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Environmental Assessment

13 Mile Rock Range Allotment

Mogollon Rim and Red Rock Ranger Districts,
Coconino National Forest
Coconino County, Arizona

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CHAPTER 1 – PURPOSE AND NEED

This chapter describes the:

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Project Scope

This report summarizes the site-specific planning process and the environmental, social and economic impacts of five management alternatives for managing livestock grazing use on the 13-Mile Rock Range Allotment during the next 10 years. This Environmental Assessment (EA) is not a decision document. The EA only discloses the environmental consequences of implementing the proposed action and alternatives to the proposed action. The Forest Supervisor's decision would be stated and explained in the Decision Notice that would accompany this EA when the planning process is completed. The Project Record documenting the process and analysis includes all resource specialists' data and reports located in their respective resource files, and the process record located at the Red Rock Ranger District's Sedona Office in Sedona, Arizona.

This environmental analysis process was formally initiated by the Beaver Creek/Sedona District Ranger, Ken Anderson, with a project initiation letter, dated June 30, 1998. An Interdisciplinary Team (Team) of Forest Service resource specialists were selected based on current uses and anticipated concerns. Representatives from the Arizona Game & Fish Department (AG&FD) and the Ranch Manager worked with the Team to describe the existing and desired conditions for the area, and to develop specific objectives and management practices to meet those objectives. The Team developed a proposal for managing rangeland use on the allotment, and subsequently mailed the proposal to the public and Forest Service personnel for review and comment in September 1998. From these comments, the Team developed statements to capture the substantive issues and developed alternative rangeland management strategies to address the issues. These issues are listed below; the management alternatives are presented in Chapter 2. The impacts of implementing each alternative are summarized in Chapter 4, Environmental Consequences.

Project Area

The 13-Mile Rock Range Allotment is located on the Beaver Creek and Long Valley Ranger Districts of the Coconino National Forest. The administrative office for the permitted livestock use is the Beaver Creek/Sedona Ranger Districts office in Sedona, Arizona.

Approximately 2/3 of the allotment is within Yavapai County, and 1/3 is within Coconino County.

The allotment includes approximately 39,191 acres of Forest Service lands south of West Clear Creek and north of State Highway 260. The eastern boundary is Clover and Toms Creeks, and the western boundary is the Verde River. The legal description for the allotment areas is Township (T) 14 North (N), Range ® 7 East (E), portions of Sections 34-36 south of West Clear Creek; T14N, R8E, portions of Sections 28, 29, and 31-36 south of West Clear Creek; T14N, R9E, portions of Sections 32 and 33 south of West Clear Creek; T13N, R5E, all or portions of Sections 12-15, 22-27, 35 and 36; T13N, R6E, all or portions of Sections 3-27; T13N, R8E, all or portions of Sections 1-8 and 10-13; T13N, R9E, all or portions of Sections 3-10 and 16-18; Gila and Salt River Meridian (Appendix A, Map 1).

Forest Plan Management Areas

The allotment contains the following Management Areas (MAs) designated by the Coconino National Forest Land Management Plan (LMP) (USDA Amended 2002):

MA 1	West Clear Creek Wilderness (not grazed)
MA 2	Verde Wild and Scenic River (not grazed)
MA 3	Ponderosa Pine and Mixed Conifer
MA 4	Ponderosa Pine on greater than 40% slopes
MA 6	Unsuitable Timber Land
MA 7	Pinyon-Juniper on less than 40% slopes
MA 8	Pinyon-Juniper on greater than 40% slopes
MA 10	Transition Grassland
MA 11	Verde Valley
MA 12	Riparian and Open Water (limited grazing)
MA 15	Developed Recreation Sites (not grazed)

Most of West Clear Creek, the Cottonwood Spring area, all of the Verde River corridor and the Clear Creek Campground within this allotment are excluded from livestock grazing, leaving approximately 38,206 acres available for permitted livestock grazing use.

Current Livestock Management

The 13-Mile Rock Allotment is a year-round allotment, meaning that the maximum permitted number of livestock (550 head of cows/calves and bulls, and 6 horses) are grazing on some part of the allotment at any given time of the year. Bulls are grazed year-long with the cows, resulting in calving throughout the year.

Livestock movement, control and grazing use is managed under an intensive rest rotation grazing system. When plants are dormant, graze periods can be as long as 2 months in a pasture. When plants are growing, graze periods are 20 days (slow growth) or less (fast growth) in a pasture. In addition, in high and mid-elevation areas where elk and cattle compete for forage, approximately ½ of the pastures are rested from livestock grazing each

year, while the remaining ½ of the pastures are grazed. When the northern tier of pastures is grazed, the southern tier is rested, and visa versa. Some pastures scheduled for grazing each year may also be deferred through the fast growth season. Pastures designated for year-long rest are not grazed by the allotment's permitted livestock. Currently, livestock grazing is managed for light (11-25% to moderate (26-50%) total utilization (livestock and wildlife) at the end of the growing season. Recent monitoring and range inspections show this goal is being met across the allotment. The intensive rest rotation grazing system provides substantial rest within the allotment, especially at the high and mid-elevation areas of the Red Rock and Mogollon Rim Districts. This pattern of grazing use insures that wildlife have adequate forage, adequate prey base cover and reduced competition for habitat requirements within each allotment and across the landscape. This rest half concept of management also insures that plants go through a full cycle of development, where seed is set and vigor is stored in root reserves of both warm and cool season forage species. Consequently, where ecologically feasible the rest promotes improved species diversity as well as higher frequency and density. To illustrate the intensive rest rotation grazing system, the pastures used and length of graze period for each pasture during the past 3 years is listed in Appendix B, Table B-1.

The summer use area is in the higher elevation ponderosa pine vegetative type (east 1/3), and includes the Tule (north and south), Wilbur (north and south), and Toms/Good Enough pastures. In the fall, livestock move toward the lower elevations through the transition vegetation type (pinyon/juniper grasslands) of the Meadow Canyon (north or south), Tin Can (north or south), Maverick Basin (north, west, or south), and Tanque Aloma pastures. Winter use (January and February) is in the large Winter pasture, and spring use (March through June) is in the Heifer and the four Wingfield Mesa pastures, located in the foothills of the Verde Valley (western side of the allotment). In June, the herd moves toward the upper elevation pastures on constructed livestock drive trails through the Heifer and Winter pastures. The herd then grazes through the transition pastures toward the summer country. Livestock are excluded from Cottonwood Springs (Wingfield South pasture), the Clear Creek Campground and day-use area at West Clear Creek (Heifer, Bobs and Cactus pastures) and all but a small, rock armored portion of West Clear Creek riparian corridor (Heifer, Bobs, Cactus and Winter pastures). The fencing and water lanes controlling livestock use at West Clear Creek in the Heifer pasture were completed in 1998 in compliance with the mitigation requirements of the 1998 Ongoing Grazing Consultation with the FWS and FS Regional Team (USDA 1998 and 1998).

Bobs and Cactus pastures are separated from the main allotment area by West Clear Creek and are not used at this time. These pastures were used historically for grazing small herds of bulls or heifers. The current permittee keeps the bulls and heifers with the main cow herd year-round, and does not use the Bobs or Cactus pastures. Water in Bobs pasture is unreliable, and livestock can access West Clear Creek in the Cactus pasture. Bob's pasture may be use on a limited basis for permitted saddle horses if the permittee is willing to haul waters, frequently move the water hauls and insure the southern boundary (West Clear creek riparian fence) is well maintained and frequently monitored.

Purpose And Need

An environmental analysis for the livestock grazing use of the 13-Mile Rock Range Allotment was last completed in 1987. The 1987 allotment management plan (AMP) and subsequent Annual Operating Plans (AOPs) implemented the decision and multiple resource goals for vegetation and soils, riparian condition, wildlife habitat, recreation and livestock performance. When needed, incremental changes were made in the implementation of the plan in response to "lessons learned", new technology and changing needs and conditions.

After more than 10 years of range management under the 1987 plan, the Forest Service needs to review and evaluate the current livestock grazing use and the movement toward meeting the environmental, social and economic goals developed during the last planning effort, and in subsequent efforts. The water rights information and cultural resources and potential impacts to Native American Traditional Cultural Properties (TCPs) within the allotment also need to be reviewed. A summary of the Forest Service findings is presented below.

Existing Conditions and Review of the 1987 Management Objectives

For each resource or category listed below, there is a brief description of the existing condition, and how or whether we are meeting the objectives stated in the 1987 decision for livestock grazing use and management for this allotment. For more complete goal statements, refer to the 1987 Allotment Management Plan (USDA 1987).

Soils, watershed and vegetation

Soil conditions on approximately 86% of the allotment are in satisfactory condition, based on Terrestrial Ecosystem Survey (TES) data (USDA 1991) and current field reviews. Unsatisfactory soil conditions are found on approximately 14% of the allotment area in low lying areas of the pinyon-juniper woodland and the semi-desert shrub lands.

Portions of the Fossil Creek, West Clear Creek, and Horseshoe Reservoir 5th code watersheds occur within the allotment. The draft 1998 Arizona Water Quality Assessment Report by the Arizona Department of Environmental Quality (ADEQ: in draft) lists each of the effected perennial streams as in full compliance for assigned designated uses.

Overstory vegetation is divided into three cover types: ponderosa pine/grass (6000 to 6900 ft. in elevation), which includes inclusions of oak and pine stringers; pinyon/juniper woodlands and grasslands (4500-6000 ft.); and semi-desert shrubs and grasslands (3300-4500 ft.). There are no high elevation meadows within the allotment, though some small openings in the ponderosa pine forest do exist.

Perennial grasses in the ponderosa pine type includes Arizona fescue, mountain muhly, june grass, smooth brome, bottlebrush squirrel-tail, intermediate wheatgrass and orchard grass. The cool season grasses are used by elk early in the year before livestock enter the summer pastures. The livestock primarily use the warm season grasses in late July or August, and

the second season's growth of cool season grasses in the early fall months, depending on the grazing sequence and environmental conditions each year.

Perennial grasses in the pinyon-juniper grasslands areas are dominated by western wheatgrass, sideoats and hairy grama, june grass, squirrel-tail and blue grama, with large areas of yellow blossom sweet clover. Grasses in the Maverick Basin South and Tin Can South pastures include near monocultures of blue grama, with areas of hairy grama, sideoats grama and western wheatgrass. Clover and snakeweed are found in some areas throughout the allotment, but especially in portions of the Tanque Aloma, Maverick Basin South, Tin Can South and Meadow Canyon South pastures. Grasses on Wingfield Mesa and in the Heifer pastures are primarily warm season species, dominated by tobosa grass.

Browse is generally in good, healthy condition in the Maverick Basin West and North, and the Tin Can North pastures where burning occurred in the 1990s. However, some areas of browse plants in the Winter pasture are decadent and provide poor quality forage for wildlife and livestock. These plants are essential wildlife forage and cover, and provide additional forage for livestock.

1987 soils, watershed and vegetation goals for the allotment of reducing oxidized feed and plant pedestaling are being met. The goals for increasing plant interspace fill-in and plant litter are partly met, generally on Wingfield Mesa, and in the Heifer and northern tier of pinyon-juniper grassland pastures. There are still opportunities to move toward these goals in the Winter and southern tier of pinyon-juniper grassland pastures, and to improve browse conditions in the Winter pasture.

Riparian

Riparian areas within the allotment encompass 1% of the total area of the allotment, and include portions of West Clear Creek, Meadow Canyon, Cover Creek, Toms Creek and Cottonwood Spring. Riparian assessments conducted in 1998 show West Clear Creek, Meadow Canyon, Clover Creek and Toms Creek are in proper functioning condition (PFC). The Cottonwood Spring livestock exclosure fencing is now functional, and this riparian area is showing substantial improvement. The Verde River is fenced to exclude livestock, but unauthorized livestock use from this allotment into the River corridor can occur if recreationists cut fences or leave gates open in the Wingfield Mesa pastures.

1987 riparian goals are being met in all riparian areas, except Cottonwood Spring. Cottonwood Spring is fenced to exclude livestock, but, because one of the water gap fences was down, cattle from the 13-Mile Rock Range Allotment trespassed into the riparian corridor in 1998. The exclosure fence is now repaired and maintained, and no further trespass is expected. Some members of the Team visited the area in August 1998, April 1999, June 2001 and May 2002 found the ground cover vegetation was recovering, woody riparian species were beginning to re-establish and soil deposition had occurred from recent rains.

Airshed

The allotment is within the Verde Airshed, which is designated by Arizona Department of Environmental Quality (ADEQ) as sensitive. Sycamore Canyon Wilderness and the Yavapai-Apache Indian Reservation, located in Camp Verde, are designated a Class I Airshed, meaning the air quality is protected from degrading impacts. Air quality in the allotment area is generally very good, except when local residents are burning agricultural fields or trash, or when wildfires or prescribed fires are burning on the Forest.

Wildlife

Nine species of wildlife or fish associated with this allotment are listed under the Endangered Species Act (ESA) of 1973, as amended. Species habitats within or adjacent the allotment are either occupied or potentially available. These nine species include the Mexican spotted owl (MSO), southwestern willow flycatcher (SWWF), bald eagle, Yuma clapper rail, Gila trout, Colorado squawfish, razorback sucker, loach minnow, and spikedace. The Chiricahua leopard frog is a candidate for Federally listing under the ESA. An additional 20 species of amphibians, birds, fish, insects, reptiles, and plants have Arizona State status, and are included on the Regional Forester's Sensitive Species List (USDA Forest Service, Southwest Region; July 21, 1999). These 20 species either occur, or there is potential habitat, on or adjacent the allotment.

Direction for threatened and endangered (T&E) wildlife and plant species has, and is, being implemented on the allotment. The area-wide environmental impacts of changes in livestock management were evaluated when implementing direction for the MSO and SWWF, and recently for potential native fish habitat in West Clear Creek and the Verde River.

Other wildlife species on the allotment include elk, mule deer, white-tailed deer, antelope, turkey, Gambel quail, dove, ducks, rodents, coyotes, javalina, bear, squirrel, mountain lion, raptors and songbirds. Antelope and deer movement through pinyon-juniper/grassland area of the allotment is impeded by two old barbed wire fences that do not meet the current fencing standards for wildlife.

1987 wildlife goals for turkey nesting habitat are being met; the goals for elk (cool season forage) and deer (browse) forage are partially met, but there is still much opportunity for improvement. The goal for leaving 50% of forage for wildlife is being met in the grazed tier of pastures in the pinyon-juniper and pine vegetation types and in the Winter, Heifer and Wingfield Mesa pastures. One-half of the pastures in the pinyon-juniper and pine vegetation types are not grazed by livestock each year, but are grazed up to a 20% utilization rate by elk.

Water Rights

Water rights records for stock tanks located within drainages are in the process of being verified and assigned a Statement of Claimant (SOC) number for each Certificate of Water

Right. These documents are necessary for the adjudication process to maintain the rights to these water sources.

Recreation.

Recreation use within the allotment area includes developed (Clear Creek Campground) and dispersed camping, hunting, fishing, hiking, horseback riding, 4-wheel and ATV driving, and driving for pleasure. Conflicts, such as pasture gates being left open or livestock grazing in dispersed camping areas, are on-going problems. Clear Creek Campground is fenced to exclude livestock.

1987 recreation goal for insuring fences around the developed campground are maintained is being met under the current permittee. Conflicts between livestock recreation use still occur when pasture gates are left open or fences are cut by recreationists and nearby residents from the Verde Valley.

Cultural resources

Recorded archaeological sites at the higher elevation ponderosa pine vegetation type are represented by occasional lithic scatters, while the lower elevations contains heavy concentrations of Southern Sinagua sites. Historic sites within the allotment include the Clear Creek Ranger Station, a CCC work camp, and portions of the General Crook Trail. There is no evidence that livestock are impacting any cultural resource sites or TCPs on the allotment.

Ranch and livestock performance.

The Ranch contributes to the local and regional economy by providing jobs, both directly through the ranch operation and indirectly through purchases and investments in the Ranch, spending by ranch employees in the community and fees paid to the counties by the Forest Service in lieu of taxes. This and other ranches in the area also help maintain the rural ranching lifestyle of the Verde Valley, Northern Arizona and, generally, in the Southwest.

The 1987 livestock performance goals are not yet being met by the new (less than 3 years) permittee. The calf crop (90%), average weaning weights (550 lbs-steers; 500 lbs-heifers) and bull to cow ratio (1:15 or 20) goals are still attainable. The goals for calving and bulling periods are not applicable under the current ranch management.

Desired Conditions

The desired conditions listed below for the allotment area are based on the Coconino Forest Plan, Forest Service direction, and State and Federal laws pertaining to natural resource management.

Soils, watershed and vegetation

Throughout the project area, soils are functioning properly and normally, meaning the soils are stable and are able to absorb, store and transmit water and recycle nutrients. Adequate vegetative ground cover promotes proper soil aggregation and water infiltration, minimizes soil erosion, and enhances nutrient cycling. The degree of functionality and ability to support the growth of diverse plant communities depends on climate and the inherent properties of each soil.

Water quality in perennial streams is in full compliance with all designated uses. Best Management Practices to protect water quality are identified for livestock grazing management and monitored for implementation and effectiveness.

The upper elevation ponderosa pine vegetation type is a mixture of uneven-aged overstory, denser areas that provide hiding and thermal cover and open areas that support a diverse community of cool and warm season (70:30) perennial forage plants. The ratio of cool to warm species in the lower elevation pine type is 50:50.

The pinyon-juniper grassland vegetation type is a mosaic landscape of open, savannah-like areas with a balance of cool and warm season (50:50) perennial plants and pinyon-juniper woodland areas of varying densities. Trees and shrubs are generally on rocky, shallow soils.

The semi-desert shrub and grassland areas contain a diverse, well distributed and appropriate mixture of cool and warm season (25:75) perennial grasses and forbs on deep soils, and a diverse shrub component on shallow rocky soils. Browse species, found primarily in the Winter and northern areas of the Maverick Basin pastures, are healthy and producing forage and cover for wildlife.

Native perennial and annual ground cover vegetation on the allotment is at or moving toward the desired seral stage and corresponding potential natural community listed in the TES.

Wildlife

Known occupied sites and potential habitats for TE&S species are protected from adverse impacts from livestock grazing through management or structures. Monitoring of habitats and forest uses show management is compatible with resource protection.

Quality habitat is plentiful and available to sustain viable populations of key wildlife species. The transition area is managed as key wintering and breeding habitat for turkey, elk, deer, and squirrel. The grassland habitat supports a self-sustaining antelope herd.

Riparian

All riparian areas and wetlands within or affected by grazing use on the 13-Mile Rock Range Allotment are in proper functioning condition. Management and uses are compatible with protection of riparian values.

Water Rights

Water rights for all water sources needed for proper livestock management on the allotment are secured and properly maintained.

Airshed

Air quality within the Verde Airshed and Sycamore Wilderness, and on the Yavapai-Apache Indian Reservation is not adversely impacted by Forest management.

Recreation

Conflict between recreation and livestock grazing use is minimal. Range structural and non-structural improvements have minimal impact on the recreation use and visual quality of the area. Recreation users continue to contribute to the economic and social structure, and the rural atmosphere of the local and regional community.

Cultural resources

Livestock use is not adversely impacting sensitive archeological sites or Traditional Cultural Properties (TCPs) identified by the Tribes.

Ranch and Livestock Production

Livestock management strategies and techniques are cost-effective and meet the Forest Service goals for resource protection. This and other ranches continue their contribution to the economic and social structure, and to the rural atmosphere of the local and regional community.

Project Objectives

The Team compared existing resource, social and economic conditions within and around the project area with desired conditions. The following project-specific objectives were then developed to guide the agency and the permittee in moving toward or maintaining the desired conditions.

1) Maintain or improve soil conditions, water quality and riparian condition by:
   Increasing perennial grass and vegetative litter throughout the allotment area where needed, with special emphasis in the pinyon-juniper grasslands and desert grasslands of Wingfield Mesa;
   Maintaining the proper functioning condition of Meadow Canyon, West Clear Creek, and Toms Creek riparian corridors; and
   Improving the riparian condition and function of Cottonwood Spring.
2) Maintain the integrity of the Verde River corridor and its Wild and Scenic River designation by preventing livestock trespass.
3) Attain an appropriate balance and diversity of cool to warm season perennial grasses and

forbs throughout the allotment for livestock and wildlife forage and vegetative ground cover by:

Increasing cool season species in the higher elevation ponderosa pine areas (Toms/Good Enough and Tule pastures) to achieve a 70:30 ratio of cool to warm season perennial forage species.

Increasing the cool season species in the pinyon-juniper grassland and lower elevation ponderosa pine areas to achieve a 50:50 ratio of cool to warm season forage species; and Increasing cool season species in the Winter, Heifer and the four Wingfield Mesa pastures to achieve a 25:75 ratio of cool to warm season forage species in these areas;

4) Maintain the savannah-grassland (mid-seral) state in the pinyon/juniper pushed areas by:
   Controlling juniper encroachment into the areas of productive soils, and
   Maintaining or increasing the grass and forb vegetative component where needed.
5) Properly manage and protect habitat for threatened and endangered and sensitive (TE&S) wildlife, fish and plant species using current knowledge of habitat needs and responses.
6) Maintain or improve key wintering and breeding habitat areas for turkey, elk, deer and antelope in the mid-elevation areas by:
   Maintaining the current 60:40 forage to cover ratio, and
   Minimizing disturbance and obstructions to wildlife movement.
   Continue working with the AG&FD to maintain elk populations at levels compatible with our management objectives for vegetation, soils and habitat for other wildlife species.
7) Protect air quality in the Verde Airshed and the Yavapai-Apache Indian Reservation from impacts of Forest management actions on this allotment through appropriate planning and implementation of prescribed burns.
8) Maintain the economic and social contribution of recreation use to the local and regional community by providing opportunities for quality recreation experiences and visual quality, and
   Eliminating conflicts between recreation use and livestock grazing use where possible.
9) Secure and properly maintain the water rights for all tanks within drainages or developed springs on the 13-Mile Rock Allotment.
10) Maintain the economic and social contribution of ranching to the local and regional community by allowing properly managed livestock grazing use on the Forest, with emphasizes on cost-effective management strategies and land uses that protect natural and cultural resource values.

Proposed Action

The Proposed Action, developed by the Team and sent to cooperating agencies and interested individuals and groups in September 1988, addresses specific resource and social needs related to livestock grazing use on the 13-Mile Range Allotment area. Livestock grazing is allowed to continue for the next 10 years, with some modifications to the existing management plan to further our land management goals. Additional structural and non-structural improvement projects and minor alterations in livestock use patterns are proposed, as follows, to address concerns about riparian, watershed and soil conditions, and wildlife and native fish habitat.

