tribal Governments have been notified and no Traditional Cultural Places (TCP) have been identified within the allotment. The Forest Service will consult with the SHPO on the effects of livestock grazing on heritage resources prior to the signing of the EA. Continued livestock grazing is not expected to significantly impact heritage resource sites. The Forest Service's proposal to continue livestock management as proposed under this alternative is considered to have a no adverse effect on the heritage resource sites located within the allotment.

Cumulative Effects of Alternative 1

Past, present, and reasonably foreseeable future actions on the allotment have been considered as part of this cumulative impacts analysis. Authorization of livestock grazing along with the past, present, and reasonably foreseeable future actions, would have minimal cumulative effects on heritage resource sites.

Alternative 2 – No Action/No Grazing Alternative

If livestock grazing is not authorized then there would be no direct or indirect effects on heritage resource sites.

Cumulative Effects of Alternative 2

Since no direct or indirect effects are anticipated, there would be no cumulative effects.

Monitoring Recommendations

Heritage specialists will periodically monitor known heritage properties to assess their condition.

CHAPTER 4 – Coordination and Agencies Consulted

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

Core Interdisciplinary Team Members

| | |
|-----------------|---------------------------------|
| Christine Thiel | ID Team Leader/ Writer / Editor |
| David Evans | Range Management Specialist |
| David Moore | Forest Soil Scientist |
| Loyd Barnett | Contract Hydrologist |

Extended Team Members

| | |
|----------------|--|
| Albert Sillas | Aquatic Biologist |
| Bill Falvey | TEAMS Wildlife Biologist |
| Debra Crisp | Botanist |
| Dorothy Baxter | Recreation Planner |
| Elaine Zamora | Archeologist |
| Linda Jackson | Bradshaw District Ranger |
| Nancy Walls | Forest Natural Resources Staff Officer |
| Thomas Potter | GIS Coordinator |

Allotment Permit Holder

Bumble Bee Ranch, Jerold Collings

Federal and State Agencies

AZ Department of Environmental Quality, Northern Regional Office
AZ Game and Fish Department
AZ State Historic Preservation Office
US Fish and Wildlife Service, AZ Ecological Services Office

Tribes

The Fort McDowell Yavapai Nation
The Hopi Tribe
The Hualapai Tribe
The Tonto Apache Tribe
The Yavapai-Apache Nation
The Yavapai Prescott Tribe

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APPENDICES

Appendix 1 - Allotment Map

Appendix 2 - Actual Use Table

Appendix 3 - List of Existing Improvements

Appendix 4 – Glossary of Terms

Appendix 5 – Cumulative Effects Area Map

Appendix 1 – Allotment Map (See following pages)

See Allotment Proposed Action Map on the preceding page.

Appendix 2 - Actual Use Tables

Authorized Use on the Horsethief Allotment, 1984-1996

| YEAR | ANIMAL-MONTHS | 6 MONTH OCCUPANCY CATTLE EQUIVALENT |
|-----------------|----------------------|--|
| 1984 | 1238 | 206 |
| 1985 | 1575 | 262 |
| 1986 | 1895 | 316 |
| 1987 | Non-use | 0 |
| 1988 | 2473 | 412 |
| 1989 | 2677 | 446 |
| 1990 | Non-use | 0 |
| 1991 | 434 | 72 |
| 1992 | 3177 | 530 |
| 1993 | 1050 | 175 |
| 1994 | Non-use | 0 |
| 1995 | Non-use | 0 |
| 1996 | 1283 | 214 |
| AVERAGES | 1215 | 203 |

From 1997 to present, there have been no cattle authorized on the allotment, although some instances of trespass livestock were noted in the early 2000's.

Appendix 3 - List of Existing Improvements

Range Improvements on the Horsethief Allotment

| TYPE | Improvement Number |
|---------------------------|---------------------------|
| Allotment Boundary Fences | Various; approx. 17 miles |
| Allotment Interior Fences | Various; approx. 3 miles |
| Upper Dead Cow Corral | 002C57 |
| Mud Spring Corral | 002C54 |
| Castle Creek Corral | 002C64 |
| Willow Corral | 002C48 |
| Oak Corral | 002C59 |
| Cleator Corral | 00C56 |
| Hay Road | 002C74 |
| Upper Dead Cow Spring | 318034 |
| Sheep Spring | 318031 |
| Mud Spring | 318033 |
| Silver Cord Spring | 318073 |
| Oak Spring | 318061 |
| Bill Arp Spring | 318029 |
| Golden Turkey Spring | 318036 |
| FF Well | 318045 |
| Upper Sycamore Spring | 318035 |
| Bench Well | 318046 |
| Barrel Spring | 318032 |
| Lower Dead Cow Spring | 318028 |
| Burnt Ground Spring | 318026 |
| Willow Creek Spring | 318038 |
| Cleator Tank | 318075 |
| Waterhole Tank | 318039 |
| Harris Spring | 318030 |
| Castle Creek Spring | 318037 |