Specifically, the Forest Service proposes to:

- continue current livestock grazing strategy, pattern of grazing use and permitted livestock numbers, and maintain all existing range structures,
- reduce the length of time livestock graze the entire area of the Winter pasture from 60 days (January and February) to 30 days each in two newly-created, smaller pastures [Winter East (January) and Winter West (February)].
- increase the graze period in the Wingfield Mesa group of pastures from 80 to 100 days in the spring to increase the grazing use on the dominate tobosa grass and encourage a greater diversity of grass and forb species.
- use livestock to scarify soils and plant an appropriate mix of cool and warm season perennial native grass and forb species in selected areas of light to moderate soil compaction in the Maverick Basin South and Tin Can South pastures, and plant seed on productive soil units in the Winter, Heifer and Wingfield Mesa pastures.
- cut, lop and scatter immature juniper trees on approximately 3,000 acres of pinyon-juniper grasslands (Winter, Maverick Basin, Tin Can, Tanque Aloma and Meadow Canyon units) over the next 10 years to maintain the savannah-like grasslands.
- prescribe burn approximately 1,000 acres of decadent browse plants in the Winter pasture.
- replace the bottom barbed wire of non-conforming barbed-wire fences with smooth wire, raising the height of the bottom wire to at least 18" above ground for exterior and interior pasture fences and waterlots throughout the allotment, and to 21" above ground in antelope habitat areas.

Public Involvement

The Proposed Action was distributed for review and comment to 87 individuals, organizations, or agencies in September 1998 (Consultation/Public Involvement). The Team received eight written responses to the Proposed Action, and considered comments in two other unsolicited letters concerning livestock grazing use and planning in general. The following issues were raised in response to the Proposed Action, and were used to develop alternatives for managing the 13 Mile Rock Range Allotment.

Issue 1

The proposed action allows for continued livestock grazing, although there is evidence that livestock grazing can be detrimental to riparian habitat, vegetation, soils, water, wildlife and other uses of public lands when grazing is not controlled. The existing condition states that past livestock use in some mid-elevation pastures may have contributed to soil compaction, showing that livestock grazing may not be appropriate. Livestock should be removed from the allotment until riparian areas and watersheds are in "excellent" condition.

Discussion and disposition:

After careful field checking of the area listed in the Proposed Action as having compacted soils, the Forest Service Soils Scientist assigned to this project determined that the soils are only lightly or moderately compacted, though there is little effective ground cover to allow

for good infiltration of rain water. There is a need to improve ground cover in this area to protect the soils and break up the soils for better water infiltration.

A "No Grazing" alternative (Alternative 2) is fully developed in this project analysis to address this issue, and to compare the biological, social and economic effects of removing livestock grazing for this 10 year project planning period. This alternative also includes actions to move toward desired conditions for Cottonwood Spring, areas of juniper encroachment, wildlife habitat and recreation use.

The current and desired conditions for the riparian corridors and the watershed, and the impacts of implementing each alternative, are discussed in Chapter 3, Affected Environment and Chapter 4, Environmental Consequences, respectively, and are presented in standard terminology for each resource. The term "excellent" is not used for riparian or watershed conditions, but is equivalent to Proper Functioning Condition for riparian corridors and Satisfactory Condition for watersheds.

Issue 2

The proposed action allows for continuation of the present management of the bulls, which results in inconsistent calving throughout the year and a need for multiple shipping to meet Forest Service land use and administrative policies. This is an economic impact to the ranch in time, shipping costs and fluctuating market values.

Discussion and disposition:

Two alternatives were considered to address this issue. One alternative was to separate the bulls and cows from August to mid-March, and use the Wingfield Mesa pastures and the Bobs and Cactus pastures for grazing the 50 head bull herd during that time. The second alternative was to lease the needed bulls during the primary breeding season (mid-March to July). The Ranch evaluated the economic costs of these alternatives, and decided to continue running the cow and bull together year-round, with some changes in shipping strategy to meet the Forest Service land use and administrative policies. A complete explanation of the alternatives and the rationale for dropping these from full consideration are found in Chapter 2, Alternatives Considered, But Not Fully Developed.

Issue 3

The proposed action allows for continued livestock grazing use with the current stocking level of 550 head (cow/calf and bulls) without presenting sufficient evidence that the allotment is properly stocked at or below capacity. Data on forage production and utilization (all ungulates), range trend, soil and watershed condition, water availability, and forage species abundance and diversity needs to be presented to assure the livestock capacity is appropriate for this allotment.

Discussion and disposition:

An alternative was considered to address this issue that would allow livestock grazing at the level permitted prior to implementation of the current intensive management strategy (450

head, cow/calve operation). However, given the success of the current intensive grazing strategy, based on forage use monitoring data, actual and estimated forage production, range inspection reports, range cluster data (trend), and watershed, soil and riparian condition reports, the Forest Service feels the livestock numbers are well within the capacity of the allotment. A complete explanation of the alternative and the rationale for dropping it from full consideration is found in Chapter 2, Alternatives Considered, But Not Fully Developed.

Issue 4

The proposed action includes expensive structural and non-structural improvements that may not be accomplished during the 10-year planning period, given the limited funding available. All structures for controlling livestock and projects to improve resource need to be economically feasible and implementable within the planning period.

Discussion and disposition:

Alternative 4 was developed that allows for current livestock numbers and management intensity, but limits the structural range improvements and areas of non-structural resource improvements to those with the greatest expected results. An economic analysis and resource and social impacts assessment is presented for each alternative in Chapter 4, Environmental Consequences.

Issue 5

The proposed action does not address the need to improve the condition of the grasslands on Wingfield Mesa, such as the need for increase the diversity of ground cover vegetative species and to stop encroachment by mesquite and cat-claw into the grasslands.

Discussion and disposition:

Alternative 5 was developed to evaluate another option for more quickly improving the diversity of the ground cover vegetation on Wingfield Mesa, using a combination of livestock grazing, rest and prescribed fire. Prescribed fire also provides a means for controlling encroaching mesquite and cat-claw shrubs on the Mesa.

Concerns

Several responses raised questions and concerns about the capability of the land to support livestock grazing use, the analysis process and the need to fully evaluate the environmental and economic impacts of all management alternatives that are fully developed. Some questions focused on the existing and future protection for riparian areas, soils, and cultural resources; others asked for a clearer explanation of the current and proposed livestock grazing strategy. One person asked if the Team had considered the impact of livestock on cryptogamic soils. These concerns were noted and are addressed in Chapter 3, Affected Environment and Chapter 4, Environmental Consequences.

Decision To Be Made

The Forest Supervisor is District Rangers Anderson and Sears are the Deciding Officer for this project, and would decide what actions are most appropriate for managing the 13-Mile Rock Range Allotment area for the next 10 years. The Forest Supervisor may select any of the management alternatives presented here, or may select a management alternative that is different or includes portions of these alternatives.

If a livestock grazing alternative is selected, the Forest Supervisor's decision would include the maximum permitted number of livestock for this allotment, the grazing strategy to use and the number and type of range structural and non-structural improvements. He would also approve the monitoring plan and authorize a 10-year Term Permit for livestock grazing on this allotment.

CHAPTER 2 – ALTERNATIVES

This chapter presents the alternatives and coordination needs for managing the rangeland resource on the 13-Mile Rock Range Allotment, including:

- Alternatives fully developed in response to the issues, including coordination needs and Best Management Practices to comply with the Clean Water Act,
- Alternatives considered, but not fully developed, and
- Comparison of the management alternatives that are fully developed.

Alternatives Fully Developed

The following alternatives for managing the 13-Mile Rock Range Allotment for the next 10 years were fully developed to meet the management objectives and address resource issues. Each was fully analyzed for environmental effects during this planning process:

- Alternative 1 - continuing the current livestock management strategy,
- Alternative 2 - no grazing for the next 10 years, with projects for improving watershed conditions and wildlife forage and habitat,
- Alternative 3 - the Proposed Action, with some modification,
- Alternative 4 - continuing the current livestock management strategy, with emphasis on watershed/grassland maintenance and forage improvement projects with the greatest expected results, and
- Alternative 5 - same as Alternative 3, but with additional emphasis on managing the grasslands on Wingfield Mesa.

Coordination and Implementation Practices Needed for All Alternatives

Cultural resources

Consult with the State Historic Preservation Office (SHPO) on the effects of ongoing grazing within the allotment area, and determine appropriate mitigation measures as needed. Complete site-specific surveys and consultation prior to implementing any approved structures, ground-disturbing activities or prescribed burning.

Threatened and Endangered (T&E) species

Consult with US Fish & Wildlife Service (FWS) on the impacts of the preferred alternative on T&E wildlife, fish or plant species, and any appropriate mitigation measures prior to selecting a final management alternative for the next 10-year period.

Grass and forb seeding

Seed with native grasses and forbs that are appropriate to each specific site. Consult with the Forest Botanist and review the TES list of potential ground cover vegetative species to determine the most appropriate seed mix.

Noxious weed control

Minimize disturbance to the existing native plant population during project implementation, and take care not to introduce seeds of unwanted plants. Clean vehicles, equipment and personal gear if they have been in an infested area. Use only certified, weed free seed to revegetate areas, and weed free hay if hay is used as a cover or feed for the scarify and seed projects (Alternatives 3, 4 and 5). Conduct post-project implementation monitoring to insure no noxious weeds were introduced or become established. Control or eliminate populations of noxious weeds that may become established due to this project, as allowed on the Coconino National Forest.

Arizona Department of Environmental Quality (ADEQ)

Coordinate prescribed burning projects to meet State air quality standards.

Ranch

Coordinate all prescribed burning and tree thinning in the Good Enough/Tule 20K, browse and grassland burning, seeding and juniper treatments during development of the Annual Operating Plan (AOP) with the Ranch operations to assure resource objectives are met with few conflicts.

Good Enough/Tule 20K Project

Coordinate livestock use of the pastures within the Good Enough/Tule project area where tree thinning and prescribed burning are proposed. Also, coordinate implementation of the soil scarification and seeding projects proposed under Alternatives 3, 4 and 5, with the thinning and burning projects to assure adequate forage is available in the Good Enough/Tule area if the seeded pasture(s) are unavailable for livestock grazing.

Arizona Department Of Transportation (ADOT)

Inform the Department of Public Safety (DPS) when the livestock are scheduled to cross SR 260 to move between the Wingfield Mesa pastures and the Heifer pasture. Work with ADOT to modify the Right Of Way (ROW) fences along SR 260, if possible, to meet wildlife needs, especially in the antelope habitat area (Maverick Basin, Tin Can and Meadow Canyon pasture groups).

Inform ADOT when prescribed burning would take place, and coordinate road safety signing along the highway and public information with this agency.

Best Management Practices to Comply with the Clean Water Act

The following project-specific Best Management Practices (BMPs) are designed to minimize the potential adverse effects of sedimentation and turbidity of downstream perennial waters. Unless monitoring proves to the contrary, implementation of the following site specific Best Management Practices constitutes compliance with Arizona State and Federal Water Quality Standards.

- Monitor permittee compliance with the Allotment Management Plan throughout the grazing period of each year for the life of the permit. Compliance with the terms and conditions of the livestock grazing permit would be strictly enforced by the District Range Staff and District Ranger (Chapter 5. Monitoring Plan).
- Implement the soil and water monitoring plan (Chapter 5. Monitoring Plan). Modify livestock management if monitoring results indicate that soil and water objectives are not being achieved.
- Manage livestock grazing at an intensity that would improve vegetative ground cover (primarily the litter component) to enhance soil function and to improve the quality and quantity of desirable vegetation. Each pasture is grazed in a planned sequence. Adequate rest during the plants growing season allows plants to become established and grow undisturbed, and allows for accumulation of plant litter. Key grazing areas would be monitored to determine when cattle should be moved to prevent over use (Chapter 5. Monitoring Plan). A planned grazing system is designed to promote flexibility in the grazing program and to buffer the adverse effects of drought (Chapter 2. Management Alternatives).
- Use salt to achieve livestock distribution objectives or to correct localized over-use by livestock grazing. Salt at a reasonable distance away from waters or natural congregating areas such as swales, drainages, riparian areas and meadows, reference the terms and conditions of the 10-Year Term Grazing Permit).
- Implement seeding projects to maintain or improve vegetative ground cover in areas where soils are compacted and native seed is scarce, in areas where erosion is contributing sediment directly into a drainage channel, riparian area or a perennial stream channel, and in disturbed areas created by management activities. Provide a period of protection from grazing until herbaceous vegetation is established and soil condition is satisfactory (Chapter 2. Management Alternatives).
- Maintain existing range structural improvements, and install and maintain new range structural improvements as needed, to allow for proper livestock control and distribution, control graze and rest periods and implement other livestock management techniques necessary to improve and/or maintain long-term soil productivity and water quality. Structural range improvements, such as corrals, troughs, trails, or storage tanks, should not be located in swales, drainages, riparian areas or meadows (Chapter 2. Management Alternatives).
- Prescribed burn only under conditions where the intensity and spread of fire can be controlled. To protect soil productivity, fire intensity is at a level that prevents the loss of soil nutrients and organic matter, minimizes reductions in vegetative ground cover that would result in increased soil erosion and prevents the alteration of soil physical properties that would reduce infiltration of water into the soil. To enhance long-term

soil productivity, heavy concentrations of slash and ground fuels should not be burned, but should be dispersed and lopped into areas void of slash such as interspaces between tree canopies. Burned areas should be protected from livestock grazing until vegetation is re-established. Refer to BMP 5 (Chapter 2. Management Alternatives; Chapter 4. Environmental Consequences; Environmental Assessment for the Good Enough/Tule 20K Analysis Area).

Alternative 1 (Appendix A, Map 1)

Intent: The current livestock grazing management strategy would continue on the allotment (Management Intensity D), including assigned maintenance of structural improvements and monitoring requirements. Continued movement toward desired conditions and Forest Plan direction for improving vegetation, watershed and riparian conditions and wildlife habitat would be through proper livestock management. The only changes anticipated within the next 10 years would be those that may result from changes in Forest Service direction. An Allotment Management Plan would be developed and a new 10-year term grazing permit would be issued following a decision to implement this alternative.

Livestock grazing strategy

Continue managing livestock use under the current intensive rest rotation grazing strategy, with the graze ½, rest ½ pattern in the high and mid-elevation pastures and annual use in the low elevation pastures. Pastures are grazed for 20 days or less during the plant growing season and up to 60 days during the plant dormancy season. The approximate length of graze for each pasture is planned during development of the Annual Operating Plan (AOP) Annual Operating Instruction (AOI) based on anticipated plant growth and resource needs. The actual length of graze each year may vary from the AOP schedule, depending on the actual plant growth stage encountered in each pasture.

Specifically consider wildlife breeding areas and key wintering habitat needs, soil conditions and vegetative ground cover (plants and litter) when planning annual livestock grazing use. During drought years, livestock would not be allowed to use pastures scheduled for rest that year.

Continue grazing use in the entire Winter pasture for 60 days during January and February each year, with a maximum 7 day pass through in June (average 1 day) as the livestock move to the mid and high elevation pastures for summer grazing.

Graze livestock in the Heifer pasture for approximately 20 days in March. Use the two restricted access points to West Clear Creek as the water sources for the herd during the March graze period. The herd is then moved to the Wingfield Mesa group of five pastures.

Drive livestock through the Heifer pasture in June toward the summer grazing pastures within 5 days. Close the gates to the West Clear Creek water lanes during the move. Move the main herd through the pasture in 1-2 days. If newly born calves cannot move with the

main herd, allow the calves and their mothers to stay in the Heifer pasture for 2-3 days while the remainder of the herd is moved through the Winter pasture. Open the gates to the water lanes while the calves and their mothers are in the Heifer pasture (Decision Memo for the West Clear Creek Fisheries Fencing project, January 29, 1999). Move the calves and their mothers to rejoin the main herd within 3 days.

Do not graze livestock in the Bobs and Cactus pastures, except during emergency situations approved by the Forest Service.

Existing rangeland management structures

Maintain all existing range structures, including fencing, dirt tanks, wells, water storages, pipelines, riparian exclosures (Cottonwood Spring), and water lanes at West Clear Creek.

Replace the bottom barbed wire of old fences with smooth wire to wildlife standards (minimum 18 inch height) as the fences are replaced or maintained, or grant monies are available, as follows.

Exterior and interior pasture fences and waterlots throughout the allotment as needed, except approximately 2.5 miles of fence in antelope habitat areas where the bottom wire of exterior and interior fences should be 21" above ground. Leave gates open at waterlots when livestock leave each pasture.

Maintain the recently completed road closure and fence reconstruction in the Wingfield South pasture to restrict inappropriate recreation and livestock assess to the Verde River.

Additional rangeland management structures

None Proposed

Soil and vegetation improvements

All Pastures

Scatter an appropriate seed mixture of cool and warm season native grasses and forbs on productive soil units throughout the allotment, where needed, during normal grazing operations each year.

Pinyon/juniper grassland maintenance

None Proposed

Browse species maintenance/improvement

None Proposed

Monitoring

Monitor riparian, soil and vegetative conditions; vegetative ground cover; forage utilization; Best Management Practices (BMPs); impacts to TE&S wildlife, fish and plant species and cultural resources; and permittee compliance. ADEQ monitors water quality; AG&FD monitors and manages general wildlife populations. Monitor for private land livestock trespass.

Alternative 2. (Appendix A, Map 2)

Intent: Livestock grazing use would not occur on the allotment for the next 10 years; a 10 year term grazing permit would not be issued. Movement toward desired conditions and Forest Plan direction for improving vegetation, watershed and riparian conditions and wildlife habitat would be through site-specific watershed and wildlife projects and complete rest from livestock grazing use.

Livestock grazing strategy

No livestock grazing is allowed, except as defined by livestock Management Intensity Level A (USDA 1987).

Existing rangeland management structures

Maintain (to Forest standards) exterior fences shared with adjacent allotments, along the Verde River and along SR 260 (as allowed by ADOT); replace and raise the bottom wire of the Forest Service-owned exterior fences to improve wildlife movement and to meet wildlife habitat standards as the fences are replaced or maintained, or grant monies are available.

Remove the bottom wire of interior fences that do not meet wildlife standards and remove all wires on waterlot fences within antelope habitat to reduce the obstacles to antelope and other wildlife movement. Leave the fence posts for potential future use. Remove interior fences throughout the allotment as they fall down. Wire all gates open.

Maintain the recently reconstructed livestock exclosure at Cottonwood Spring to protect the riparian area from inappropriate recreation use and potential trespass livestock.

Maintain the recently completed road closure and fence reconstruction within the Wingfield South pasture to restrict inappropriate recreation and trespass livestock assess to and from the Verde River.

Additional rangeland management structures

None Proposed

Soil and vegetation improvements

Grassland maintenance

None Proposed

Pinyon/juniper grassland maintenance

Cut, lop and scatter immature juniper trees on approximately 3,000 acres of pinyon-juniper grasslands (Winter, Maverick Basin, Tin Can, Tanque Aloma, and Meadow Canyon units) over the next 10 years to maintain the savannah-like grasslands for wildlife habitat and watershed values, as follows. Conduct the project during the fall to allow time for needle-drop before antelope fawning the following season.

Year 1-3: 1,000 acres

Year 4-6: 1,000 acres

Year 7-10: 1,000 acres

Allow pinyon/juniper and shrubs to fill in on rocky areas. Keep all Gambel oak, pinyon and large alligator juniper trees.

Browse species maintenance/improvement

Prescribe burn approximately 1,000 acres of decadent browse plants within 8 years in the Winter pasture to improve forage for wildlife. Coordinate burning with affected agencies, Tribes and private individuals. Develop site-specific burn plans to manage impacts to airsheds, soils, water quality, wildlife, cultural resources, visual quality and vegetation.

Monitoring

Same as Alternative 1, except do not monitor BMP's for livestock grazing or forage use. Periodically, Annually evaluate forage use by wildlife during the 10-year. Monitor for private land trespass livestock yearlong.

Alternative 3 (Appendix A, Map 3)

Intent: The Proposed Action would be implemented as presented in October 1998. However, the projects to restrict livestock access to West Clear Creek in the Heifer pasture and at Cottonwood Spring are no longer included in this alternative because these projects are already completed (as per the requirements of the 1998 Ongoing Grazing Consultation with US Fish & Wildlife Service). Maintenance of these new fences is now part of the current and ongoing management of livestock grazing use. Continued movement toward desired conditions and Forest Plan direction for improving vegetation, watershed and riparian conditions and wildlife habitat would occur by continuing the current livestock grazing management strategy on the allotment (Management Intensity Level D), modifying

structural improvements where needed and implementing site-specific projects in the pinyon-juniper grasslands and browse vegetation areas. An Allotment Management Plan would be developed and a new 10-year term grazing permit would be issued following a decision to implement this alternative.

Livestock grazing strategy

The livestock grazing strategy is the same as Alternative 1, with the following exceptions.

Continue grazing the Winter pasture for 60 days during the dormant season (January-February) each year until the proposed pasture division fence is installed to reduce the time livestock use each are (see Additional Rangeland Structures below). When the pasture division fence is complete, reduce the grazing period in each portion (Winter East and Winter West) to approximately 30 days each during the dormant season (January and February) each year.

Move the livestock through the Winter West and Winter East pastures in June within a maximum 10 days, using existing livestock trails. Livestock would be driven through the Winter West pasture, and not allowed access to West Clear Creek.

Graze the Wingfield Mesa group of pastures for 100 days each the spring, under a deferred rotation system, to rotate the time of year the pastures are used during the grazing period. Monitor the growth rate of the cool season grasses to determine the allowed length of graze period in each pasture. When the cool season grasses begin fast growth, reduce graze periods; as the warm season tobosa grass begins to grow, lengthen the graze periods to allow more use on this dominant species. Graze some pastures more than once if necessary to keep the livestock in this area for 100 days to meet the objective for reducing the dominance of tobosa and to allow forage plant recovery from elk use in the pinyon/juniper and ponderosa pine areas before livestock enter these pastures. End the Wingfield Mesa grazing rotation in the Wingfield East pasture with adequate time to consolidate the herd before crossing SR 260.

The Ranch agreed to keep the bulls with the cows and to reduce the livestock numbers at the October shipping to accommodate holding over any late season calves in January. Consequently the ranch will purposely reduce numbers in October (to approximately 500 head total) within their cow herd, so that when young calves (estimated 50 head) become counters in January each season, full permitted numbers (550 total head) will not be exceeded. This conscious decision to reduce permitted numbers at October shipping eliminates the need to construct another small shipping facility at Saw Log Tank within the upper end of the Winter Pasture.

Existing rangeland management structures

Same as Alternative 1, except develop a schedule for replacing the bottom barbed wire of old fences with smooth wire and raising the height of the bottom wire, as in Alternative 1. The priorities for this work would be determined by wildlife movement patterns and key

wintering and breeding areas. Work with ADOT to replace and raise the bottom wire on right-of-way fences along SR 260, if possible.

Additional rangeland management structures

Install approximately 3 miles of 3-strand, barbed wire fence (wildlife standard) to divide the Winter pasture into the Winter East and Winter West pastures and allow the length of the dormant season graze period to be reduced to approximately 30 days each in the newly-created Winter East and Winter West pastures. Locate the fence line from Black Mountain south to Runner and Parsons Tanks, and then to 13-Mile Butte. Construct waterlots around Runner and Parsons Tanks to allow access from each of the "new" pastures. See grazing strategy above.

Soil and vegetation improvements

Maverick Basin South and Tin Can South pastures

Use livestock to scarify soils when soils are dry, and plant an appropriate mix of cool and warm season perennial native grass and forb species to increase ground cover and plant diversity on approximately 300 acres in selected areas of bare and/or light to moderately compacted soil in the Maverick Basin South and Tin Can South pastures, as follows:

Year 1-5: 150 acres

Year 6-10: 150 acres

Treat one pasture at a time, and at least one pasture within the first 5 years of this 10-year planning period. The second pasture can be treated within the first 5 years only if the treatment and required rest from grazing can be coordinated with thinning and burning projects approved for the Good Enough-Tule 20K area. Scarification and seeding would occur when soils are dry (year 1), allowing for full rest from livestock grazing the following year (year 2, as per the graze ½ - rest ½ grazing strategy). The next year (year 3), the treated pasture may be grazed, depending on the vegetative response to treatment and the plant phenologic stage, soil condition and precipitation.

Winter, Heifer, and Wingfield Mesa pastures

Seed cool season native grasses and forbs on productive soil units in the Winter, Heifer and Wingfield Mesa pastures to increase plant diversity for livestock and wildlife. Scatter seed and use livestock to scarify the soil and plant the seed during normal grazing operations each year.

Pinyon/juniper grassland maintenance

Same as Alternative 2.

Browse species maintenance/improvement

Prescribe burn approximately 1,000 acres of decadent browse plants within 5 years in the Winter pasture to improve forage for livestock and wildlife. Coordinate burning as in Alternative 2.

Riparian vegetation at Cottonwood Spring

Monitor recovery of the woody riparian vegetation within the Cottonwood Spring livestock exclosure for 3 years. If recovery of these species is slow or not occurring, plant pole-sized woody riparian vegetation.

Monitoring

Same as Alternative 1.

Alternative 4 (Appendix A, Map 4)

Intent: The overall cost of project implementation on the 13-Mile Rock Range Allotment would be reduced, while there would be continued movement toward desired conditions and Forest Plan direction for improving vegetation, watersheds, and wildlife habitat. The current livestock grazing management strategy (Management Intensity Level D) would continue, and site-specific structural and non-structural improvement projects would be implemented that are cost-efficient and in areas of the semi-desert grasslands, pinyon-juniper grasslands and browse vegetation where the greatest results are expected. An Allotment Management Plan would be developed and a new 10-year term grazing permit would be issued following a decision to implement this alternative.

Livestock grazing strategy

Same as Alternative 3.

Existing rangeland management structures

Same as Alternative 3.

Additional rangeland management structures

Same as Alternative 3.

Soil and vegetation improvements

Maverick Basin South and Tin Can South pastures

Same as Alternative 3.

Winter, Heifer, and Wingfield Mesa pastures

Same as Alternative 3.

Pinyon/juniper grassland maintenance

Cut, lop, and scatter immature juniper trees on approximately 600 acres of pinyon-juniper grasslands (Winter, Maverick Basin, Tin Can and Tanque Aloma units) over the next 5 years to maintain the savannah-like grasslands. Allow pinyon/juniper and shrubs to fill in on rocky areas; keep all Gambel oak and pinyon trees.

Use Christmas tree cutting to harvest pinyon and juniper trees on 400 acres within the southeast corner of the Winter pasture and the southern 1/3 of the Tanque Aloma pasture within the next 5 years to maintain the savannah-like grassland, while providing a service to the adjacent community.

Browse species maintenance/improvement

Prescribe burn approximately 700 acres of decadent browse plants within the next 5 years in the areas most accessible and important for livestock and wildlife forage in the Winter pasture. Coordinate burning as in Alternatives 2 and 3.

Riparian vegetation at Cottonwood Spring

Same as Alternative 3.

Monitoring

Same as Alternative 1.

Alternative 5. (Appendix A, Map 5)

Intent: A comprehensive approach to managing the land would be emphasized across the allotment area. Grazing use on Wingfield Mesa would be modified, incorporating rest rotation grazing system, (Management Intensity Level D), structural improvements would be modified where needed, and site-specific structural and non-structural improvement projects would be implemented within in the semi-desert grasslands, pinyon-juniper grasslands, and browse vegetation areas. Movement toward desired conditions and Forest Plan direction for improving vegetation, watersheds, and wildlife habitat would continue under the current livestock grazing management strategy. An Allotment Management Plan would be developed and a new 10-year term grazing permit would be issued following a decision to implement this alternative.

Livestock grazing strategy

Same as Alternative 3, except graze 3 of the 4 Wingfield Mesa pastures each year under a

rest rotation strategy for 100 days each spring to allow complete rest from livestock use for at least one pasture each year. Monitor growth rate of the cool season grasses to determine the allowed length of graze period in each pasture.

Existing rangeland management structures

Same as Alternative 3.

Additional rangeland management structures

Same as Alternative 3, except realign approximately 0.7 miles of the fence between Heifer and Cactus pastures when the fence needs to be replaced to allow livestock use of approximately 160 acres of what is now the southern-most end of the Cactus pasture (south of West Clear Creek) in the Heifer pasture. Do not provide or allow access to West Clear Creek in this area.

Soil and vegetation improvements

Maverick Basin South and Tin Can South pastures

Same as Alternative 3.

Wingfield Mesa pastures

Prescribe burn approximately 2,000 acres within TES mapping units 382 and 383 on Wingfield Mesa within the first 5 years to stimulate forage plants for livestock and wildlife forage and increase plant diversity, as follows:

Year 1-3: 1,000 acres

Year 4-5: 1,000 acres

Burn during the summer months for maximum smoke dispersal; use existing roads for fire lines/boundaries and coordinate with adjacent landowners. Spot-seed, if needed, with an appropriate mix of native grasses and forbs immediately after the burns.

Winter, Heifer, and Wingfield Mesa pastures

Seeding: same as Alternative 3.

Pinyon/juniper grassland maintenance

Cut, lop and scatter immature juniper trees on approximately 2,600 acres of pinyon-juniper grasslands (Winter, Maverick Basin, Tin Can and Tanque Aloma units) over the next 5 years to maintain the savannah-like grasslands. Allow pinyon/juniper and shrubs to fill in on rocky areas; keep all Gambel oak, pinyon, and large alligator juniper trees.

Use Christmas tree cutting to control encroachment by juniper trees on an additional 400 acres of pinyon-juniper grassland within the southeast corner of the Winter pasture and the southern 1/3 of the Tanque Aloma pasture within the next 5 years.

Browse species maintenance/improvement

Same as Alternatives 3.

Riparian vegetation at Cottonwood Spring

Same as Alternative 3.

Monitoring

Same as Alternative 1.

Alternatives Considered, But Not Fully Developed

The following management options were considered, but not fully developed or analyzed during this planning process. The rationale for eliminating each of these options from full consideration is discussed following a brief description of the features.

Graze Bobs and Cactus pastures with the bulls

Livestock grazing strategy: Same as Alternative 1, except the bulls are kept with the main cow herd from March to late July only. Separate the bulls (50 head) in late July and truck them to the Wingfield Mesa pastures for August and September to meet resource goals for reducing the dominance of tobosa grass in these pastures. Then move (truck) them to the Bobs and/or Cactus pastures. Graze these pastures, and possibly some private land, for 6 months.

New structures and facilities: Same as Alternative 3, except:

- haul water to both pastures: exclusively to Bobs and as additional water in Cactus,
- construct a fence and one (1) water lane at West Clear Creek in Cactus pasture to limit livestock access to the Creek.
- reconfigure the east end of the Heifer pasture to include the southeast corner of what is now the Cactus pasture. Build short pieces of drift fence across the bluff above West Clear Creek to prevent livestock from accessing the Creek. Install one water lane with gated access for livestock watering at West Clear Creek during the March grazing period. Close the gate to restrict livestock access during the June move through the Heifer pasture to the higher elevation summer pastures.

This alternative was discussed in the initial proposal as an option to the current strategy of running the bulls with the cow herd, and to address the economic concerns of the Ranch (Issue 2). Under this plan, there would be a consistent calving and shipping schedule. There

would be no calves in the Heifer pasture in June, thereby removing the potential need to open the gates to the water lanes to allow newly born calves and their mothers to access the water at West Clear Creek for 2-3 days. The Ranch would only need to maintain the fences and gates, and repair/check the water lanes only for the March graze period.

The Team's initial evaluation of the physical structures, livestock manipulations and costs (time and money) needed to address Issue 2, and also meet resource objectives, were discussed and presented to the Ranch. The Ranch and the FS determined the costs of constructing and maintaining the required structures, trucking the bulls between pastures and hauling water, and the anticipated impacts to the shallow soils prevalent in the Bobs and Cactus pastures were prohibitive. The Ranch and the FS then decided to withdraw this alternative from further consideration, and to keep the bulls with the cows throughout the year. The Ranch agreed to reduce the livestock numbers at the October shipping to accommodate holding over any late season calves in January. This also eliminates the need for second shipping in December and for the small shipping facility at Upper Sawlog

Lease the bull needed to service the cow herd each year

Livestock grazing strategy: same as Alternative 1, except lease bulls during the breeding season only (March - late July) under an annual livestock use permit for breeding purposes. Drop the bulls off at Wingfield Mesa and pick them up at the Sandrock shipping facility. Hold over 50 head of calves until March 1 each year to fill the 50 allowed number left vacant by the bulls. Ship the hold-over calves before the bulls are brought on approximately March 15.

This alternative was discussed as a way to meet the resource objects, address concerns about the anticipated impacts to the shallow soils prevalent in the Bobs and Cactus pasture, and still address the economic concerns of the Ranch (Issue 2). This strategy would mean there would be a consistent calving and shipping schedule, as stated in the previous discussion.

The Ranch's initial evaluation of the livestock manipulations and costs (time and money) needed to address Issue 2 and also meet resource objectives, showed that leasing the bulls would be cost prohibitive. The Ranch and the FS decided to withdraw this alternative from further consideration. The Ranch agreed to keep the bulls with the cows and to reduce the livestock numbers at the October shipping to accommodate holding over any late season calves in January. Consequently the ranch will purposely reduce numbers in October (to approximately 500 head total) within their cowherd, so that when young calves (estimated 50 head) become counters in January each season, full permitted numbers (550 total head) will not be exceeded. This conscious decision to reduce permitted numbers at October shipping eliminates the need to construct another small shipping facility at Saw Log Tank within the upper end of the Winter Pasture.

Livestock shipping option from the Proposed Action

Place a small shipping structure at Upper Sawlog to ship late season calves prior to January 1 of each year if bulls are kept with the cows year-round.

This was an option for managing the livestock numbers under the Proposed Action to meet Forest Service land use and administrative regulations. The shipping structure was to be used to ship the late season calves prior to January 1 when they would otherwise be considered as "counters" toward the permitted livestock numbers.

Because the alternatives for separating the bulls from the cows were dropped from further consideration (see above), the second shipping facility at Upper Sawlog is not needed.

Reduce livestock numbers and management intensity

Livestock Grazing Strategy: Reduce livestock numbers to the level permitted prior to implementation of the current intensive grazing management strategy (450 head). Return to a rest rotation grazing system using the entire allotment area (Management Intensity Level C).

This alternative was discussed as a way to address the issue of range capacity (Issue 3). After reviewing the available data on total forage use with current numbers (550 head), actual and estimated forage production, range inspection, monitoring and Forest NEPA review reports, current range cluster data, and watershed, soil, water quality and riparian condition, the Forest Service feels the current permitted numbers are well within the available capacity for the 13-Mile Rock Range Allotment. The current numbers are based on implementation of the intensive rest rotation grazing strategy, which allows for complete plant recovery through short-duration impacts and long rest periods between grazes. The strategy has been very successful on this allotment, and has resulted in substantial movement toward LMP goals and the stated goals of the 1987 Allotment Management Plan (see Chapter 1, Existing Condition and Review of 1987 Management Objectives). An important aspect considered when evaluating the need for this alternative was the Permittee's proven willingness to comply and implement the intensive management strategy, and to coordinate livestock use with other uses on the allotment area.

Table 1 Comparison of Alternatives[1]

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Total Acres	39,191	39,191	39,191	39,191	39,191
Acres Available for Grazing	38,206	0	38,206	38,206	38,206
Permitted Numbers	550 Yearlong	0	550 Yearlong	550 Yearlong	550. Yearlong
Livestock Class	Cow/calf & Bulls	N/A	Cow/calf & Bulls	Cow/calf & Bulls	Cow/calf & Bulls
Allowable Use %	50%	0%	40%	40%	40%
Days Use in Wingfield Mesa's Pastures	80 Days	0 Days	100 Days	100 Days	100 Days
RANGELAND STRUCTURES					
Fence Maintenance	All	Exterior & Exclosures	All	All	All
New Fence (Miles)	0	0	3	3	3
Realign Fence (Miles)	0	0	0	0	0.7
Fence Removal	0	Waterlots in Antelope Habitat (P/J Grasslands)	0	0	0
Wildlife Fence Improvements	As Possible	Scheduled (as funding is available)	Scheduled (as funding is available)	Scheduled (as funding is available)	Scheduled (as funding is available)
VEGETATION TREATMENT (ACRES)					
Lop and Scatter	0	3,000	3,000	600	2,600
Christmas Tree Cut	0	0	0	400	400
Browse Burning	0	1,000	1,000	700	1,000
Grassland Burning	0	0	0	0	2,000
Incidental Seeding	Yes	No	Yes	Yes	Yes
Scarify and Seed	0	0	300	300	300

[1] Table 1a (above) present comparisons of the features of each alternative fully developed and analyzed within this planning process. The impacts of implementing each alternative are presented within Chapter 4, Environmental Consequences.

Table 2 Comparison of how each alternative addresses the project objectives and issues identified for the 13-Mile Rock Range Allotment area.

Objective/Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Objective 1: Maintain or improve soils, water quality & riparian condition	No change from current condition expected	Improve soil condition on 2,798 acres; maintain water quality and riparian condition	Same as 2	Same as 2	Same as 2
Objective 2: Maintain the integrity of the Verde River corridor/prevent livestock trespass	No change from current condition expected	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
Objective 3: Attain appropriate balance & diversity of cool and warm season perennial ground cover.	Continue current trend/rate to attain balance and diversity	No change from current condition expected on Wingfield Mesa; improvement in Winter, Tin Can, and Maverick Basin pastures by yr 10; potential loss in pinyon-juniper grasslands	Increase rate of improvement in balance and diversity from Alt. 1 on Wingfield Mesa (2,234 acres), and in Winter (2167 acres) and mid-elevation pastures (3,300)	Same as Alt 3, except fewer acres improved in pinyon-juniper grassland areas (1,000).	Increased rate of improvement on Wingfield Mesa than under Alt. 3; Winter and mid-elevation pastures, same as Alt. 3
Objective 4: Maintain the savannah-grassland state of the p-j pushed areas.	Continued encroachment by junipers; loss of grassland component (3,300 acres)	3,000 acres of juniper encroachment reclaimed to grassland	3,000 acres of juniper encroachment reclaimed to grassland; 300 acres of grasslands maintained	1,000 acres of juniper encroachment reclaimed; 300 acres of grasslands maintained	Same as Alt 3
Objective 5: Manage & protect habitat for TE&S species.	No change from current condition, except as direction changes	Same as Alt 1, except Improvement in fish habitat w/ improvement in soils conditions	Same as Alt 2	Same as Alt 2	Same as Alt 2

Objective/Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Objective 6: Maintain or improve key wintering and breeding habitat for turkey, elk, deer and antelope.	Gradual improvement in available forage and fence maintenance under current management	Increased rate of forage and hiding cover w/no grazing, p-j grassland maintenance (3,000 acres), and browse burning (1,000 acres)	Increased rate of improvement in forage and hiding cover with p-j maintenance (3,000 acres), seeding (300 acres and allotment-wide), browse burning (1,000 acres), division fence in Winter pasture, and scheduled changes to existing fence design.	Increased rate of improvement in forage and hiding cover with p-j maintenance (1,000 acres), incidental seeding allotment-wide, browse burning (700 acres), division fence in Winter pasture, and scheduled changes to existing fence design.	Same as Alt 3
Objective 7: Protect air quality during rx burns.	No burning proposed.	Mitigation during rx burning on 1,000 acres of browse	Same as Alt 2.	Mitigation during rx burning on 700 acres of browse	Mitigation during rx burning on 1,000 acres of browse and 2,000 acres of grassland
Objective 8: Maintain recreational opportunities; eliminate conflicts where possible.	Maintain structural improvements, including fence at CC Campground.	No livestock grazing; no need to maintain fences at CC Campground.	Same as 1.	Same as 1.	
Objective 9: Secure and maintain water rights, as needed	Forest is proceeding	Same as Alt 1, no new waters proposed	Same as Alt 2	Same as 2	Same as 2
Objective 10: Maintain the ranch's economic and social contribution to the local and regional community	No change to current conditions expected	Loss of the economic and social contribution of this ranch to the communities	Same as Alt 1	Same as Alt 1	Same as Alt 1

Objective/Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Issue 1: Livestock use may not be appropriate due to impacts to soils, water, wildlife, riparian and other uses of public lands.	Monitoring shows vegetation and soils are improving in some areas, but soil condition is unsatisfactory in west side of Winter pasture = soil loss, few recreation impacts, good water quality and riparian use is excluded or controlled.	No livestock grazing impacts. Soil loss is reduced in Winter pasture (west end) and p-j grasslands are maintained w/lop and scatter on 3,000 acres. Browse burning in Winter pasture, remove wire or fencing in antelope country.	Soil conditions improved/maintained in Winter pasture w/fence and p-j grassland maintenance on 3,000 acre, allotment-wide and project seeding on 300 acres in mid-elevation; Wildlife habitat improved with grassland maintenance, seeding and browse burning on 1,000 acres, and prioritized fence improvement in antelope country.	Soil conditions improve/maintained in Winter pasture w/fence and p-j grassland maintenance on 1,000 acres, allotment-wide and project seeding on 300 acres; Wildlife habitat improved with grassland maintenance, seeding and browse burning 700 acres, and prioritized fence improvement in antelope country.	Same as Alt 3, with increased rate of forage availability with burning (2,000 acres) and rest-rotation on Wingfield Mesa
Issue 2: Economic impact to the ranch from grazing bulls and cows together yearlong: inconsistent calving, multiple shipping.	DROPPED FROM CONSIDERATION: SEE ABOVE				
Issue 3. Current stocking levels may be too high: info to determine proper stocking is not available.	DROPPED FROM CONSIDERATION: SEE ABOVE				
Issue 4. The expense of structural and non-structural improvements may not be cost effective and/or accomplish the objectives stated.	No additional structures or resource projects proposed. Est. Investment Costs: $438,089 Est. Quantifiable Benefits: $625,589	No livestock control structures needed; resource improvement projects for soils, watershed and wildlife habitat. Est. Investment Costs: $72,726 Est. Quantifiable Benefits: $ 0.00	Structures and resource projects are proposed at high levels to control livestock, and maintain or improve soils, watershed and wildlife habitat. Est. Investment Costs: $580,239	Est. Quantifiable Benefits: $625,588 Structures and resource projects are proposed for areas expected to have the greatest results/need. Est. Investment Costs: $541,922 Est. Quantifiable Benefits: $627,088	Same as Alt 3, except with increased cost due to burning on Wingfield Mesa. Est. Investment Costs: $593,515 Est. Quantifiable Benefits: $625,088

Objective/Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Issue 5. Increasing the diversity of ground cover and stopping encroachment of woody vegetation on Wingfield Mesa	Gradual improvement in diversity under current management; encroachment by woody vegetation continues.	No change from current condition expected.	Increased rate of improvement in diversity expected over Alt 1; encroachment by woody vegetation continues.	Same as 3.	Increased rate of improvement in diversity expected over Alt 3; encroachment by woody vegetation is reduced.

CHAPTER 3 – AFFECTED ENVIRONMENT

This chapter describes the history of human use in the allotment and adjacent areas, and the existing and desired conditions for the:

- biotic components, including vegetation, soil, water, air and wildlife;
- cultural components, including prehistoric and historic sites and artifacts and TCPs;
- social and economic components, including recreational uses and visual quality, social values and economic influence

History Of Human Use

Human use and possibly occupation within the 13-Mile Rock Range Allotment area below the Mogollon Rim began with Archaic hunter-gatherer groups as early as 6,000 BC, and lasted until roughly AD 1 (Fish and Fish 1977; Pilles 1981). These early people left few traces that are preserved today, other than stone tools and lithic debris. Following the Archaic period, there began a more sedentary use of the area between AD 1 and AD 700 by either the Hakataya or the Southern Sinagua cultures. These early beginnings of sedentism, pottery manufacture, and agriculture eventually led to the early stages of the Southern Sinagua culture (AD 600-1100). A continuous development of the Sinagua culture persisted from approximately AD 1100-1425, with use by indigenous peoples, including ancestral Hopi. Later the Yavapai and, still later, the Apache people called the area home, until historic times (late 1800's) and Euro-American settlement.

Evidence of human use above the Mogollon Rim is far less extensive than below the Rim, indicating that the use was less intensive and possibly seasonal in most areas. This area of high elevation pine forest contains a mixture of historic sites and low density prehistoric artifact scatters near permanent water. Prehistoric sites consist of a mixture of raw materials with Kaibab chert and lesser amounts of obsidian, other crypto-crystalline material and ceramics, indicating these sites may have been loci for the exploitation of natural resources by the Northern Sinagua. Historic sites above the Rim include homesteads, line shacks, and logging camps.