Appendix 4 – Glossary of Terms

Adaptive Management- A formal, systematic, and rigorous approach to learning from the outcomes of management actions, accommodating change, and improving management. It involves synthesizing existing knowledge, exploring alternative actions and making explicit forecasts about their outcomes.

Allotment Management Plan (AMP) - An Allotment Management Plan (AMP) is unique, and is based on the individual landscape and ranch operation and will be modified with modification or issuance of a new permit following a NEPA decision to ensure consistency with the NEPA decision.

Animal Month (AM) - A month's use and occupancy of rangeland by a single animal or equivalent.

Animal Unit Month (AUM) – The quantity of forage required by one mature cow (1,000 pounds) or the equivalent for 1 month; approximately 26 lbs of dry forage per day is required by one mature cow or equivalent.

Annual Operating Instructions (AOI) - Instructions developed a guideline for grazing management by the agency and livestock permittee for implementing grazing management activities on a specific allotment for a specific grazing season.

Aquatic – Pertaining to standing and running water in streams, rivers, lakes and reservoirs.

Browse – Young twigs and leaves of woody plants consumed by wild and domestic animals.

Candidate Species- Plants and animals for which the U.S. Fish and Wildlife Service (FWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Community Type – Community types represent existing vegetation communities that do not currently reflect potential due either to disturbance or natural processes related the development of the community. Vegetation may be disturbed by a number of factors including: grazing, fire, and other activities.

Critical Habitat – That portion of a wild animal's habitat that is critical for the continued survival of the species as declared by the Secretary of the Interior.

Cultural Resource – The physical remains of past human cultural systems and places or sites of importance in human history or prehistory.

Desired Conditions- Descriptions of the social, economic and ecological attributes that characterize or exemplify the desired outcome of land management. They are aspirational and likely to vary both in time and space.

Dispersed Recreation – In contrast to developed recreation sites (such campgrounds and picnic grounds) dispersed recreation areas are the lands and waters under Forest Service jurisdiction that are not developed for intensive recreation use. Dispersed areas include general undeveloped areas, roads, trails and water areas not treated as developed sites.

Ecological Type – Ecological types are derived directly from the TES document and describe the potential vegetation for a particular soil type. The potential vegetation was defined through intensive field sampling. See the Terrestrial Ecosystem Survey Handbook, USDA 1986 for a full description of how potential vegetation descriptions were derived.

Endangered Species – Any species that is in danger of extinction throughout all or a significant portion of its range, as declared by the Secretary of the Interior.

Environmental Analysis – An analysis of alternative actions and their predictable short- and long-term environmental effects, including physical, biological, economic and social effects.

Environmental Assessment – The concise public document required by regulations for implementing the procedural requirements of NEPA (40 CFR 1508.9).

Ephemeral – A stream that flows only in direct response to precipitation, and whose channel is above the water table at all times.

Erosion – The wearing away of the land's surface by running water, wind, ice or other geological agents. Erosion includes detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Forage – All non-woody plants (grass, grass-like plants and forbs) and portions of woody plants (browse) available to domestic livestock and wildlife for food.

Forage Utilization – The portion of forage production by weight that is consumed or destroyed by grazing animals. Forage utilization is expressed as a percent of current year's growth.

Forest Plan – A document, required by Congress, assessing economic, social and environmental impacts, and describing how land and resources will provide for multiple use and sustained yield of goods and services.

Grazing Capacity – The maximum level of plant utilization by grazing and browsing animals that will allow plants or associations of plants to meet their physiological and/or reproductive needs.

Grazing Period - The length of time grazing livestock or wildlife occupy a specific land area.

Grazing Permittee – An individual who has been granted written permission to graze livestock for a specific period on a range allotment.

Gully Erosion – The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to depths ranging from several feet to as much as 75 to 90 feet.

Habitat – The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Impaired Soil Condition – Indicators signify a reduction in soil function. The ability of the soil to function properly and normally has been reduced and/or there exists an increased vulnerability to degradation. Changes in land management practices or other preventative measures may be appropriate.