As the white man entered the Verde Valley in the later half of the last century, livestock grazing increased dramatically. Large numbers of sheep and cattle grazed the Verde Valley and the surrounding areas. Water was generally plentiful here and the temperate climate provided excellent spring, fall and winter ranges for the livestock. The Valley often provided a temporary haven for settlers and ranchers as they herded stock from the winter ranges of southern and central Arizona to the summer ranges above the Mogollon Rim on the Coconino Plateau. Often livestock (cattle, sheep and horses) were herded along the historic General Crook Military Trail to supply settlements and the military posts with food (sheep and cattle) and horses for mounts. Consequently, the areas adjacent the Trail received frequent grazing use.

In the early 1900's, the National Forests were created and vast rangelands in the West were fenced and divided up into permitted allotments. In time, the fencing and general control of livestock resulted in reductions in permitted livestock herds or numbers and in grazing use that was more compatible with the land's forage capacity and the grazing management philosophies of the time.

From the early 1900's to 1975, a sheep driveway permit was created to allow sheep to cross three to four Forests (Tonto, Prescott, Coconino, and Sitgreaves NF's), following the traditional migration route between winter and summer range. Each year thousands of sheep traveled the Government Gap/Mud Tanks Sheep Driveway, often impacting the rangelands adjacent the driveway. Since early settlement of the Verde Valley, livestock trespass from adjacent private lands onto Forest lands has occurred. Trespass still occasionally occurs today, and sometimes results in damage to riparian vegetation and associated uplands. In the mid 1980, the Coconino NF fenced most of the east side of the Verde River to reduce unauthorized and trespass livestock onto the Forest and into the Verde River corridor.

As early settlers and the Forest Service suppressed wildfires, the openness of the Forest's grasslands, pinyon/juniper woodlands and ponderosa and mixed conifer forests became more and more closed as tree seedlings and saplings became established, and later matured into dense overstory stands. As the canopy cover increased, the trees and shrubs out-competed the native grasses and forage production decreased. Reductions in the forage base caused the Forest Service to further reduce livestock numbers. These changes occurred throughout the entire western United States, and to some degree within the Coconino NF and on the current 13-Mile Rock Range Allotment.

Following World War II, as a part of the post-war boom (1950's to 1960's), rangelands throughout the West were mechanically treated to reduce the pinyon/juniper woodland overstory and to restore grasslands and stabilize watersheds. These efforts to restore and maintain these vegetative communities in a mid-seral condition improved forage conditions dramatically. This, coupled with implementation of rest rotation grazing systems and construction of more stock waters, allowed the Forest to grant small increases in livestock numbers on many allotments. Within the current 13-Mile Rock Range Allotment, approximately 10,300 acres of rangeland were mechanically treated, and are periodically maintained by prescribe burning at this mid-seral successional stage to support a watershed and forage emphasis.

Rangeland Management

Current livestock grazing strategy, use and management are discussed in Chapter 1, Current Livestock Management.

Range Condition

Range condition information for the allotment is available from analyses conducted in 1959 and 1970, and from Parker 3-step range transects data from 1953, 1980, and 1998-1999.

The 1959 and 1970 range condition maps show the allotment was predominantly classed as poor or fair at that time, with a few areas of good. Recent range inspection reports and range transect data show range condition across the entire allotment is generally improved, with a stable or upward trend in vegetation and soil stability on nearly all the clusters/transects. Consolidated management of the 13-Mile Rock, Wingfield Mesa and Tule-Toms allotments and exclusion of the Verde River corridor were important steps in making these improvements. Implementation of the current livestock management strategy was also important, as shown in recent range inspections that document improvements to perennial ground cover vegetation (abundance, species diversity, and vigor). For instance, Wingfield Mesa was primarily a monoculture of tobosa grass prior to initiating the new management in 1987. Inspections in the last 3 years show some improvement in species diversity, with noticeable increase in vine mesquite, sand dropseed, sideoats grama, and black grama in this area.

Comparison of the range cluster data to the Terrestrial Ecosystem Survey (TES) listings of the Potential Natural Communities (PNC) for various soil types shows vegetation and soil conditions are above or moving toward the potential of the soils. Data from all clusters indicate the plant species composition is at mid-seral successional stage, which is the desired rangeland condition. Species composition lists in TES as PNC are for climax successional stages. Appendix B, Table B-2 shows the results of the 1998-1999 Parker 3-step cluster readings and the comparisons to the PNC for the soil types samples.

Grazing Capacity

Permitted livestock numbers were historically based on Regional and Forest standards for allotment analysis, production/utilization surveys assessments, grazing utilization surveys, range inspections and permittee management. In the mid 1970's, the original 13-Mile Rock Range Allotment area was permitted for 310 head of cattle (cow/calf) year-long. In 1981, the Tule-Toms Creek (125 head; summer use) and the Wingfield Mesa Range Allotments (125 head; winter use) were combined with the original 13-Mile Rock Range Allotment to create the larger allotment area that exists today. The permitted livestock numbers from the three smaller allotments were combined, and the season of use was distributed as appropriate to develop the permitted livestock numbers and seasons of use for the present 13-Mile Rock Range Allotment area. From 1981 to 1987, the combined allotment's estimated capacity was 450 head of cattle yearlong. In 1988, with implementation of the new management plan and a corresponding increase in range capacity, the permitted numbers were raised from 450 to 500 head. And in 1989, the permitted livestock numbers were increased to 550 head (cow/calf) yearlong, based on range inspections and resource data. This is the current permitted livestock numbers for the allotment. Appendix B, Table B-3 shows the permitted livestock numbers for the 13-Mile Rock Range Allotment from 1976 to 1999.

To validate the allotment's current grazing capacity, the Team used the Forest's 1991 Terrestrial Ecosystem Survey (TES; USDA 1991a), range inspection reports, project implementation records, past production/utilization (P/U) study data and current field inspection information. Of the total acres included in the allotment area, full capacity range

is estimated as 29,698 acres (78%), potential capacity range is estimated as 1,233 acres (03%) and no capacity range is estimated as 7,275 acres (19%).

Estimated forage production data was taken from each TES soil mapping unit that occurs within the allotment. This information was combined with professional estimates of forage production based on past P/U data and current field inspections and range inspection reports to determine a total forage availability of 22,364,752 pounds/year on acres appropriate for livestock grazing use. The percent livestock use was estimated for the allotment, assuming an average livestock forage consumption of 20 lbs/day/cow) for year 1 (northern tier + winter and spring use pastures) and year 2 (southern tier + winter and spring use pastures). The estimated average use by livestock alone, assuming full use with currently permitted livestock numbers (550 head), was 27% in year 1 and 26% in year 2. Estimated use in the pastures rested from livestock use each year (alternate tier) by wildlife ungulates is up to 20%. The remaining forage production in the grazed and ungrazed pastures is available for wildlife and plant reproduction. The estimated forage production and percent use shown in Appendix B, Table B-4 are estimates only, and should not be considered as actual total production and livestock use. The 1998 monitoring data for grazing use by both livestock and wildlife ungulates shows the actual use in each grazed pasture light (11-25%) to moderate (26-50%). Range inspection reports from 1997 and 1998 document actual use as less than 40% throughout the allotment at the end of the growing season. Monitoring data would continue to be collected in the grazed pastures each year before livestock enter the pasture, during livestock use and at the end of the growing season, and adjustments in use of individual pastures during and for future grazes would be made based on this information (Chapter 5. Monitoring Plan).

Vegetation

Overstory Vegetation

Overstory vegetation follows the elevation regime within the allotment area, with ponderosa pine and mixed conifer in the upper elevations and canyons (6000 to 6900 ft.), pinyon-juniper and pine/oak in the mid elevations (4500 to 6000 ft.) and desert scrub at the lower elevation areas of the allotment (3300 to 4500 ft.). All components have inclusions of riparian vegetation wherever there are springs or creeks. There are no high elevation meadows within the allotment, though some small openings in the ponderosa pine forest do exist. Table 2 shows the approximate number of acres and percent of the allotment in each vegetative type that occurs on the Coconino NF.

Table 3 Vegetative types occurring on the Coconino National Forest, and the approximate number of acres and percent of the allotment within each vegetative type.

Vegetative Type	Acres w/in the Allotment	Percent (%) of the Allotment
Desert Scrub/grasslands	6,271	16
Pinyon-juniper/grasslands	21,555	55
Pinyon-juniper/Pine	784	2

Ponderosa pine	4,311	11
Pine/oak/juniper	4,703	12
Pine/oak canyons	392	1
Mixed conifer	0	0
Mixed conifer canyons	784	2
Mountain meadows	0	0
Riparian	392	1
TOTAL	39,191 acres	100%

Understory Vegetation

Desert scrub/grasslands

Grasslands on Wingfield Mesa and the Heifer pastures in the Verde Valley are primarily warm season species, dominated by monocultures of tobosa grass. Mesquite and cat-claw are encroaching into this grassland community, within noticeable increases in both species over the past 10 years. Comparison of range monitoring data with the TES list of expected or potential vegetation for this area shows a greater than expected or desired occurrence of these woody plants.

The Forest is working toward an increase in grassland species diversity within the Wingfield Mesa group and Heifer pastures, and has seen an increase in the percent of cool season grasses in the Heifer pasture over the past 10 years. Other warm season grass species on the Wingfield Mesa include vine mesquite and sand dropseed, with lesser amounts of Arizona three-awn and sideoats grama. Important, though minimal, cool season grasses present include squirrel-tail and New Mexico needle and thread. During the time livestock are in the Wingfield Mesa pastures, the preferred forage is annuals and the limited cool season species available. There is some use on the tobosa grass by livestock during the dormant stage; the use increases if there is adequate precipitation and warm weather to allow the tobosa to green up. The ratio of cool to warm perennial forage species within these pastures is approximately 5:95, which is consistent with the Potential Natural Community listed for this area in the TES report (USDA 1991a).

Pinyon-juniper/grasslands

The perennial grass community in the pinyon-juniper grassland areas is dominated by western wheatgrass, hairy grama and blue grama, with large areas of yellow blossom sweet clover. The ratio of cool to warm season perennial grasses is generally 35:65. Browse species are generally in good condition in the Maverick Basin West and North and Tin Can North pastures where grassland and browse burning occurred in the 1990's. The mature stands of western wheatgrass are dense, with an adequate vegetative litter component in there northern pastures. Grasses in the Maverick Basin South and Tin Can South pastures include monocultures of blue grama and large areas of hairy grama and sideoats grama. Western wheatgrass is also present, but is not as abundant as in the northern pastures. Clover and snakeweed are found in some areas of the Tanque Aloma, Maverick Basin

South, Tin Can south and Meadow Canyon south pastures where grazing occurred for three consecutive years while the grassland and browse were burned in the northern pastures. Vegetative litter is light in these southern pastures.

Some of the browse plants, dominated by turbinella oak with lesser amounts of cliffrose, ceanothus and mountain mahogany, in the Winter pasture are available, but decadent or clubbed from heavy use, and are poor quality forage for wildlife and livestock. These plants are essential wildlife forage and cover, and provide additional forage for livestock during the January and February graze period.

Ponderosa pine/grasslands

Perennial grasses in the ponderosa pine type include Arizona fescue, mountain muhly, June grass, smooth brome, bottlebrush squirrel-tail, intermediate wheatgrass and orchard grass. The ratio of cool to warm season perennial grasses is approximately 60:40. The cool season grasses are used by elk early in the year before livestock enter the summer pastures. The livestock primarily use the warm season grasses when they move through that year's grazed portion of the summer pastures in July and August, and then use the second season growth of the cool season grasses in the early falls months. Elk follow behind the livestock to graze on the new flush of plant growth that occurs in the summer after the initial graze by livestock (Miller and Brock unpublished; Miller and Brock 1995).

Noxious Weeds

The allotment area was surveyed in spring and summer of 1999 for noxious weed species that have potential to exist, or could be introduced or become established in the area (Appendix B. Table B-5). Of these species, only bull thistle *(Cirsium vulgare)* was found on the allotment. As with previous surveys, most sites of bull thistle are associated with past logging operations, though some populations are found at tanks. There is no direct evidence that cows or native wildlife eat the tops of the bull thistle, as they would other thistle species, and the plant is thought to be spread by the wind, water run-off or vehicles. At Tule Tank, the plants are along the electric fence line and appear to be recently established. The plants in Tom's Creek are found where there is no evidence of vehicle use, and none were found near the area where vehicles access the drainage. There are also bull thistle plants in the forest above the drainage to the west of Toms Creek, and seeds may have washed down into the Creek. The Toms/Good Enough pasture is the most infested, with some plants found in Wilbur, especially adjacent the Toms/Good Enough pasture. These three pastures drain into West Clear Creek and the bull thistle may enter this rugged riparian area, just as it entered Toms Creek. The native plants in Tom's Creek are healthy and the introduction of the bull thistle is light at this point. How rapidly the population is spreading depends on how long bull thistle has been in the bottom of Toms Creek, and that is unknown.

In 1997, the areas around Clear Creek Campground and Upper Sawlog Tank and the length of State Route (SR) 260 adjacent the allotment were all surveyed for noxious weeds. Although none of the species listed in Appendix B, Table B-5 were found at these locations, Russian knapweed was found on SR 87 (MP 286.6) just east of the Forest Road (FR) 142

junction, which is only a few miles east of the allotment. The plants were physically removed in 1997, but the species has likely returned and has a very high potential to spread to other areas.

The other species on the list were found within 20 miles of the allotment, and could easily spread to the allotment. Scotch thistle was found at tanks on the Long Valley and Sedona Ranger Districts, and may be either spread or controlled by cows, which eat the buds, flowers, and tops of plants. Yellow star thistle, which is very toxic to livestock, was found within 2 miles of Wingfield Mesa. Also in 1997, bull thistle was found along FR 142 and FR 142E on the east end of the allotment.

Soil And Watershed Condition

The following assessment of existing soil conditions within the 13 Mile Rock Range Allotment is based on information from the Coconino National Forest's TES summary and site specific field surveys. A soil condition category (satisfactory, impaired and unsatisfactory) is assigned to each ecological land unit for each of the major vegetative life zones that occur within this allotment. Soil condition is an evaluation of watershed condition, but is not an evaluation of soil creep, landslides or stream channel health, nor is it an evaluation of sediment yield to a stream channel or a way to determine erosion from a single storm event. Another category, unsuited, is assigned to areas on slopes >40% and on areas of unproductive soils (<100 lbs/acre).

Within the entire allotment (39,191 acres), 33,806 acres (86%) are in satisfactory condition and 5,385 acres (14%) are in unsatisfactory condition. Of the acres available for livestock grazing use on the allotment (38,206 acres), 32,821 acres are rated as satisfactory and 5,355 acres are rated as unsatisfactory. There are no acres rated as impaired within the allotment area. Satisfactory soils include the 33, 34, 46, 53, 60, 280, 350, 382, 383, 385, 401, 417, 430, 462, 463, 466, 492, 493, 520, 546, 549, 550 555, 567, 575, and 578 mapping units. Unsatisfactory soils include the 404, 420, and 530 series. Lands considered unsuited due to steep slopes (TES units 350, 430) are generally located in the Winter pasture and along West Clear Creek. Soils in these areas are considered in satisfactory condition and, though incidental livestock grazing use does occur, these areas are rated as "no capacity" for livestock grazing use.

Ponderosa Pine Forest

This life zone consists of TES mapping units 56, 60, 520, 530, 546, 549, 550, 555, 567, 575, and 578. Soil condition is generally satisfactory within these ecological land units, indicating that soils are functioning properly and normally. Current sheet and rill erosion from forested areas is normally minimal because of the vegetative ground cover in the form of needle casts, oak leaves, woody material and perennial grasses, forbs, and shrubs. Organic matter is distributed evenly across the soil surface, promoting satisfactory soil aggregation. The surface A horizon is present, well distributed and not fragmented. Mapping unit 546 was initially identified as being impaired due to past timber harvesting

activities, but a review of the site-specific conditions indicates these area are, in general, now in satisfactory condition. The improvements are due to the passage of time, needle caste, re-establishment of perennial grasses and forbs and an increase in all sizes of downed woody materials. There may still be patches of impaired soils that are too small to map, but these areas have improved considerably with time. The total acres of satisfactory soil condition within the ponderosa pine life zone are approximately 10,872 acres.

Included in the total acres of satisfactory soil condition in the ponderosa pine life zone are mapping units 575 and 555 that occur on escarpments and hills. These units, covering approximately 1,241 acres, are associated with rock out-cropping and some steep slopes (> 40 percent). Slopes >40% are classified as no capacity range, meaning that no grazing capacity is assigned, but incidental livestock grazing may occur.

Pinyon-juniper Woodland

This life zone includes mapping units 46, 401, 403, 404, 417, 420, 430, 462, 463, 466, 492, and 493. Within units 46, 417, 420, 462, 463 and 493, soil condition is generally satisfactory, indicating that soils are functioning properly and normally due to the existence of acceptable vegetative ground cover in the form of needle casts, woody material and perennial vegetation such as grasses, forbs, and shrubs.

Ecological mapping units 401, 403 and 404 are in unsatisfactory soil condition, signifying that a degradation of soil quality has occurred. Ecological mapping unit 403 includes lowland plains that contain deep soils formed in alluvial material derived from limestone and sandstone parent material. Management activities historically were concentrated within these areas; the result is some areas of compaction, inadequate vegetative ground cover and litter or large areas of bare soil that support only annual grasses and forbs, snakeweed and other shrubs. Soils rated as unsatisfactory soil condition are prime candidates for improved management practices or restoration designed to recover soil functions.

Ecological mapping units 466 and 492 each contain two major soil components that occur on elevated plains with slopes ranging from 0 to 15 percent. The components are moderately deep and deep, fine-textured soils formed in residium derived from basalt and cinder parent materials. Soil productivity has improved in these areas with the removal of much of the pinyon-juniper overstory in the 1950s and 1960s, prescribed burning and seeding in the early 1990s and changes in livestock management over time. These areas now produce a substantial amount of western wheatgrass, yellow blossom sweet clover and vegetative litter, and the diversity and distribution of perennial grasses is improving. The shallower, rockier soils within these mapping units are located on broad ridge tops and are also in satisfactory condition. These areas seem to be less impacted by management activities than those associated with unsatisfactory “vertic” soils.

Semi-Desert Grasslands and Shrubs

This life zone consists of TES mapping units 33, 34, 280, 350, 382, 383, and 385. Soil condition is generally satisfactory within ecological units 33, 382, 383, and 385, indicating

that soils are functioning properly and normally due to acceptable vegetative ground cover and well distributed organic matter. Soil condition in TES mapping units 33 and 385 is satisfactory, due to large amounts of surface rock and short slope lengths, which reduces the inherent erodibility of the soil.

Soil condition in ecological land units 34 and 280 is generally unsatisfactory, especially where there is very little surface rock or perennial grasses and forbs, and soil erosion has occurred. These areas typically support opportunistic plants such as broom snakeweed, annual grasses, and forbs. The surface A horizon is generally present, but it is poorly distributed and is fragmented. Mapping unit 280 supports a high canopy cover of creosote bush. Revegetation potential of these soils is severely limited due to highly calcareous soils.

Cryptogamic Soils Concern

Cryptogamic communities (Cryptogamic crusts or cryptogams) are not found within the 13-Mile Rock Range Allotment. Soils within the allotment's pinyon-juniper areas are derived from basalt parent materials, and are highly productive loam and clay loam soils with varying surface rock contents. On fertile, highly productive sites, such as those found on this allotment, cryptobiotic communities are out-competed by higher plants, such as perennial grasses and forbs.

Areas that do support cryptogamic communities tend to be harsh sites with poorly developed, low fertility soils and a lack of extensive communities of higher plants. Some examples of fairly extensive cryptobiotic communities are associated with soils derived from the Supai Sandstone near Sedona, some otherwise barren areas within the Superstition Wilderness on the Tonto National Forest, and sites within Canyonlands National Park in Utah. Additional information addressing cryptogamic soils is presented in the Project Record.

Watershed

The allotment lies within portions of three 5th Code Watersheds (sub watersheds) of the Verde River Basin (West Clear Creek, Fossil Creek and Horseshoe Reservoir). The percentage of the allotment within each of these sub watersheds is shown below.

Table 3. Percent of Allotment by Sub-Watershed.

Sub watershed	Percentage of Allotment
West Clear Creek	80%
Fossil Creek	11%
Horseshoe	09%

As indicated above, most of the allotment drains into West Clear Creek, which flows from east to west into the Verde River. The portion of the allotment in the Horseshoe sub watershed drains directly into the Verde River, and the portion within the Fossil Creek

watershed drains south into Sandrock Canyon, and then into Fossil Creek several miles downstream. Fossil Creek then flows for several miles to its confluence with the Verde River several miles downstream from the allotment's southwestern border. None of the perennial waters affected by this range allotment are identified by the State as being "water quality limited." Table 4 is a summary of the water quality status of the 5th code watersheds that occur within the 13-Mile Rock Range Allotment.

Table 4. Water Quality Status For The 5th Code Watersheds Within The 13-Mile Rock Range Allotment.

Watershed	Stream Reach No Affected Waterbody	Designated Uses[2]	Use Support	Water Quality Limited Waters
Fossil Creek	15060203-024 Fossil Creek Headwaters to the Verde River	A&Ww, FBC, FC, AgI, AgL	Full	No
West Clear Creek	15060203-026 West Clear Creek; Headwaters to the Verde River	A&Wc, FBC, FC, AgL	Full	No
Horseshoe Reservoir	15060203-025 Verde River; West Clear Creek to Fossil Creek	A&Ww, FBC, FC, AgI, AgL	Full	No

Riparian

There are five major riparian stream courses within or adjacent the 13-Mile Rock Range Allotment: West Clear Creek, Cover Creek, Toms Creek, Meadow Canyon, and the Verde River. Cottonwood Spring, located at the edge of the Wingfield South pasture, is within the allotment boundary, but is excluded from livestock grazing. Riparian surveys of the stream courses reaches show West Clear Creek, Clover Creek, Toms Creek and Meadow Canyon are in proper functioning condition, based on the interaction of three components: 1) vegetation, 2) landform / soils, and 3) hydrology. There are no current surveys for the portion of the Verde River adjacent this allotment or for Cottonwood spring.

West Clear Creek

West Clear Creek forms the north boundary of the allotment from Clover Creek to Bull Pen Ranch. From Bull Pen Ranch to the Clear Creek Campground, the creek flows through the

[2] Information is from ADEQ's "Draft Arizona Water Quality Assessment 1998." Explanations for Arizona Surface Water Designated Use abbreviations are displayed on page 12 of Part II of this report, entitled "Surface Water Quality Assessments."

allotment. The upper reach (from Clover Creek to Bull Pen Ranch) is within the West Clear Creek Wilderness where the canyon walls are too steep for cattle.

A 1993 study of West Clear Creek documents conditions just after the floods of February 1993, which was a channel altering event. The inner areas, or middle reaches of the canyon that form the northern boundary of the allotment, are comprised mostly of bedrock and boulder sized substrate and little soil substrate to provide a basis for riparian vegetation. However, the eastern end of the canyon and the lower or western end of the canyon do support diversity of woody vegetation. The overall assessment of West Clear Creek states that West Clear Creek supports an outstanding closed canopy, deciduous broadleaf riparian forest, which is dominated by a diverse assemblage of deciduous broadleaf tree species (Envirotech 1993).

A riparian assessment of the reach from Bull Pen Ranch to the campground, completed in 1998, rated the reach in proper functioning condition. Vegetation is regenerating throughout the reach, with a variety of woody riparian vegetation coming in since the 1993 floods. Species present include Arizona alder, sycamore, Fremont poplar, willows, box-elder, Arizona walnut, and velvet ash. Tamarisk regeneration is also evident throughout the reach, but it is scattered. The gradient in this reach is moderately steep, with surveyor remarks indicating multiple channels shifting over time. Less than 25% of the stream banks are bare, with substrates consisting of approximately 35% cobble, 25% small boulder and 25% medium boulders.

Clover Creek and Toms Creek

Portions of Clover Creek and Toms Creek form the eastern boundary of the allotment. Toms Creek flows into the lower reach of Clover Creek, and then into West Clear Creek. In this area, the creeks flow through deep canyons, except at the upper reaches of Toms Creek where livestock, primarily from the adjacent allotment, have limited access. A riparian assessment was completed in 1998, with both the Clover Creek and Toms Creek reaches given a rating of proper functioning condition. Toms Creek is described as “one of the nicest reaches on the Forest.” Riparian woody species occur within these reach, including Arizona alder, willows and box-elder. The stream banks are stable, with vegetation and large boulder providing stability.

Meadow Canyon

Meadow Canyon is a steep gradient, step-pool system with approximately 20% of the reach at limestone bedrock. A proper functioning condition assessment was completed in July 1998, with the reach rating as functional. Riparian woody species present include Arizona alder, box elder and chokecherry. The riparian canopy is less than 25%, but is close to potential given the shallow nature of the soils in the reach. Much of the riparian vegetation is in regeneration, probably as a result of the heavy flows of the 1993 storm events. Bank stability is provided primarily from rock; no riparian grasses were noted. Yellow blossom sweet clover is the only non-native noted within the reach.

Verde River

The Verde River corridor is outside the western boundary of the allotment, but the riparian condition could be impacted by watershed conditions and management actions on the 13-Mile Rock Range Allotment. Other impacts to the Verde corridor include recreation use, agriculture, and development of private lands. The Verde River is fenced to exclude livestock, but cattle from this allotment can trespass into the riverbed if recreationists cut the fences in the Wingfield South pasture. Unauthorized livestock permitted by the Prescott National Forest and trespass cattle from private lands also occasionally enter the Verde River corridor, though the Prescott NF has now fenced the Verde River boundary on several allotments to keep their permitted livestock off the River. The stretch of river adjacent the 13-Mile Rock Range Allotment is designated as Scenic under the Wild and Scenic River Act, and is heavily used for recreation.

Cottonwood Spring

Cottonwood Spring is now excluded from livestock grazing, though over the years trespass and unauthorized livestock use has occurred. In spring 1998, livestock from the 13-Mile Rock Range Allotment grazed within the exclosure area because one of the water gap fences was washed out. The damage to woody and ground cover vegetation and stream banks resulted in a loss of riparian function. In August 1998, the ground cover vegetation and stream banks showed good recovery and there were signs of woody plant regeneration. The exclosure fence is now repaired and maintenance is closely monitored; no further trespass is expected. No formal assessment of riparian condition is available for Cottonwood Spring, though, even with the rapidly progressing recovery, Cottonwood Spring would likely be rate as non-functional at this time.

Water Rights

The Forest is currently verifying water rights records for springs and stock tanks located within drainages that are used for livestock management and wildlife waters on this and other range allotments on the Forest. Waters trapped in drainages are appropriable and require filing with Arizona Department of Water Resources (ADWR). Many of the stock tanks built on the allotment within the past 10 years are roadside tanks, which intercept sheet runoff instead of drainage flow. These waters are not appropriable and do not require a water right. The Term Grazing Permit for this and all Forest Service range allotments includes a statement clarifying that the Forest retains ownership of the water rights for current and future grazing permittees, as well as for wildlife and recreation consumptive needs.

Air Quality

The 13-Mile Rock Range Allotment is within the Verde River Airshed, which is very sensitive to impacts from Forest management prescribed fire activities. This sensitivity is primarily due to the current and increasing population of elderly or retired individuals living

in the Verde Valley, and the cumulative impacts of localized agricultural and residential burning.

Specific areas within the Verde River Airshed are granted special air quality status. Sycamore Canyon Wilderness, located in the northwest corner of the airshed, and the Yavapai-Apache Indian Reservation, located near Camp Verde, are Class 1 areas and are protected from significant deteriorations in visibility. West Clear Creek, Fossil Creek and Wet Beaver Creek Wildernesses are located within the Verde River Airshed and are designated as Class 2 Wilderness areas.

Air quality in the Verde River Airshed is not impacted by livestock grazing on this or other Forest Service allotments. Some short-term, site-specific impacts (dust and odor) may occur when livestock are gathered or transported.

Wildlife Resource and Habitat Management

The Arizona Game and Fish Commission and the Forest Service, Region 3 signed a Memorandum of Understanding (MOU) in 1973 to strengthen the cooperative approach to managing wildlife species and wildlife habitat on the National Forest at all levels of the agencies (USDA 1991c). Under this MOU, the Forest Service recognizes the Commission as the agency responsible for managing the fish and wildlife resource of the State, and the Commission recognizes the Forest Service as the agency primarily responsible for managing wildlife habitat on National Forests. In keeping with this agreement, the Forest Service and Arizona Game & Fish Department (AG&FD) are working in cooperation to manage the 13-Mile Rock Range Allotment and the surrounding area for mutual benefit of the people of Arizona and the United States. The 13-Mile Rock Range Allotment is located within AG&FD Game Management Unit (GMU) 6A.

Terrestrial Wildlife Species

Elk

Rocky Mountain elk (*C. e. nelsoni*) are common on much of the allotment, from pinyon-juniper woodlands to mixed conifer forests. During the spring, elk migrate to the higher elevation summer range to forage on the green grasses, forbs, ferns, and lichens. Elk breeding occurs in the early fall, generally within the pine and upper elevation juniper types. During the winter, elk move to the lower elevation winter range below the snow line, and forage mainly on browse such as serviceberry, ceanothus, juniper, bitterbrush, mountain mahogany, aspen, willow, alder and ash. Elk travel great distances to meet their nutritional needs, shifting their foraging patterns to move into areas of fresh feed and returning to areas they have previously grazed if there is plant regrowth to consume. Elk would also move into areas that cattle have grazed after the plant regrowth is available for consumption.

Historically, mountain lion, wolves and bears preyed on adult and young elk. Today, the small populations of predators do not greatly affect the elk population. However, starvation

and periodic deep winter snows remain potential causes of mortality.

Pronghorn antelope

A very small herd of 3 to 8 American pronghorn (*Antilocapra americana americana*) use the mid-elevation grassland areas of the allotment. Pronghorn prefer these flat, open grassland areas where they use their keen eyesight and exceptional speed to avoid predators. Rolling or broken hills and mesa tops, and to a lesser extent, woodlands and open forests are also potential habitat areas. Pronghorn forage on forbs, shrubs, grasses, cacti and domestic crops. If forbs are not readily available during the winter, antelope would forage on shrubs. Grasses are used when growth is young and succulent.

Pronghorn breed from late July to September. Tall grasses and forbs, about 10 to 24 inches high, or small shrub provide hiding cover, which is probably the most important factors in fawn survival. If there is insufficient hiding cover for fawns, predation by bobcats, mountain lions, golden eagles, wild dogs and especially coyotes can be a substantial impact on antelope survival. These predators often use the small junipers trees that are scattered across the grasslands as cover when stalking the unsuspecting fawns.

White-tailed deer

The only subspecies of white-tailed deer in Arizona and on the allotment is the Coues white-tailed deer (*Odocoileus virginianus couesi*). These white-tailed deer forage mostly on browse in the late fall and winter months, and on succulent forbs in the spring. Native grasses are not a large component in the deer's diet, although young green shoots may be eaten in late winter and early spring. Acorns are preferred whenever they are available. Salt is also important, and is generally obtained from natural salt licks and from salt blocks (Schmidt and Gilbert 1978).

Competition for forage can occur between white-tailed deer and other ungulates, depending on the time of year and extent of overlapping ranges. Cattle compete with deer when there is a shortage of food, especially during the winter when both are seeking green forage. Elk and white-tailed deer ranges overlap in this area, creating the potential for competition for browse during the late summer. Competition between white-tailed and mule deer rarely occurs because of their different habitat preferences. Cover is also a critical factor in providing adequate protection, especially from extreme winter weather. Hardwoods, such as Gambel oak and evergreen trees, such as pinyon/juniper or ponderosa pine, provide the year-round needs of white-tailed deer.

Mule deer

Two subspecies of mule deer occur in Arizona: the Rocky Mountain mule deer (*Odocoileus hemionus hemionus*) and the desert mule deer (*O. h. crooki*). Both subspecies may be present on the 13-Mile Rock Allotment. As with the white-tailed deer, browse is the primary forage for mule deer, although studies indicate that mule deer consume a wide variety of available and palatable plant species. Mule deer prefer more open areas than

white-tailed deer, and can benefit from openings interspersed with cover.

Turkey

Merriam's turkey (*Meleagris gallopavo merriami*) inhabit the ponderosa pine, mixed conifer and pinyon-juniper forests within and adjacent the allotment. Ponderosa pine habitats are preferred by turkeys for summer range, but mixed conifer areas are also used. Pinyon-juniper woodland with a ponderosa pine and/or Gambel oak component provide suitable fall, winter and spring breeding habitats (Dickson 1992).

Non-game species

An abundance of non-game species occur on the allotment due to the variations in elevation and vegetation types available. Non-game mammals known to occur on the allotment include coyote, bobcats, badgers, skunks, bats, cottontails, jackrabbits and many other species of rodents. Birds include several species of hawks, owls, nuthatches, woodpeckers, sapsuckers, titmice, chats, and several species of sparrow, warblers, jays, juncos and many others. There are also a variety of reptiles, amphibians and macro invertebrates that inhabit the allotment.

Management Indicator Species

Management indicator species are identified for each management area in the Forest Plan. These are summarized in Appendix C, Table C-1, and the impacts of livestock grazing are discussed in Chapter 4.

Threatened, Endangered (T&E), Proposed and Sensitive Wildlife and Plant Species

Several threatened, endangered, proposed and sensitive terrestrial wildlife and plant species inhabit the 13-Mile Rock Allotment, as discussed below. In addition, designated critical, but currently unoccupied, habitat for southwestern willow flycatchers is found on West Clear Creek within the allotment boundaries and along the Verde River adjacent to the allotment. Appendix C, Table 2 summarizes the status of these species on the allotment.

Threatened and endangered species

Mexican spotted owl

There are portions of eight Mexican spotted owl (MSO) Protected Activity Centers (PACs) located in the eastern area of the allotment, and centered around the steep slopes of West Clear Creek, Clover Creek and Tom's Creek. Designated "Protected Habitat" on the allotment includes 3,179 acres of the PAC's, 13 acres of steep slopes in pine-oak habitat and 420 acres of steep slopes in mixed conifer habitat. Approximately 4,695 acres of the allotment are considered "restricted habitat" for MSO, including approximately 3,871 acres

of pine-oak outside of protected habitat, 412 acres of mixed conifer outside of protected habitat and 412 acres of riparian habitat. Acres designated as "Other Forest and Woodland Types" for the MSO on the allotment include 3,148 acres of ponderosa pine, 22,295 acres of pinyon-juniper woodland, and 6,283 acres of desert grasslands.

Bald eagle

There are no known nesting territories for bald eagles on the 13-Mile Rock Range Allotment. The nearest known nest site is located approximately 1.25 miles from the allotment within the Verde River corridor. Foraging habitat also exists along the Verde River and it's tributaries, including West Clear Creek and in the uplands throughout the 13-Mile Rock Range Allotment. No winter roosts are known on the allotment, though bald eagles are known to winter throughout the Coconino NF and along the Verde River corridor.

Southwestern willow flycatcher

Currently, there is no occupied suitable habitat for southwestern willow flycatcher on the 13-Mile Rock Range Allotment. However, approximately 1.5 miles of the West Clear Creek corridor and approximately 2.2 miles of the Verde River corridor within and adjacent this allotment are designated critical habitat for this riparian-dependent bird species. The designated critical habitat along the Verde is currently unoccupied and considered unsuitable habitat. Unoccupied suitable habitat occurs near Clear Creek Campground and along West Clear Creek downstream of Bull Pen. The nearest known occupied habitat occurs more than 5.0 miles from the allotment's western boundary.

Yuma clapper rail.

The 13-Mile Range Rock Allotment occurs outside of the historically known habitat areas for this species. However, a recent discovery of Yuma clapper rail at Tavasci Marsh, which is owned by Phelp's Dodge, along the Verde River indicates that this species may be more widespread than previously believed. Potential and suitable Yuma clapper rail habitat may occur along West Clear Creek and the Verde River.

Proposed species

There is no wildlife, fish or plant species proposed for Federal Listing known to occur on the allotment.

Candidate species

Chiricahua leopard frog

This frog is the only candidate species known to occur on the allotment. This means the species is a candidate for proposing as a Federally Listed species. Past sighting of this species are documented at New Tank, which is fenced to exclude livestock as a proactive

measure to improve habitat and possibly provide a site for reintroduction of these frogs in the future. Suitable habitat also exists in stock tanks, springs, seeps, creeks, and rivers throughout and near the allotment.

Sensitive species

The updated Regional Forester's Sensitive Species List, dated July 21, 1999, was used for this analysis. Appendix C, Table C-2 shows the species, their status, and their potential of exist on or adjacent to the 13-Mile Rock Range Allotment.

American peregrine falcon

The peregrine falcon was removed from the Federal Endangered Species list on August 25, 1999, and is now considered a sensitive species. The populations and impacts to habitat would be carefully monitored for at least the next 5 years. There are two American peregrine falcon nesting territories known to occur within one mile of the 13-Mile Rock Range Allotment in the West Clear Creek corridor. The Toms North and Wilbur North pastures are the closest grazed areas on this allotment to these eyries. Other potential nesting habitat in the area exists in West Clear Creek, Horsetank Wash, Sandrock Canyon, Calf Pen Canyon and on the Mogollon Rim.

The allotment is also within foraging range for eight peregrine falcon active territories. There is minimal prime foraging habitat, such as wetlands, riparian areas, meadows, parklands, croplands, mountain valleys, and lakes on the allotment. However, the remainder of the allotment may still be used for foraging by peregrine falcons.

Northern goshawk

One northern goshawk (*Accipiter gentilis)* post-fledging area (PFA) is designated on the 13-Mile Rock Range Allotment. Portions of this PFA occur in the Tule and Wilbur pastures on the west side of the allotment. Management direction in Amendment 11 of the Forest Plan that requires the ground surface layer to be managed to maintain satisfactory soil conditions for the goshawk is being met.

Other sensitive species

Several species of sensitive plants and animals are known to occur on or adjacent to the 13-Mile Rock Range Allotment, and listed in Appendix C, Table C-2. Potential habitat for several sensitive riparian-dependent species exists on the allotment, particularly along the Verde River and West Clear Creek corridors. Potential habitat exists for wetland and riparian-dependent birds, including western yellow-billed cuckoos, Bell's vireo, and common black-hawk. Amphibian species reliant on perennial water sources include the narrow-headed garter snake, Mexican garter snake, lowland leopard frogs, northern leopard frogs, and southwestern (Arizona) toads.

In addition, there are five plants, three insects, and one fish species listed as sensitive that could occur on the allotment. The plants include Arizona monkshood, Mt. Dellengaugh

sandwort, Arizona bugbane, Mogollon thistle and cliff fleabane. The insect species include mountain silverspot butterfly, Maricopa tiger beetle, and obsolete viceroy butterfly. There are no known populations of these species, but potential habitat does exist in the allotment area. The fish species, roundtail chub, is discussed below.

Aquatic Wildlife and Fish Species

Amphibians

There are historical records of Chiricahua leopard frogs at on the allotment at New Tank. This species is discussed above as a Candidate species.

Fish

Based on relative abundance figures given for the more recent fish surveys (1985 - 1996), the West Clear Creek fish community is dominated by natives (desert and Sonora suckers, and speckled dace). Non-native fishes (red shiners and mosquitofish) are most abundant in the Verde River between Beasley Flat and Childs (Girmendonk and Young 1997). Appendix C, Table 2 lists the native and non-native fishes known to inhabit the waters directly associated with the allotment.

Native fish

Of the 14 native fish species that either currently occupy or historically occupied the Coconino NF, seven species exist/existed only within the Verde River, three species exist/existed only in West Clear Creek and four of these species occurred in both West Clear Creek and the Verde River. Five of these 10 native species are Federally listed under the Endangered Species Act. Two other species (roundtail chub, speckled dace) are on the Regional Forester's 1988 sensitive species list.

Gila trout - Historic Gila trout habitat includes the upper reaches of West Clear Creek. Although not mentioned, the headwater drainages to West Clear Creek (Willow Valley and Clover Creek) could also be included as historic habitat. The nearly 100 year extirpation of Gila trout from its historic habitat in West Clear Creek is likely due to competition and hybridization with introduced rainbow trout (Minckley 1973, 1993).

Razorback sucker - Historically, the razorback sucker was abundant throughout the Colorado River Basin, primarily in the mainstem and major tributaries in the southwestern United States and northwestern Mexico. This fish species was extirpated from the Gila River Basin by 1960, and was last recorded in the Verde River Basin at Peck's Lake, near Clarkdale, in 1954. Critical habitat for the razorback sucker was designated in 1994, and includes the Verde River and its 100 year floodplain from Perkinsville (T.18N., R.2E., Section 31) downstream to Horseshoe Dam, including Horseshoe Lake to the full pool elevation.

Colorado squawfish - Historically, Colorado squawfish existed in the Verde River system as indicated from remains found at an archeological site near Perkinsville, at the headwater of the Verde River, (Minckley 1993). Natural populations now exist only in the mainstem Colorado River and in its upper basin. Colorado squawfish in the Verde River Basin are designated as "experimental-nonessential" from Horseshoe Reservoir upstream to Perkinsville (USDI 1984).

The AG&FD and the Fish & Wildlife Service (FWS) have tried to reintroduce the razorback sucker and Colorado squawfish to the Verde River since 1981 and 1985, respectively (Kubacki 1998). Two razorback suckers were collected during surveys on the Verde River in 1989, and 8 were collected in 1990 (Girmendonk and Young 1997). Since 1994, all squawfish stockings have occurred in the lower Verde River below Camp Verde.

Loach minnow - Minckley (1993) states that loach minnows have disappeared from the entire Verde River system. The only known specimens were taken from Beaver Creek in 1938 (Minckley 1993, Girmendonk and Young 1997). Beaver Creek drains into the Verde River several miles up river from the 13-Mile Rock Range Allotment.

Spikedace - The record for spikedace is not much better than that of the loach minnow, at least within the middle Verde River. Spikedace were collected in West Clear Creek in 1937 and in Beaver Creek in 1937 and 1938. This species has only been collected at these locations and in the upper Verde River (upstream from Sycamore Creek).

Roundtail chub - In June 1997, AG&FD personnel surveyed the roundtail chub population in West Clear Creek from Tramway downstream to a 20 foot waterfall located approximately six miles upstream from Bull Pen. The survey was conducted to determine the status of the native roundtail chub population, and upstream movement of the introduced, non-native smallmouth bass. The roundtail chub population appeared extremely healthy, with all age classes well represented in the collections. Other fish species collected during the survey, above the waterfall, included desert suckers, rainbow trout, and speckled dace. Although not sampled, smallmouth bass were abundant below the waterfall (C. Benedict, Non-game Fish Specialist, AG&FD - pers. comm.).

Non-native fish

Of the 16 non-native species known to inhabit the streams associated with this allotment, 13 are known in the Verde River and 10 are known in West Clear Creek. Seven of these non-native fish species occur in both stream courses.

Over the years, the AG&FD and sport fish enthusiasts have introduced non-native warm water fish species (channel and flathead catfish, large and smallmouth bass), trout (rainbow, brown), baitfish (red shiners, fathead minnows), and crayfish to the Verde River and West Clear Creek. Minckley (1993) provides AG&FD stocking records as early as 1941 in the Verde River, and 1933 in West Clear Creek. Except for rainbow trout, the AG&FD has not stocked non-native fishes into the Verde River and West Clear Creek for a number of years. Although the stocking of non-native warm water fishes no longer occurs, several species

(catfish, bass) continue to persist in the Verde River (Minckley 1993, Kubacki 1998) and smallmouth bass continue to persist in West Clear Creek, downstream of the waterfall (Minckley 1993, C. Benedict, pers. comm.) .

The AG&FD began a winter trout stocking program in the Middle Verde River reach in 1989 between the Verde River's confluence with Sycamore Canyon at the north end and with West Clear Creek at the south end. Trout stockings occur from November through March. Rainbow trout cannot survive in the Verde River beyond April or May due to warm water temperatures (Kubacki 1998).

The AG&FD also stock rainbow trout at Bull Pen and Clear Creek Campground in West Clear Creek. In 1997 and 1998, approximately 5400 rainbow trout were stocked between these two stocking sites (C. Benedict, pers. comm.). These trout suffer the same temperature restriction and angling pressures as those stocked in the Verde River. Rainbow trout persist as a self-sustaining population in the upper (higher elevational) reaches of West Clear Creek (Minckley 1993, Envirotech 1993).

Recreation Use And Visual Quality

The Recreation Opportunity Spectrum classes within the allotment are Rural ® (near Camp Verde), Roaded Natural Appearing (RNA) (along SR 260 and other high use roads), Semi-Primitive Motorized (SPM) (most of the allotment), and Semi-Primitive Non-Motorized (part of Winter pasture) Visual Quality Objectives (VQO) include Retention and Partial Retention along SR 260 and associated viewsheds, and Modification (M) in the remaining areas of the allotment.