Improvement – Manmade developments such as roads, trails, fences, stock tanks, pipelines, power and telephone lines, survey monuments and ditches.

Incidental Use - Incidental Use targets the lower range of the Light Use (0-30%) category in all seasons by applying such practices as herding or by limiting where livestock attractants such as salt or water are placed relative to the area of concern.

Indicator Species – A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes are believed to indicate effects of management activities on a number of other wildlife species.

Instream Flows – Those necessary to meet seasonal streamflow requirements for maintaining aquatic ecosystems, visual quality and recreational opportunities on National Forest lands at acceptable levels.

Interdisciplinary (ID) Team– A group of individuals with skills from different resources. An interdisciplinary team is assembled because no single scientific discipline is sufficient to adequately identify and resolve issues and problems. Team member interaction provides necessary insight to all stages of the environmental analysis process.

Intermittent (or Seasonal Stream) – A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

Issue – a point of discussion, debate, or dispute with a Proposed Action based on some anticipated effect.

Key Area - A relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing use.

Management Indicator Species – See "Indicator Species."

Mesa – A tableland; a flat-topped mountain or other elevation bounded on at least one side by a steep cliff.

Monitoring - The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives. This process must be conducted over time in order to determine whether or not management objectives are being met.

National Environmental Policy Act (NEPA) – An act to declare a National policy that will encourage productive and enjoyable harmony between man and his environment; to promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

National Forest System Land – National forests, national grasslands and other related lands for which the Forest Service is assigned administrative responsibility.

NEPA- See “National Environmental Policy Act”

Perennial Stream – A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

Permitted Grazing – Authorized use of a National Forest range allotment under the terms of a grazing permit..

Proper Functioning Condition (PFC) - A methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area. PFC evaluates how well the physical processes are functioning through use of a checklist.

Proper Functioning Condition (PFC) Assessment - Provides a consistent approach for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of a riparian-wetland area.

Proposed Action – In terms of the National Environmental Policy Act, the project, activity or action that a Federal agency intends to implement or undertake and that is the subject of an environmental assessment.

Range Allotment – A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

Range Condition – The state of health of a range land site based on plant species composition and forage production in relation to the potential under existing site conditions. Range condition is rated as satisfactory or unsatisfactory.

Riparian – Land adjacent to perennial and intermittent streams, lakes and reservoirs. This land is specifically delineated by the transition ecosystem and defined by soil characteristics and distinctive vegetation communities that require free and unbound water.

Satisfactory Soil Condition – Indicators signify that soil function is being sustained and soil is functioning properly and normally. The ability of the soil to maintain resource values and sustain outputs is high.

Sheet Erosion – The removal of a fairly uniform layer of soil from the land surface by rainfall and runoff water without the development of conspicuous water channels.

Soil Erosion – The wearing away of the land surface by running water, wind, ice or other geological agents, including such processes as gravitational creep. Detachment and movement of soil or rock by water, wind, ice or gravity.

Soil Productivity – The capacity of a soil in its normal environment to produce a specified plant or sequence of plants under a specified system of management.

Species Composition – Species composition refers to a descriptive list of species that together make up a given ecological community.

Species Diversity – Diversity refers to the measure of composition for a given community and is also referred to as species richness.

Stream Reach - the length of the stream selected for monitoring.

Structural Range Improvement – Any type of range improvement that is manmade (e.g., fences, corrals, water developments).

Suitable Range – Range which is accessible to livestock or wildlife and which can be grazed on a sustained yield basis without damage to other resources.

Terrestrial Ecosystem Survey (TES) - consists of the systematic analysis, classification and mapping of terrestrial ecosystems. It describes and maps the soils and potential vegetation (ecological types). This Ecological Classification describes the existing vegetation (community types) associated with the ecological map units.

Threatened Species – Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Travelway - Any transportation facility that allows vehicle passage of any sort, that came into existence without plans, design or standard construction methods, that is not maintained or signed and has a very low traffic volume.

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

Unsatisfactory Soil Condition – Indicators signify that a loss of soil function has occurred. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs or recover from impacts. Unsatisfactory soils are candidates for improved management practices or restoration designed to recover soil functions.

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.

Watershed – The entire area that contributes water to a drainage or stream.

Watershed Condition – A description of the health of a watershed in terms of the factors that affect the hydrologic function and soil productivity.

Wildlife Habitat – The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Appendix 5 - Cumulative Effects Area Map for the 5th Code Watersheds Containing the Project Area