Recreation use within the allotment area includes camping, hunting, fishing, hiking, horseback riding, firewood gathering, some 4-wheel and ATV driving and driving for pleasure. Camping use includes both dispersed, or throw-down camping throughout the allotment, and camping in Clear Creek Campground east of Camp Verde off Highway 260. Clear Creek Campground is administered by the Forest Service, but is currently operated year-round by Recreation Resource Management, a recreation concessionaire company. This developed, but still rustic, campground offers 18 individual campsites and one group area site with a maximum capacity of 80 people, toilets and water. A fence surrounds the campground and adjacent day-use area to exclude livestock; this fence is maintained by the range allotment permittee.

A portion of the General Crook Trail is within the allotment, adjacent SR 260 and where it crosses West Clear Creek in the Heifer pasture. Military personnel, civilian settlers and their livestock extensively traveled this trail in the late 1800s. Recently this historic trail was identified on the ground and the portion of it within the allotment is frequently used by recreationists (hikers, horseback riders and some bicyclists) as individuals and in groups of various sizes.

Conflicts between recreation and livestock grazing use are minimal at this time. In the past, the fence around the Clear Creek Campground was not well maintained and livestock (bulls)

were sometimes found in the campground area. The current permittee maintains the fence well, and does not use two of the pastures adjacent the campground. No livestock have encroached into the campground or adjacent day-use area in over 3 years. Other conflicts include pasture gates being left open throughout the allotment, particularly during heavy recreation season in the upper elevation pine area and during fall hunting season. The result is a breakdown in the livestock management strategy, unwanted grazing use in some areas, and heavy time and money expenditures to the Ranch and the Forest Service. The ranch manager now wires gates open in pastures not being used, and posts signs on the gates that need to be closed to minimize this conflict. Also in the past, recreation users often left gates open along the Verde River in the Wingfield pastures and livestock would access the River corridor. These gates are now fenced and blocked, and access to the River for recreation is provided by cattleguards across the main roads.

Cultural Resources

Recorded prehistoric sites at the higher elevation ponderosa pine vegetation type are represented by occasional lithic scatters, while the lower elevations contain heavy concentrations of Southern Sinagua sites. These include one and two room field houses, pit house villages, multi-roomed Pueblos, caveats and petroglyphs. At least one prehistoric site within the allotment suggests influence from the Hohokam culture. Yavapai and Apache cultures are also represented by agave pits and wickiup sites in the lower elevation country. Modern day descendants of the prehistoric populations are represented by the Yavapai-Apache Nation, Hopi Tribe, and Yavapai-Prescott Tribe.

Historic sites within the allotment include the Clear Creek Ranger station, a CCC work camp, and portions of the General Crook Trail. Wild ungulates have ranged free for millineum and livestock grazing over the past one hundred years have and continue to impact surface remains of archaeological sites. The level and frequency of impacts resulting from wildlife and livestock grazing is expected to continue at the existing rate (*status quo),* and not to accelerate.

The latest Forest Service listing for the National Register of Historic Places was consulted for this project, and two sites within the 13-Mile Rock Range Allotment are listed: portions of the General Crook Trail and the Clear Creek Pueblo and Caveates. Permitted livestock do have access to the General Crook Trail, but are excluded from the Clear Creek Pueblo and Caveates, which are within the Clear Creek Campground area. Approximately 119 additional sites are recorded within the allotment areas, and, in accordance with 36 CFR 800.4, these sites are potentially eligible for nomination to the National Register of Historic Places under Criterion D of 36 CFR 60.4. These sites are considered eligible for Section 106, and would be protected pursuant to FSM 2361.21(2) until testing or additional information is available that allows a formal determination of eligibility to be made.

The Forest Service determined that the Hopi Tribe, Yavapai-Prescott Tribe, and the Yavapai-Apache Nation may attach religious and cultural significance to historic properties in the project areas. Each tribe or nation was consulted in 1999 about this project. No places of traditional cultural importance were identified and no issues or concerns were

expressed about the project area during these consultations.

Social Concerns and Perceptions

Social concerns for livestock grazing use on the Forest, and on this allotment, are related to public perception of the appropriate use of public lands, customs and traditions of the area and the community and the ranching life-style in relation to forest resources. Based on comments from local residents and Forest visitors, there is a wide variation in reactions to cattle on the Forest. To the visitor traveling along the highways or back roads, cattle on the Forest may be thought of as picturesque and typical of the "western life-style". But to someone who dislikes any kind of "un-natural" structures or animal on the landscape, the presence of cattle disrupts their perception of the Forest as a wild place. Some people object to livestock grazing of western public lands based on ecological concerns, such as damage to riparian areas, watersheds and wildlife habitat, which can be caused by poorly managed livestock use. However, to those whose economic and social well-being is tied to the land and to ranching in particular, livestock use is perceived as part of everyday life. Based on responses to the proposed action for the 13-Mile Rock Range Allotment management, there appears to be overall public acceptance of livestock grazing as long as the animals are controlled, impacts to all resources are considered and monitored and sensitive areas (especially riparian areas) are protected from unwanted impacts. A few responses indicated a strong preference for eliminating livestock grazing use on the Forest.

The population of the Verde Valley is growing, with many new residents of this traditionally rural area coming from large urban areas in search of a smaller, safe community. This growth mixes rural and urban values and increases conflicts between rural natives and ex-urbanites whose beliefs and values often challenge the existing way of life (USDI/USDA 1994). These new residents generally have no historic ties to the area or to the land, and are already asking local residents and governments to make land use changes to accommodate their urban values. With the continuing trend toward increasing residential expansion and urban Forest visitors to the Verde Valley and Mogollon Rim areas, the potential for conflict between livestock and people on this allotment, and across the Forest, may increase in the future.

Much of the 13-Mile Rock Range Allotment is located in an isolated area of the Forest, and is not greatly impacted by concentrated recreation use or adjacent communities. However, the winter and spring use areas are within the Verde Valley, just east of Camp Verde with some portions clearly visible from SR 260. The western edges of the Heifer and the northern Wingfield Mesa pastures are adjacent growing residential subdivision, with some conflict occurring when residents cut the livestock management fence to access the Forest lands. Occasionally livestock would congregate near the fences between the Forest and the subdivisions, which the residents do not like if the cows are near their property for more than a few days or weeks. Portions of the Bobs, Cactus and Heifer pastures border the Clear Creek Campground or the adjacent day-use area but, because livestock are fenced out of these recreation areas and no grazing occurs in the Bobs and Cactus pastures, conflicts are minimal.

Ranching and the community

Ranching has been a way of life in these areas since the late 1800's when large numbers of cattle and sheep were brought to the area to feed the Army and settlers of the Verde Valley. The values, attitudes and beliefs of the ranchers and other people making a living from agricultural-based activities are incorporated into the social structure and self-image of the long-time residents of the area. This Ranch, and other ranches in the area, contributes to the rural ranching life-style and social atmosphere of the Verde Valley, Northern Arizona and in the Southwest.

Traditional recreation uses

Traditional recreation uses, including hunting, fishing, horseback riding, firewood gathering and throw-down camping, are also an important part of the rural heritage and social structure of the local Verde Valley and larger Northern Arizona communities. Even the rustic Clear Creek Campground is considered a traditional-use camping area. Most visitors are from the Phoenix area, and return year after year, generation after generation.

Economic Influences

The economies of Northern Arizona and the Verde Valley have long been tied to agricultural-based activities such as ranching and logging. With urbanization and the associated changes in values have come changes in the economic bases of these areas. Tourism is now considered the leading industry in Northern Arizona and much of the Verde Valley. However, domestic livestock grazing still contributes to the livelihood of the permittees, their employees and employees of ranching-based services, as well as directly and indirectly to the economy of the local communities and counties.

The Ranch

Although the permit holder's livelihood is not solely dependent on revenues generated from this allotment, the livelihood and life-style of the Ranch Manager and his family and several day-workers are dependent on continuing livestock grazing use on this allotment. The Ranch contributes to the local and regional economy by providing jobs, both directly through the ranch operation and indirectly through purchases and investments in the Ranch, spending by Ranch employees in the community. Most of the Ranch purchases would likely be made in Yavapai County, generally in the Camp Verde areas. The Ranch Manager and day-workers used periodically live in the Camp Verde areas. Therefore, the majority of the related income and jobs would be created in Yavapai County.

In addition, a portion of the fees collected from grazing permits (25%) is paid to Yavapai and Coconino Counties each year in lieu of taxes by the Forest Service. Although these fees are only a part of the total payments made by the Forest Service, the revenue gained by the Counties is important to their highway maintenance and school budgets. Table 4 shows the estimated number of direct and indirect jobs, and fees paid to Yavapai and Coconino Counties by the Forest Service in lieu of taxes, for the 13-Mile Rock Range Allotment.

Table 5. The estimated number of direct and indirect jobs created by the 13-Mile Rock Range Allotment, and the fees paid to Yavapai and Coconino Counties in lieu of taxes based on the maximum permitted livestock numbers. .

Number of Permitted Livestock	Direct and Indirect Jobs (1.14 jobs/100 head)[3]	Payments to the Counties($) (25% of grazing fees @ $1.35/HM)[4]
550	6.3	$1,650/year

Recreation use

Recreation users contribute to the economy when they purchase hunting and fishing licenses and permits, pay fees at the Clear Creek Campground and purchase goods and services needed for their particular activities. Indeed, the revenues generated by hunting and fishing in Arizona alone are estimated by Congressional Sportsman's Foundation as equal to $140/resident, with added tax revenues equal to $16/resident (CSF 1998). Many of these purchases are made in the Verde Valley, but may be made at other locations throughout the State and region.

[3] 1.14 jobs/100 head (R3 estimate; 1995)
[4] Payment in lieu of taxes; 25% of 1999 grazing fees ($1.35/HM)

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental consequences of implementing each of the alternatives on the 13-Mile Rock Range Allotment, as an individual activity and cumulatively with past, present and future projects within the area, including consequences to the:

- biotic components, including vegetation, soil, water, air and wildlife;
- cultural components, including prehistoric and historic use and artifacts;
- social and economic components, including recreational uses and visual quality, social values and economic influence.

Rangeland Management

Alternative 1

Livestock would continue to be grazed under an intensive rest rotation ½, graze ½ management strategy on alternate years in the allotment's mid to high elevation summer ranges, with the lower winter ranges managed in an intensive deferred rotation system. All permitted livestock (cow/calf/heifer/bull) would be run together as a single herd. Annually, branding would occur in June and October, with fall round-up and shipping stock to market typically occurring in late October or early November.

The management of livestock pasture moves would continue to be based upon an intensive rest rotation grazing strategy. Grazing use in the Winter Pasture would be dispersed or concentrated in some areas for approximately 60 days, while use in all other pastures grazed during the dormancy period would not exceed approximately 30 days. In pastures grazed during the active growing seasons, the livestock graze period per pasture would range from approximately 10 to 20 days. Pastures designated for year-long rest would not be grazed by the allotment's permitted livestock.

Forage use would continue to be monitored by the permittee and the Forest Service. The graze ½, rest ½ concept of management would continue to insure that up to 50% of forage plants in grazed pastures and 80% of forage plants in the rested pastures would complete a full cycle of development each alternating year. Seed is set and vigor is stored in root reserves of both warm and cool season forage species. Consequently, where ecologically feasible the rest promotes improved species diversity as well as higher frequency and density.

Existing structural and non-structural range improvements would be maintained and replaced as needed, in accordance with Forest LMP standards. No new range improvements are planned or anticipated. However, existing improvements would be maintained or

replaced, as needed. Existing boundary and division fences that do not meet wildlife standards would be upgraded, but only as fences are routinely maintained. The permittee and the Forest would coordinate with the AG&FD to develop a list of fences that need to be upgraded to current Forest standards for wildlife.

Riparian habitat management in the Heifer and Wingfield South pastures would continue to protect the critical habitats of Cottonwood and Mesquite Springs, and lower portions of West Clear Creek. However, the concern for long duration (60 days) exposure of a small portion of West Clear Creek in the Winter pasture would continue. Currently, there is very little impact to the vegetation from livestock use of this area in the cold winter months (January and February) when livestock access the rock armored creek site for water. However, there is concern that the 60 day exposure of the riparian to livestock use may result in unwanted impacts, if the pasture fences are damaged by flooding events and livestock can access the lower portions of West Clear Creek.

Grazing use on Wingfield Mesa would continue under a deferred rotation management scheme using all 4 pastures for approximately 20 days each, from mid March to mid June annually. Annually rotated deferment of the graze period should promote a slow increase in the frequency and density of the spring growing (cool season) species. Cat-claw and mesquite are expected to increase over time, with a corresponding decrease in grass and forb species within the encroached areas.

Bob's and Cactus pastures would continue to be available as emergency use pastures only, and only for a portion of the herd. If these pastures are use, water would need to be hauled in for livestock and measures must be taken to keep livestock from impacting the West Clear Creek riparian corridor in the Cactus pasture. Historically, water was diverted from West Clear Creek to provide dependable water outside the riparian corridor for the livestock use. Today the diversion is not physically feasible or politically correct with current Arizona State Water Laws.

Alternative 2

No permitted livestock grazing would occur for a 10-year period within this grazing allotment, except if approved as a tool for a site-specific project. The allotment's exterior boundary fences would be maintained by reallocating maintenance responsibilities to adjacent permittees as appropriate and through Forest Service appropriated funding along the Verde River. The boundary fences along SR 260 may or may not be maintained by ADOT while the allotment is vacant. Interior improvements would be allowed to deteriorate and in time key multiple-use water sources would be nonfunctional, which potentially could affect wildlife and recreation uses, values and activities.

Without livestock, wildlife species would not have competition for habitat and forage. But concerns about potentially heavy grazing in key sensitive areas (such as cool season dominated areas, or palatable browse areas) by big game species, particularly elk, would continue. Heavy grazing by elk and over-rest (non-use or non-disturbance) on the remainder of the allotment would, given enough time, result in deterioration of vegetation that is now

protecting the soils.

The riparian areas fences at West Clear Creek, which are currently assigned maintenance responsibility to the allotment grazing permittee, would deteriorate in time. As current levels of funding and staffing by the Forest continue to decrease, the likelihood of these fences being maintained by the Forest Service is negligible. Consequently, destruction of habitat and quality resources is possible from trespass livestock. The fence around Cottonwood Spring and along the Verde River would continue to be maintained by the Forest Service, but not as frequently and to the level currently provided by the grazing permittee.

Vegetative maintenance of pinyon-juniper/grassland areas and browse areas would be conducted solely for wildlife habitat and watershed improvement, and would be funded for this purpose as money becomes available.

Alternative 3

The livestock grazing impacts are similar to those of Alternative 1, except that the impacts of livestock grazing in the Winter pasture would be reduced when the large pasture is divided into two smaller pastures (Winter East and Winter West pastures). This division would reduce the current 60-day graze period throughout the entire area to approximately 30 days within each smaller area, thereby reducing the exposure of the rock armored area of West Clear Creek in Winter West from 60 days to 30 days. Livestock would be driven quickly through the Winter West pasture in June toward the upper elevation pastures, and not allowed to graze or to access West Clear Creek during this active growing season. The East Winter pasture may be used for a short period (10-15 days) in June as cattle are rotated from winter range pastures to summer range pastures.

Winter range use (mid March through mid June) within the Wingfield Mesa group of pastures would continue under the deferred rotation grazing system. This management is similar to the management described in Alternative 1, but the sequence of moves and duration of grazes would depend on the active growth of cool season forage species. This system would provide rest and short periods of livestock use to these cool season species, with emphasis on increasing the frequency and density of cool season species within the warm season-dominated forage communities of these pastures. The pasture rotation would be planned to hold the permitted livestock in the Wingfield East pasture for up to 5 days prior to crossing SR 260. This 5 day holding period would insure all livestock are gathered and ready for the highway crossing, and none are left behind when the herd is moved toward the summer pastures.

Alternative 3 works to improve the wildlife access through existing boundary and division fence improvements on the allotment. The permittee and Ranger District would coordinate with the AG&FD to develop a schedule for upgrading fences where needed to meet current Forest standards for wildlife. Priorities for this work would be determined by wildlife travel corridors and key habitat areas, and coordinated with any needed maintenance or replacement of existing fences on the allotment.

Soil scarification and seeding specific areas with native warm and cool grass and forb species within the Maverick Basin South and Tin Can South Pastures, coupled with the scheduled rest from grazing use would improve the vegetative composition and abundance in these areas. Scarification would occur when soils are dry before summer rains or winter moisture to insure compaction during wet conditions does not occur.

Seeding of cool season forage species in specific areas of high revegetation potential within the Heifer and Wingfield Mesa Pastures complex would help improve the balance of vegetative diversity in the winter ranges. Although TES indicates that, in general, the soils in these pastures would support a predominance of warm season species, such as tobosa and sand dropseed, a higher occurrence of cool season species would benefit the forage and nutritional values for wildlife and livestock. The greater the forage species diversity, the more flexibility the grazing management scheme becomes, providing a greater array of graze periods and season of use on these pastures if ever needed. Seeding would be done on small site-specific areas by the grazing permittee during daily management routines.

The impacts of pinyon-juniper/grassland maintenance are the same under Alternative 3 as those under Alternative 2. However, implementation would include funding from range management, cost sharing or grants. These projects would be scheduled as funds are available to treat the 3,000 acres over a 10 year period. The immature trees would be cut by hand and/or mechanically, (retaining all oak and many of the mature alligator juniper trees) to provide a savannah woodland type. This savanna woodland would provide high quality and quantity forage values, and scattered thermal and hiding cover for livestock and many wildlife species.

The prescribed burning of decadent browse plants within portions of the Winter pasture would promote a more vigorous and available browse forage base for wildlife and livestock. This alternative recommends 1,000 acres of scattered treatments that would create a mosaic pattern of growth stages. The browse burning would stimulate the plants, thereby reducing competition between wildlife and livestock for the limited existing available browse.

Alternative 4

This alternative is very similar to Alternative 3, but has a tighter constraint on economics and, therefore, on the number of acres and methods for implementing individual resource project plans. The livestock grazing strategy and plans for maintenance and new construction of structural improvements for the allotment, and the associated impacts, are the same as under Alternative 3. However, the number of acres of pinyon-juniper/grassland maintenance and the corresponding scale of the long-term benefits is reduced from 3,000 acres in Alternative 3 to 1,000 acres in Alternative 4. Treating 400 acres of the maintenance area with a Christmas tree cut is a creative way to accomplish the resource needs, while offsetting the costs and meeting the public's desire for Christmas trees within a reasonable traveling distance to the Verde Valley. The remaining 600 acres would be accomplished with a lop and scatter treatment, as range management funds or grant monies become available. Under this alternative, the amount and scale of the benefits of browse burning in the winter pastures is reduced to 700 acres. The browse burning would occur in areas where

the greatest improvements can be expected, and where the browse is most used and needed as wildlife and livestock forage.

Alternative 5

The overall livestock grazing strategy is the same as Alternatives 1, 3 and 4, with the exception of planned use of the Wingfield Mesa pastures. These pastures would be managed under a rest rotation system, with three pastures used and one pasture rested each year. Under this strategy, one pasture would be completely rested for up to 21 months, allowing the cool season grasses and forbs to naturally reseed/revegetate. Use in the other three pastures would be rotated to vary the time and season of grazing during the 100 day annual use period for the Mesa pastures. This system of full rest for each pasture at least every 4 years, and the deferred rotation of the grazed pastures should provide an opportunity for further improvements in vegetative and soil conditions and trends.

The proposed prescribed burning of approximately 2,000 acres on Wingfield Mesa (TES soil mapping units 382 and 383) within the first 5 planning years would reduce the invasion of mesquite and cat-claw shrubs into this grassland community. The burning would remove old, decadent forage plant growth, and the emergent growth would be palatable and available for all ungulate grazing. Cool season species would be dormant growth during the prescribed burn and should not be affected by the fast moving burn. However, the warm season species, predominantly tobosa, would be affected and perhaps suppressed, as desired. This, in turn, would provide an opportunity for cool season species to release and increase in frequency and density. Some broadcast seeding with native species grass and forbs mix may occur within the burned pastures, as well as in the western portions of Heifer Pasture, to further increase vegetative diversity.

Cumulative effects

Timber harvesting, prescribed burning and road closure/obliteration projects proposed under the Good Enough/Tule Butte 20K Analysis may impact the timing of grazing use in the ponderosa pine areas of the allotment during the years the projects are implemented. Coordination of these projects with the scarification and seeding in the Tin Can South and Maverick Basin South pastures is essential to assure the season and duration of livestock use meets the need for adequate ground fuels for burning and adequate forage for livestock during project implementation. After implementation of the Good Enough/Tule Butte projects is complete, there would be an increase in the amount and diversity of ground cover vegetation, including grasses and forbs, available for wildlife cover and forage, livestock forage and watershed protection.

The fencing project at New Tank, completed in 1998, has and would not impact the continued livestock grazing use proposed under Alternatives 1, 3, 4, and 5 because an additional tank was constructed to replace New Tank. Any additional recreation use of this area would likely impact the ground cover vegetation around the fenced area as new camping and parking areas are created. The limited recreation use would not impact livestock grazing management in the area.

Grazing mitigation measures (Alternatives 1, 3, 4 and 5)

Appendix B, Table B-3 lists, by pasture and for the entire allotment, specific livestock grazing mitigation measures required in Mexican spotted owl and peregrine falcon habitats within the 13-Mile Rock Range Allotment (USDA 1998). Forest Service personnel monitor the permittee's compliance with the specific livestock salting techniques. In addition, there would be no construction, livestock gathering or spring branding in MSO PACs or the buffer area around peregrine eyries between March 1 and August 31.

Noxious Weeds

Some form of soil or area disturbance is associated with each alternative management action. Under Alternative 1, the only potential disturbances are from continued livestock grazing use and possibly from annual maintenance of structural improvements. Disturbance from continued livestock grazing is also a possibility under Alternatives 3, 4, and 5 but, since no livestock grazing use is proposed under Alternatives 2, there would be no disturbance from this use. Under Alternatives 2, 3, 4 and 5, areas proposed for lop and scatter, soil scarification and seeding, prescribed burning or Christmas tree cutting could be invaded by noxious weed through ground disturbance and introduction of noxious weed seeds.

The best control for noxious weeds is a healthy population of native plants. It is a lot easier to maintain a current population of native plants than to reestablish them, therefore minimizing needed disturbance is an important first step. Equally important is not introducing noxious weed seeds, which is easier (though not necessarily easy) than eliminating noxious weeds once they get established. Currently, the only method of controlling or eliminating established populations of noxious weeds on the Coconino National Forest is by mechanical means. This usually means hand labor since mechanical equipment can cause a greater disturbance and may further compound the problem. Mitigation actions are listed below for livestock grazing and the lop and scatter, scarify and seed and prescribed burning projects proposed under Alternatives 2, 3 and 4. Only diligent monitoring of the area proposed for Christmas tree cutting proposed under Alternatives 4 and 5 can ensure no noxious weeds are introduced through visitor vehicles or equipment.

Cumulative impacts

The projects proposed under the Good Enough/Tule 20K Analysis and recent implementation of the New Tank fencing project could result in introduction of noxious weeds. However, mitigation measures to lessen the probability of introduction, and continued monitoring by the Forest Service and the Ranch, would reduce the likelihood of noxious weed invasions in the project areas. Recreation use also poses a concern for introduction of noxious weeds. Visitors can easily bring or spread seed and plant material long distances to the Forest on vehicles and recreation equipment. There is no sure way to avoid this potential means of introduction, but public information campaigns currently underway may increase visitor awareness and their voluntary contribution to the solution.

Mitigation for noxious weeds

Controls for livestock grazing. The Ranch and the Forest Service would continue to monitor the allotment, and particularly areas around tanks, roads and holding areas for noxious weeds. Where these occur now or become established in the future, the Ranch and/or the Forest Service would remove or control the plants using the best available methods and knowledge for that species.

Controls for lop and scatter treatments. Make crews aware of which noxious weeds may be present so they can look for these while they are doing the work. Clean vehicles and equipment prior to the project, if they were previous exposed to noxious weeds or would be used off of any established roads. Cleaning should be done in an area where wash water can be contained. Remove residue or survey the area during range inspections to ensure no noxious weeds were introduced.

Controls for prescribed burns. Survey the project area just prior to the burn; record any noxious weeds and compare the information with a post-burn survey. Clean vehicles and equipment that had any exposure to noxious weeds in an area where any dirt, plant matter, or water can be contained. Remove residue or survey the cleaning area during the post-burn survey to ensure no noxious weeds were introduced or became established.

Controls for scarify and seed. Survey the area for existing noxious weeds just prior to implementation; remove any noxious weeds found before the scarifying takes place. Survey the area again within the following 2 years during permit operations and range inspections to insure that no noxious weeds were introduced during the scarification or seeding process.

Soil Conditions And Water Quality

Table 4, below, shows the existing and expected (after 10 years) soil condition classes for each pasture on the 13-Mile Range Allotment. The total acres of satisfactory soil condition on the allotment are the sum of those listed as satisfactory/suited and satisfactory/unsuited. Acres unsuited for management activities are in satisfactory condition, but not included in the available capacity acres because of their inherent instability or poor production capabilities. Table 4 shows the existing acres in each soil condition class and the expected changes after 10 years for each alternative.

Table 6 Existing number of acres available for livestock grazing in each soil condition category by pasture and alternative at the end of the 10 year planning period.

Pasture Name	Soil Condition	Existing Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Toms/GE	Sat/suited	4725	4725	4725	4725	4725	4725
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0

Pasture Name	Soil Condition	Existing Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Wilber N	Sat/suited	1754	1754	1754	1754	1754	1754
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0
Wilber S	Sat/suited	1052	1052	1052	1052	1052	1052
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0
Tule N	Sat/suited	1496	1496	1496	1496	1496	1492
	Sat/unsuited	3	3	3	3	3	3
	Unsatisfactory	177	177	177	177	177	177
Tule S	Sat/suited	867	867	867	867	867	867
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	180	180	180	180	180	180
Meadow N	Sat/suited	1202	1202	1202	1202	1202	1202
	Sat/unsuited	3	3	3	3	3	3
	Unsatisfactory	337	337	337	337	337	337
Meadow S	Sat/suited	1784	1784	1784	1784	1784	1784
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	122	122	122	122	122	122
Tin Can N	Sat/suited	1007	1007	1007	1007	1007	1007
	Sat/unsuited	108	108	108	108	108	108
	Unsatisfactory	118	118	118	118	118	118
Tin Can S	Sat/suited	1711	1711	1711	1711	1711	1711
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	48	48	48	48	48	48
Maverick N	Sat/suited	909	909	1349	1349	1349	1349
	Sat/unsuited	241	241	241	241	241	241
	Unsatisfactory	437	437	0	0	0	0
Maverick S	Sat/suited	1133	1133	1202	1202	1202	1202
	Sat/unsuited	0	0	0	0	0	0

Pasture Name	Soil Condition	Existing Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Unsatisfactory	69	69	0	0	0	0
Maverick SW	Sat/suited	360	360	763	763	763	763
	Sat/unsuited	54	54	54	54	54	54
	Unsatisfactory	403	403	0	0	0	0
Winter	Sat/suited	923	923	2167	2167	2167	2167
	Sat/unsuited	4532	4532	4532	4532	4532	4532
	Unsatisfactory	1769	1769	506	506	506	506
Tanque Aloma	Sat/suited	1019	1019	1652	1652	1652	1652
	Sat/unsuited	7	7	0	0	0	0
	Unsatisfactory	626	626	0	0	0	0
Cactus	Sat/suited	371	371	371	371	371	371
	Sat/unsuited	636	636	636	636	636	636
	Unsatisfactory	784	784	784	784	784	784
Bobs	Sat/suited	1034	1034	1034	1034	1034	1034
	Sat/unsuited	682	682	682	682	682	682
	Unsatisfactory	112	112	112	112	112	112
Wingfield NW	Sat/suited	1120	1120	1120	1120	1120	1120
	Sat/unsuited	34	34	34	34	34	34
	Unsatisfactory	11	11	11	11	11	11
Wingfield E	Sat/suited	792	792	792	792	792	792
	Sat/unsuited	92	92	92	92	92	92
	Unsatisfactory	27	27	27	27	27	27
Wingfield W	Sat/suited	884	884	884	884	884	884
	Sat/unsuited	199	199	199	199	199	199
	Unsatisfactory	57	57	57	57	57	57
Wingfield S	Sat/suited	458	458	458	458	458	458
	Sat/unsuited	561	561	561	561	561	561
	Unsatisfactory	0	0	0	0	0	0
Heifer	Sat/suited	452	452	452	452	452	452

Pasture Name	Soil Condition	Existing Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Sat/unsuited	1	1	1	1	1	1
	Unsatisfactory	177	177	177	177	177	177
Holding Pastures	Sat/suited	525	525	525	525	525	525
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	16	16	16	16	16	16
TES 900s	Sat/suited	90	90	90	90	90	90
	Sat/unsuited	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0

Current Satisfactory (Satisfactory/suited + Satisfactory/unsuited) = 32,821 acres
Current Unsatisfactory = 5,385 acres

Alternative 1: Satisfactory = 32,821 acres Unsatisfactory = 5,385
Alternative 2: Satisfactory = 35,619 acres Unsatisfactory = 2,587
Alternative 3: Satisfactory = 35,619 acres Unsatisfactory = 2,587
Alternative 4: Satisfactory = 35,619 acres Unsatisfactory = 2,587
Alternative 5: Satisfactory = 35,619 acres Unsatisfactory = 2,587

Alternative 1

Ponderosa pine forest

Soils are generally in stable and satisfactory condition due to vegetative ground cover in the form of needle cast, oak leaves, woody debris and vegetation such as grasses, forbs and shrubs. No change in soil condition is expected in this vegetation zone from continued livestock grazing.

Pinyon-juniper woodland

The amount and areas in satisfactory and unsatisfactory soil condition would not change under Alternative 1, as the result of continuing the current livestock management system. Juniper overstory or canopy would continue to increase gradually over the next 10 years and would cause some minor reduction in effective ground cover. Current impacts on unsatisfactory soils in the Winter pasture would continue without additional improved management to move these soils to a satisfactory condition.

Semi-desert grasslands and shrubs

Soils rated as satisfactory condition in these areas have more grazing capacity than the permitted animal unit months (AUM's) for the length of permitted grazing. The vegetative ground cover left after the grazing period is more than adequate to reduce overland flows and on-site soil loss. Under Alternative 1, soil would remain stable and in satisfactory condition in the semi-desert grassland and shrub areas. Current impacts on unsatisfactory soils would continue without additional improved management to move these soils to a satisfactory condition.

Alternative 2

Ponderosa pine forest

Soils are generally in stable and satisfactory condition due to vegetative ground cover in the form of needle cast, oak leaves, woody debris and vegetation such as grasses, forbs and shrubs. No change in soil condition is expected in this vegetation zone from removing livestock grazing use from this area.

Pinyon-juniper woodland

Under Alternative 2, the impacts of livestock grazing to the soil and vegetative ground cover would be removed for the next 10 years. Soils in satisfactory condition would be unchanged and soils in unsatisfactory condition would move toward satisfactory condition in the Tin Can South and Maverick Basin South pastures and some areas of the Winter pasture.

The lop and scatter in the pinyon-juniper is designed to maintain the savannah grassland, and would maintain satisfactory soil condition and improve areas of unsatisfactory soils in the Maverick Basin unit and Maverick Basin South and Tanque Loma pastures where ground cover has been lost to encroaching junipers in the past. In all areas of improvement, the litter/soil surface protection, organic matter/soil productivity and soil porosity/filtration capacity would increase and the potential for soil detachment would decrease over the 10 year time period.

Browse burning in the Winter and Tanque Aloma pastures would not impact soils The burns would be conducted under the best conditions for heat upward transfer, and would be fast moving with only light surface contact with the soils.

Semi-desert grasslands and shrubs

Under Alternative 2, soil would remain stable and in satisfactory condition in the semi-desert grassland and shrub areas. Even without livestock grazing during the next 10 years, little change is expected in areas of unsatisfactory soils in these areas.

Alternative 3

Ponderosa pine forest

The impacts of Alternative 3 in the ponderosa pine forest are the same as under Alternative 1. No change in soil condition is expected in this vegetation zone from continued livestock grazing.

Pinyon-juniper woodland

The change in the amount and areas in satisfactory and unsatisfactory soil condition are similar to those in Alternative 2, except that the changes are due to a combination of improved livestock management and distribution, and site-specific projects. Dividing the Winter pasture into two smaller pastures would improve livestock distribution and reduce the graze period from 60 days throughout the large pasture to 30 days in each of the smaller pastures. These changes would reduce the length of time the vegetation and soils are impacted in any one area. The greatest improvement is expected in the west side of the Winter unit (Winter West) where livestock now tend to concentrate during the current 60 day graze period.

The impacts of projects to maintain or improve vegetation and/or soil condition in the pinyon-juniper grasslands and browse communities are the same as Alternative 2. Soil condition within the lower lying areas of the Tin Can South and Maverick Basin South pastures is currently satisfactory, but the expected improvement in vegetation diversity and composition after with planned scarifying and seeding projects would help to maintain the soils in satisfactory condition.

Semi-desert grasslands and shrubs

The duration of grazing use would be increased in the Wingfield unit to achieve moderate use instead of light use. This is intended to stimulate plant growth and increase effective ground cover (both plants and litter), plant vigor and species diversity. Soils in satisfactory condition would be maintained, and soils in unsatisfactory would be moved toward satisfactory condition as effective ground cover is improved under Alternative 3.

Alternative 4

Ponderosa pine forest

The impacts are the same as for Alternatives 1 and 3 for continuation of livestock grazing use strategy in these areas.

Pinyon-juniper woodland

The impacts to soil and watersheds are expected to be the same as under Alternative 3 with division of the Winter pasture. Browse burning and removing encroaching juniper trees

would occur on fewer acres than under Alternatives 3 and 4, with correspondingly less improvement in these components. The reduced lop and scatter acres are those in the greatest need and expected results, thereby giving the same benefits to overall watershed maintenance during the 10 year planning period the more extensive proactive treatments proposed under Alternatives 3 and 5. However, the areas not treated under this alternative would still need to be treated within 10 or 15 years to stem the juniper encroachment and maintain the desired savannah-like conditions.

Semi desert grassland and shrubs

The impacts are the same as those under Alternative 3.

Alternative 5

Ponderosa pine forest

The impacts are the same as for Alternatives 1, 3 and 4 with continuation of livestock grazing use strategy in these areas.

Pinyon-juniper woodland

The impacts are the same as for Alternative 3.

Semi-desert grassland and shrub

The change in the grazing system to a rest rotation would allow one pasture to be rested each year from livestock grazing, thereby allowing the most palatable, cool season plants to completely recover from use. The expected result is an increase in the number and diversity of plants, and a corresponding increase in the effectiveness of the vegetative ground cover in some areas. In the grazed pastures, the graze periods would be increased in the Wingfield unit to achieve moderate use instead of light use. Broadcast burning across Wingfield Mesa would stimulate the fire-dependent grasses, especially the tobosa grass. Removing the old, decadent plant material around these plants would improve the health and palatability of this species to livestock, which would also help to increase grazing use. The heavier grazing use is expected to reduce the amount of tobosa grass and allow an opportunity for other ground cover species to spread or become established in opened areas. The burning would also remove encroaching mesquite and cat-claw, which, if left unchecked, would eventually out-compete the grass and forb component that protects the soil. Soils in satisfactory condition would be maintained, and soils in unsatisfactory would be moved toward satisfactory condition as effective ground cover is improved under Alternative 5.

Cumulative impacts

Changes in the amount of live vegetative ground cover is expected after pole-sized timber harvests, prescribed burns and road closures proposed under the Good Enough/Tule Butte

20K Analysis are implemented in the ponderosa pine vegetation type. Under these projects, coarse woody debris would be retained at the minimum of 5 tons per acre on all harvest and/or prescribed burn acres to maintain at least minimal soil productivity. Approximately 33 mile of road are also planned for closure and obliteration within or adjacent (south) the Toms/Good Enough and Tule South pastures, which would reduce soil movement and sedimentation into the watershed and meet the intent of the Forest Plan for an open road density of 2.5 miles/sq mile in the ponderosa pine areas (MA 3).

Ongoing and expected increases in recreation use of the Forest may result in increased impact to soils and vegetation at existing dispersed recreation sites and an increase in the amount of area impacted over time. As an example, the recently completed fence project at New Tank in the ponderosa pine forest area is designed as a proactive protection measure for the Chiricahua leopard frog, and provides an area for wildlife viewing. Roads and campsites currently exist at New Tank, and with the potential for increased recreation use and visitation, further disturbance to surrounding vegetation and soil compaction may occur over time.

Air Quality

Livestock grazing use

Livestock grazing on this allotment and on the Forest does not impact the overall air quality. Short-term, site-specific impacts may occur when livestock are gathered or transported (dust and odor). Alternatives 1, 3, 4 and 5 would continue the short-term, isolated impacts to air quality form livestock presence, movement and transport. All existing or potential short-term impacts from livestock grazing use are removed from this allotment under Alternative 2.

Prescribed burning

Alternatives 2, 3, 4, and 5 each specify some mixture of prescribed burning in browse areas and/or grasslands. Successful prescribed fire treatment in these vegetative types depends heavily on high temperatures and low relative humidities, which are typical of pre-monsoon weather normally experienced in late June. During these hot, dry weather conditions, smoke dispersion and upward transport are considered excellent with corresponding minimal smoke impacts to public health and visibility in Class 1 and 2 designated areas. Equally important is that long-term smoke production and smoldering does not occur in these vegetative types under the ascribed burn conditions. The Forest and Range Management Burn Rules, administered by Arizona Department of Environmental Quality (ADEQ), refer to these conditions and season as a Best Management Practice for reducing smoke impacts (ADEQ 1996).

All approved prescribed burning projects would be conducted by qualified prescribed burn personnel according to a site specific burn plan. ADEQ would provide daily approval of all ignitions according to regulation specified in the Forest and Range Management Burn Rules

(ADEQ 1996).

Alternative 1

No prescribed burning is specified.

Alternative 2

Prescribed burning on approximately 1000 acres of decadent browse would occur during the summer season described above. Because of the minimal acreage and remote locations, this burning project poses no substantial management challenges. Excellent upward smoke dispersal should easily allow the entire 1,000 acres to be burned in 1 day without impact on population centers or Class 1 and 2 areas. The smoke column from this burn would be highly visible from long distances, and the project should be well publicized with public announcements and appropriate signing along area highways and main Forest roads. Aerial ignition, using a helicopter, would be used because this method is safer in rough terrain than hand ignition.

Alternative 3

Prescribe burning on approximately 1,000 acres of decadent browse in the Winter and Tanque Aloma pastures would occur under the same conditions and mitigations as Alternative 2.

Alternative 4

Prescribe burning on approximately 700 acres of decadent browse in the Winter and Tanque Aloma pastures would occur under the same conditions and mitigations as Alternative 2. Although the acres planned for burning under this alternative are somewhat less than specified in Alternatives 2 and 3, the location of the burn areas is near and adjacent SR 260, and public announcement and appropriate safety signing is still a priority.

Alternative 5

Prescribe burning on approximately 1,000 acres of decadent browse in the Winter and Tanque Aloma pastures would occur under the same conditions and mitigations as Alternative 2.

Prescribe burn approximately 2,000 acres of grassland and intermittent brush on Wingfield Mesa. Part of the burn area is adjacent and south of the Verde Lakes subdivision. This burn would be highly visible and could impact the air quality of residents of Verde Lakes and neighboring developments. Pretreatment by carefully 'black line' burning the perimeter control lines adjacent and south of the Verde Lakes Subdivision would be necessary. This pretreatment could be easily and effectively done with hand ignitions, using existing 2-track roads for control lines, and timing the ignition to occur during cooler conditions. Once the

private lands have been secured with black line, the remainder of the burn could be easily ignited by helicopter. Preplanning and good smoke dispersal should easily facilitate a 1 or 2 day ignition, depending on public acceptance.

Special emphasis should be place on public awareness and further mitigating possible impacts by encouraging residents with health or respiratory problems to leave the immediate area prior to any ignition. The burn should be well announced to all publics and especially to residents of the Verde Lakes subdivision by door-to-door notification. Consecutive day burning may or may not be acceptable to residents adjacent the burn area. Department of Public Safety and law enforcement cooperators should be notified and involved in signing the highways for public safety. This project also provides a good opportunity for interagency cooperation and training with Camp Verde Fire Department.

Cumulative impacts

Competition for the available airshed during the summer/pre-monsoon months, when the browse and grassland burn are planned, is minimal. Prescribed burning in higher elevation vegetation types (i.e., Good Enough/Tule proposed prescribed burns in ponderosa pine) are not normally conducted at this time of year. Because of the location of the 13-Mile Rock prescribed burns and the atmospheric and weather conditions during the summer months, smoke is not expected to settle in the Verde Valley. Upward transport and dispersion would remove 95% of all smoke from these prescribed burns within 3-4 hours after ignition is complete.

Large wildfires can occur during this same summer, pre-monsoon period at all elevations and vegetative types. Prescribed burn activities and wildfire suppression efforts depend on similar support personnel and equipment, which means that when resources are needed for wildfire suppression prescribed burn activities would be curtailed or stopped. As a result, there would be little if any smoke emissions from prescribed fires if wildfire suppression activities are ongoing in the surrounding area.

Terrestrial Habitats and Species

Effects common to all alternatives

In all alternatives, existing fences are maintained and/or new fences are constructed. In general, fencing poses a barrier to wildlife movement whether or not it meets wildlife specifications. This is especially true where fences parallel both sides of a road in pronghorn antelope habitat, as it does along S 260. Pronghorn usually crawl under fences rather than jump over, so the bottom wire should be smooth and 18 to 21 inches off the ground. If fencing does not meet these specifications, the result may be extensive habitat fragmentation and isolation of herds.

Under all livestock grazing alternatives, the bottom wire of fences not meeting wildlife specifications would be replaced over time with smooth wire and raised to allow for

antelope to crawl under. Although this proposal is preferable to having a barbed bottom wire with inadequate wire spacing, fencing would continue to be a concern for wildlife movement. Under Alternative 2, removing fencing is preferable from a wildlife standpoint to leaving unneeded fences standing or allowing wire to lay on the ground after a fence deteriorates from lack of maintenance.

Alternative 1

Livestock grazing strategy

The degree of wildlife habitat modification caused by livestock grazing use depends upon the timing of livestock grazing (season of use, length of grazing period, amount of rest), livestock numbers, livestock distribution and the level of use. The most important impact is a reduction in above-ground herbaceous plant cover in grazed pastures, which is especially important for fawn and calf survival for pronghorn, mule deer, white-tailed deer and elk. Herbaceous plants are also important cover for ground-nesting birds and cover and forage for rodents. In most documented cases of wildlife habitat damage or degradation caused by livestock grazing, severe overgrazing had occurred. Overgrazing is not a concern on the 13-Mile Rock Range Allotment. Forage utilization monitoring data from 1998 and past range inspection reports show total use (livestock and wildlife) was consistently light (11 to 25%) to moderate (26 to 50%) in the grazed pastures of the allotment.

With continuation of the graze ½, rest ½ strategy in the mid and high elevation pastures of this allotment; nearly all of the above-ground herbaceous plant cover would be maintained over approximately ½ of the area. Where livestock and wildlife graze, at least 50% of the grass and forbs would remain at the end of the growing season to provide cover and forage for wildlife, and a seed source and root reserves needed for plant reproduction. Under this grazing strategy, species that require above-ground herbaceous plant cover would be able to find this condition on at least ½ of the mid and high elevation pastures each year within this allotment and the four allotments to the north. Generally speaking, this strategy should provide adequate foraging opportunities and cover for the many species that are able to move between these areas each year, including pronghorn antelope, mule deer, white-tailed deer, elk and most species of birds. However, there are species in the area, especially rodents, which are less mobile and may not benefit from this strategy.

There is some relation between livestock herd rotation and movement of white-tailed deer and turkey. Deer and turkey tend to move out of pastures that are heavily stocked with livestock during the grazing period, though there is no evidence that this is detrimental to these species. Other effects of short duration grazing include an increase in forb production if grazing becomes heavy. This increase may benefit species such as mule deer and antelope at certain times of the year, especially when forage species are dormant (Guthery et al. 1990).

Competition between livestock and wildlife occurs at different times of the year, depending on the species of wildlife and their nutritional needs. Competition between livestock and pronghorn for forbs and shrubs can occur during the winter when grasses are dormant and

less palatable. Competition for green, succulent forbs may also occur during the spring and summer if other sources of forage are not available. Elk and cattle diets overlap substantially. During the winter, elk would use browse species, turning to grass species during the spring and summer months. Elk would travel large distances to meet their nutritional needs, shifting their foraging patterns to move into areas of fresh feed. Elk commonly move into pastures to graze plant regrowth after cattle have left. Competition between deer and livestock occurs when there is a shortage of forage, especially during the winter and during droughts.

Grazing may have an effect on the abundance and species composition of bird communities in various habitats, depending on the grazing intensity and how much the density and composition of the understory is affected. Negative effects would most likely be to ground or shrub nesters during the breeding season. If grazing intensity is high enough, nests may be trampled or structural support and cover may be altered. Foliage gleaners and species that prefer open canopies in forests may also be negatively impacted. There may also be negative impacts on species that nest or forage near water sources if nests or vegetation are trampled. Species that are affected by cowbird parasitism, such as flycatchers, warblers, and vireos, may also be negatively impacted.

Positive effects may occur in grazed pastures for species that prefer a more open understory, and for ground feeders that forage on bare ground or in short grass. Species that prefer denser canopies in ponderosa pine and species that drink, bath or forage for emergent insects at stock tanks may also benefit from livestock grazing.

Rangeland management structures

The effects of maintaining and upgrading fencing are discussed under: Effects common to all alternatives. The effects of maintaining water developments including dirt tanks, water storages and pipelines are generally positive. Only when maintaining dirt tanks are there the possibility of impacting habitat for certain species, such as amphibians, waterfowl and other wetland-dependent species. If maintenance is done during egg development or during the tadpole stage in amphibians, there can be detrimental impacts to populations of frogs, toads, and possibly other species, such as garter snakes that exist in the tank and adjacent areas. Waterfowl may be disturbed temporarily if maintenance is done during the winter migratory period. Tank maintenance during the summer may disturb nesting waterfowl that inhabit the vegetation surrounding the tank. Maintaining water storage tanks and pipelines on Wingfield Mesa is important for both proper livestock distribution and use, and wildlife watering needs. As long as the water storages and pipelines are not dry for long periods of time, most species would find other sources of water during maintenance operations.

Maintaining water lanes and riparian exclosures should have few impacts on wildlife, other than those described for fencing in general. Riparian-dependent species would benefit from maintenance of these structures as vegetation thrives and soil functions improve in the exclosures and along protected sections of stream corridors. Maintaining road closures that restrict access to the Verde River would also have a positive effect on wildlife by preventing disturbance from recreationists and protecting the riparian habitat along the river from

degradation. No new rangeland management structures are proposed under Alternative 1.

Grassland and browse maintenance

The only grassland maintenance proposed is to scatter a mix of cool and warm season native grasses and forbs on productive soil units throughout the allotment. If seeding is successful, the increased ground cover and species diversity would provide hiding cover and forage for several wildlife species, including pronghorn antelope and ground-nesting birds. No browse maintenance projects are proposed under Alternative 1.

Alternative 2

Livestock grazing strategy

Under this alternative, no grazing would be allowed on the allotment for a period of 10 years and competition between livestock and wildlife for forage would no longer exist. Plant biomass, productivity, and vigor would improve and seed head production would increase. Plant species composition may change slightly over the 10-year period, but usually substantial changes in species composition occur over longer periods of time. Improved vegetation height and cover would positively affect pronghorn antelope fawn survival rates, as well as survival rates of deer fawns and elk calves. Ground-nesting birds would also benefit, as well as rodents requiring good herbaceous plant cover.

Rangeland management structures

The effects of maintaining boundary fences, removing fencing and upgrading fencing to wildlife standards are discussed under Effects Common To All Alternatives. The benefits of maintaining road closures to restrict inappropriate recreation access to and from the Verde River are the same as those described for Alternative 1. No additional rangeland management structures are proposed under Alternative 2.

Grassland and browse species maintenance

In Alternative 2, cutting, lopping, and scattering of young juniper trees on 3,000 acres that were historically grasslands is proposed. Juniper encroachment continues on the previously cleared areas that provided open grasslands for livestock and pronghorn. As these areas are reclaimed by juniper, grass and forb densities decrease and sight distance is reduced, thus reducing the habitat suitability for pronghorn. Restoring grassland areas should have a positive impact on pronghorn antelope habitat by increasing grass production and site-distance, thus reducing the risk of predation. Improved forage production in winter habitat would also benefit elk, deer, and turkey. Mule deer prefer more open areas than white-tailed deer and can benefit from openings interspersed with cover. Turkey would benefit from improved production of grasses and seed heads needed for forage and cover.

Increased ground cover and species composition in the Maverick Basin South and Tin Can South pastures, following scarification and seeding, should have a beneficial effect on most

of the wildlife species that occur in the area. Cover values for antelope would improve as seeds become established and grasses replace snakeweed in the area. Forage values for elk, deer, and antelope would be improved as cool and warm season grasses and forbs become established.

Browse maintenance and improvements proposed in Alternative 2 is expected to benefit most of the wildlife species using the lower elevation woodland areas. There may be some short-term reduction in cover for species such as white-tailed deer immediately after burning. However, forage values and availability would be improved for deer and other species inhabiting the area in the long-term.

Alternative 3

Livestock grazing strategy

The effects on wildlife of the livestock grazing strategy in Alternative 3 are the same as those described for Alternative 1.

Rangeland management structures

The effects of maintaining and upgrading fencing are discussed under: Effects common to all alternatives. The only additional structures being proposed in Alternative 3 is approximately 3 miles of fence to split the Winter pasture into two pastures. The effects of fencing are described under Effects Common To All Alternatives.

Grassland and browse species maintenance

The impacts to wildlife are the same as those described under Alternative 2 for all grassland and browse species maintenance projects, except there would be competition for the improved forage and cover with livestock during and for a time after the graze period. The graze ½, rest ½ strategy and the short duration graze periods would limit the length of the competition period and the amount of livestock impact to the plants.

Alternative 4

Livestock grazing strategy

The effects of the livestock grazing strategy are the same as those described under Alternative 1.

Rangeland management structures

The effects of maintaining and upgrading fencing are the same as those described under: Effects common to all alternatives, except that relocating approximately 0.7 miles of the fence between the Heifer and Cactus pastures away from the right-of-way fence along SR

260 would improve the ability of deer and antelope to move through this area. The effects of the additional fencing in the Winter pasture are the same as described under Alternative 3.

Grassland and browse species maintenance

The effects of the grassland maintenance are the same as described under Alternatives 2 and 3, except the number of acres of pinyon-juniper treatment is reduced to a total of 1,000 acres (lop and scatter and Christmas tree harvest). Accordingly, the overall benefits to wildlife would be limited to a smaller area. However, because the selected areas are within the important antelope fawning habitat, this species would still benefit greatly from these treatments.

The impacts of the proposed browse burning are the same as those discussed under Alternatives 2 and 3. However, the benefits are limited to 700 acres in the east side of the Winter pasture, where competition with livestock for available browse is and would continue to be the greatest.

Alternative 5

Livestock grazing strategy

The effects of the livestock grazing strategy are the same as those described under Alternative 1, except the annual rest incorporated into grazing rotation of the four pastures of the Wingfield Mesa unit may lessen competition between livestock and wildlife each year in the rested pasture. The emphasis on improving species diversity on the Mesa would also benefit wildlife by providing forage and cover year-long.

Rangeland management structures

The effects of maintaining and upgrading fencing are the same as those described under: Effects common to all alternatives, and Alternative 4. The effects of the additional fencing in the Winter pasture are the same as described under Alternative 3.

Grassland and browse species maintenance

The effects of the grassland maintenance are the same as described under Alternatives 2 and 3. The 2,000 acres of prescribed burning proposed under Alternative 5 on Wingfield Mesa would likely cause a short-term negative impact to ground-dwelling wildlife within each of the two burn units during and shortly after burning. However, the long-term improvements in available herbaceous vegetation and control of encroaching woody shrubs would benefit all wildlife using this area. The effects of the browse maintenance are the same as described under Alternatives 2 and 3.

Cumulative Effects

Cumulative effects on wildlife on the 13-Mile Rock Range Allotment include livestock

grazing on adjacent allotments, precommercial thinnings and commercial timber sales, activities proposed for the Good Enough/Tule 20K, activities proposed for the Iron Mine-Maxwell 20K, recreation, roads and trails, and land ownership, exchanges and agricultural uses in the area.

Livestock grazing

In addition to the livestock grazing occurring on the 13-Mile Rock Range Allotment, grazing occurs on the Buckhorn Allotment to the north, the Fossil Creek and Hackberry Allotments to the south, the Pivot Rock Allotment to the east and southeast and the range allotment to the west, across the Verde River on the Prescott National Forest. The surrounding allotments on the Coconino NF are managed much as the 13-Mile Rock Range Allotment, with plant phenologic stage as the indicator of proper livestock graze periods (season and timing). Special consideration is also given for the cumulative impacts of wildlife and livestock grazing on vegetation and soils. Depending on the extent and pattern of modification of the habitat components, some wildlife species may benefit, while others may be negatively impacted.

Timber management

As with livestock grazing, timber management activities can have both short and long-term effects on wildlife populations and habitat. Several commercial timber sales and precommercial thinnings have occurred in the past (> 8-10 years ago) in the ponderosa pine and pinyon-juniper vegetation type on the east side of the allotment and in adjacent areas. Planning for the Good Enough/Tule Butte 20K Ecosystem project, which includes prescribed burning, slash treatments, thinnings and road obliteration, is nearly complete. The EA for this project documents that the cumulative effect of all proposed actions on the wildlife community "improves wildlife habitat for the overall community by improving structural diversity, promoting the growth of large trees, and improving riparian conditions."

In the Iron Mine-Maxwell 20K Analysis Area, thinning is proposed on several thousand acres of small diameter ponderosa pine north of West Clear Creek. As with the Good Enough/Tule Butte 20K, these activities are expected to have a net benefit for wildlife habitat. Most of the large trees were removed from these areas in previous timber sales, so the thinning projects should in the long-term, result in larger trees and improve habitat characteristics for many species.

Recreation

As the population increases in the Metropolitan Phoenix area, recreation use and the impacts on wildlife on the Mogollon Rim also increases. Camping, hiking, picnicking, fishing, and hunting in the area can directly and indirectly impact wildlife. Direct effects include disturbance and harassment of wildlife by recreationists; indirect effects include impacts to soil and vegetation from concentrated use in popular areas, trampling of vegetation and fuelwood gathering.

Roads and trails

The reduction in road densities proposed in the Good Enough/Tule Butte and Iron Mine/Maxwell 20K projects is expected to reduce disturbances to the wildlife community, especially during breeding periods and for species sensitive to disturbance, such as turkeys. Poaching pressure may be reduced on game species, illegal fuelwood cutting and human-caused fires may be reduced where roads are closed and more acres of productive habitat may be returned to the landscape.

Land ownership and agricultural uses

Cumulative effects related to land ownership and agricultural uses are most evident in the Verde Valley along the Verde River. The effects to wildlife, especially from agricultural uses such as feedlots, irrigated pastures and farming along the River, are extensive. Runoff from these operations degrades water quality in the Verde River and reduces habitat quality for many species, including the endangered southwestern willow flycatcher and several native fish.

Threatened, Endangered, Sensitive and Proposed Terrestrial Wildlife and Plant Species

Mexican spotted owl

Grazing by livestock and wildlife can alter Mexican spotted owl (MSO) habitat composition and structure, including plant density, cover, biomass, vigor and plant regeneration. This, in turn, can affect the availability and diversity of prey species. Direct alterations include plant removal by consumption or trampling; indirect effects may be the loss of a seed source or soil damage. Under Alternatives 1, 3, 4, and 5, forage utilization in MSO Protect Activity Centers (PACs) and protected and restricted habitats is not expected to exceed 40% at any time. Indeed, the PACs are expected to receive little or no livestock grazing utilization because of the dense canopy closures and the steep slopes in these areas making most of these lands inaccessible to livestock. In addition, mitigation measures for salting and mineral supplements, livestock gathering and construction are in place to prevent disturbance to MSO and their habitat during the breeding season.

Cumulative effects on MSO's on the 13-Mile Rock Range Allotment include livestock grazing on adjacent allotments. The grazing pattern is synchronized among these allotments to ensure an alternating band of grazed and ungrazed pastures across the mid and upper elevation pastures. This pattern provides adequate forage and cover to reduce impacts to prey species across the landscape. Recreation use within the West Clear Creek Wilderness and throughout the Forest can also disturb nesting owls.

Bald eagle

Livestock grazing on this allotment generally does not affect wintering bald eagles, although

livestock may occasionally trample, rub down or browse terminal buds of small pines that could become recruitment roosts or perch trees in about 150 years. Since livestock are excluded from the Verde River and the majority of West Clear Creek, there are no direct impacts to cottonwood and sycamore roost or perch trees. There are no nesting eagle territories within the section of the Verde River that bounds the allotment. The river is fenced to exclude livestock, so there are no direct effects on potential bald eagle habitat from livestock grazing on the allotment.

The presence and abundance of prey species may also affect both wintering bald eagles and nesting bald eagles. The 13-Mile Rock Range Allotment exhibits the characteristics required for healthy prey populations for eagles, including healthy soil conditions and plant communities, and well managed, functioning riparian areas.

Cumulative effects on bald eagles include loss of habitat resulting from urbanization and increasing recreation use along portions of the Verde River. Approximately 2 miles of the Verde River adjacent the allotment is privately owned, with the potential for development. Disturbance to eagles nesting downstream from this allotment is increasing as recreation use and demands increase in the Verde Valley.

Southwestern willow flycatcher

Currently, there are no southwestern willow flycatchers known to occur on the 13-Mile Rock Range Allotment. The nearest known occupied habitat occurs greater than 5.0 miles from the allotment's western boundary, but the allotment falls within the radius for two suitable sites. Both of these sites are currently unoccupied. If these sites become occupied in the future, livestock management in the following pastures may be radically affected because of the potential for nest parasitism by the livestock-associated brown-headed cowbirds.

Pastures within the 5-mile radius of suitable unoccupied habitat on the Verde River at White Bridge:

- Bob's
- Wingfield Mesa East
- Wingfield Mesa Northwest
- Heifer
- Wingfield Mesa West

Pastures within the 5 mile radius of suitable unoccupied habitat on West Clear Creek at Bull Pen:

- Bob's
- Heifer
- Wingfield Mesa Northwest
- Wingfield Mesa East
- Wingfield Mesa West

- Cactus
- Winter Unit
- Tanque Aloma
- Maverick Basin West
- Maverick Basin South
- Maverick Basin North

On the 13-Mile Rock Range Allotment, the potential impacts of livestock grazing on riparian habitat components and soils are minimized by excluding livestock from riparian areas along the Verde River and all of West Clear Creek, except for two water lanes in the Heifer pasture and a short segment of West Clear Creek within the Winter pasture. These controlled access areas are used only in the winter months and are within the designated "critical habitat" for the southwest willow flycatcher on West Clear Creek. Livestock do not access any other areas designated as "critical habitat". Livestock impacts to the riparian vegetation and soils are virtually undetectable at these sites. Monitoring of these areas (annual habitat monitoring) and the livestock use (permittee compliance, forage utilization) is required to determine if the approved strategy is effective or should be modified.

Cumulative effects on southwestern willow flycatchers in the area include recreational uses, grazing by privately owned livestock, grazing by livestock on adjacent allotments and miscellaneous activities that affect watershed condition. These miscellaneous activities include timber harvesting, roads and trails construction, off-road vehicle use, heavy recreational use in concentrated areas, large-scale fires, resource extraction and other ground-disturbing activities. Recreational uses occurring near potential flycatcher habitat includes developed (Clear Creek Campground) and dispersed camping, picnicking, hiking, swimming and fishing. Recreational use along the riparian area near the developed campground is not currently impacting the riparian habitat.

Yuma clapper rail

Yuma clapper rails were discovered on Tavasci Marsh during 1997 and 1998, but have not been found on or near this allotment. However, potential habitat may occur along the Verde River and West Clear Creek. Grazing in riparian areas can have negative impacts to habitat for this species, though this would likely not be a concern even if these clapper rails were found on the allotment. For the most part, livestock grazing is excluded from riparian areas on this allotment, except for access to water at two small water lanes in West Clear Creek and an armored section of West Clear Creek in the Winter pasture. Indirect effects to Yuma clapper rails may occur from grazing if ground cover in the uplands were inadequate, thereby increasing surface runoff and silt loads and turbidity in the Verde River. This is not the case on the 13-Mile Rock Range Allotment where proper livestock management contributes to the satisfactory soil conditions found on the majority of the allotment.

Cumulative effects on Yuma clapper rails could include poor watershed conditions in the uplands on adjacent allotments, and effects to soil and vegetative conditions from fuelwood harvesting, roads and trails, off-road vehicle use, concentrated recreation use, large-scale

fires, resource extraction and other ground-disturbing activities. Indirectly, disturbance to birds can occur when noises from these types of activities disturb nesting behaviors or when habitat is destroyed or modified. The Clear Creek Campground is located in the uplands away from the riparian area, and recreational activities here do not appear to be affecting potential rail habitat.

Another effect to potential habitat is the reduction of surface flows when water is diverted from streams and rivers. Impacts from diversions include changes in riparian corridor width, vegetation types, channel morphology, water temperature, water chemistry, and flow patterns (USDI 1993). There are irrigation ditches along West Clear Creek in the Verde Valley that reduce the Creek's ability support water-dependent species, and frequently cause West Clear Creek to run dry near it's confluence with the Verde River during peak irrigation periods (USDI 1993).

Proposed Species

There are no species proposed for Federal listing on the allotment.

Candidate Species

The only candidate species known to occur on this allotment is the Chiricahua leopard frog (*Rana chiricahuensis*). One potential impact to this species from livestock grazing activities is the removal of emergent vegetation and vegetation adjacent to stock ponds, springs and creeks where leopard frogs live. Disturbance to vegetation and soils, and direct contact with equipment when stock ponds are cleaned could also impact these frogs. Emergent vegetation is important as hiding cover and substrate for laying eggs for this species, and should not be removed if possible. Cumulative effects on Chiricahua leopard frogs include recreationists and fishermen collect tadpoles and adult frogs from stock tanks and other habitat areas.

Sensitive Species

American peregrine falcon

Livestock grazing is not expected to have a direct effect on nesting peregrine falcons. Nesting habitat for this species is typically located on cliffs that are inaccessible to cattle. Spring and fall gathering activities occur over 1.0 mile from documented or historical eyries, so no direct disturbance to nesting peregrines would occur from these activities.

Indirect effects that may occur to peregrines from livestock grazing include effects on primary prey species such as pigeons and doves, which depend on seed production in the forest understory. Grazing occurs for short periods in each pasture on this allotment (generally 30 days or less) and is not likely to reduce plants ability to develop seed heads and bear seed.

Cumulative effects on peregrine falcons on the 13-Mile Rock Range Allotment include the

presence of several allotments within the foraging zones of peregrine falcons. The graze ½, rest ½ pattern of livestock grazing use on this allotment is synchronized with the four allotments to the north so adjacent pasture tiers are not used in the same year. This provides large areas that area rested from grazing within peregrine foraging zones each year.

Other cumulative effects include increased recreation use in the West Clear Creek Wilderness and across the Forest. Hikers, campers, and fishermen are attracted to the area and may disturb nesting falcons.

Northern goshawk

Over the past 5 to 10 years, potential impacts to the northern goshawk have been carefully considered and mitigated on this and adjacent allotments. Special consideration is given to providing adequate cover and forage for prey species, and preventing disturbance to nesting or foraging birds through specific mitigation measures listed in Appendix B, Table B-6. Cumulative impacts to the northern goshawk include large-scale fires, timber harvesting activities, and recreation use. Of these, recreation use is the most consistent and possibly the greatest potential impact to nesting birds and prey species and their habitats.

Other Sensitive Species

Actions that affect riparian characteristics may impact riparian-dependent wildlife and plant species. On the 13-Mile Rock Range Allotment, large riparian areas including the Verde River and West Clear Creek are for the most part, excluded from livestock grazing, so few effects are expected.

Several of the sensitive plants require specific soil types that are only found in the Bob's and Cactus Pastures. These pastures are not currently or proposed to be grazed by livestock except in emergency situation, so the effects on these plants from livestock grazing are expected to be minimal.

Cumulative effects on sensitive species are variable and wide-ranging. For sensitive plants, direct impacts from off-road vehicle use, plant collecting and livestock and wildlife grazing are of concern. The effects of recreation activities throughout the area, including disturbance by campers, picnickers, hikers and other types of recreation, may occur. Fuelwood cutting and timber harvesting may impact cavity-nesting species, though no negative effects are expected to these species from livestock grazing.

Management Indicator Species (MIS)

The effects of each alternative on the MIS identified for each of the management areas are discussed below.

- MA 1 (West Clear Creek Wilderness) - No MIS were identified.
- MA 2 (Verde Wild and Scenic River) - As described for riparian-dependent sensitive species, actions that impact riparian areas may impact the MIS identified for the

Verde Wild and Scenic River. The Verde River corridor has been fenced from livestock and no other actions are proposed for this area. As a result, there should be no direct effects on these indicator species. Indirect effects on macro invertebrates and habitat for yellow-breasted chat may occur when upland watershed conditions are poor. In the case of the 13-Mile Rock Range Allotment, the majority of soils (846) are in satisfactory condition, which would result in few, if any negative impacts on these riparian-dependent species.

- MA 3 (Ponderosa Pine and Mixed Conifer) - Management indicator species identified for ponderosa pine and mixed conifer include turkey, goshawk, pygmy nuthatch, elk, Abert's squirrel, red squirrel, hairy woodpecker and Mexican spotted owl. The effects of improvements in vegetation and soils on wildlife habitat are discussed above. These improvements are expected to have positive impacts on the MIS for this area. Specific impacts to Mexican spotted owls area discussed under the Threatened and Endangered Species section, and the effects on northern goshawks were discussed under the Sensitive Species section. Implementation of the livestock grazing alternatives is not expected to impact the cavity-nesting pygmy nuthatch, Abert or red squirrels or hairy woodpecker. The expected impacts to elk and elk habitat are discussed above for each alternative.
- MA 4 (Ponderosa Pine and Mixed Conifer on Greater than 40% Slope) - Management indicator species identified for ponderosa pine and mixed conifer on greater than 40% slopes are the same as those identified for MA 3 (Ponderosa Pine and Mixed Conifer). The effects of implementation of the alternatives on these species are discussed for MA 3.
- MA 6 (Unproductive Timber Land) - Management indicator species identified for unproductive timber land include elk, Abert's squirrel, mule deer, and hairy woodpecker. The effects on Abert's squirrel and hairy woodpecker are discussed in previous sections (MA 3); impacts to elk and mule deer are discussed in the previous terrestrial wildlife section for each alternative.
- MA 7 (Pinyon-juniper Woodlands on Less than 40% Slope) - Management indicator species identified for MA 7 include plain titmouse, mule deer and elk. Livestock grazing is not expected to negatively impact plain titmouse, which is a cavity-nesting bird. Livestock use of potential oak recruitment is considered to be minimal, based on the season of use and other forage available when livestock are using the oak areas. The effects on mule deer and elk are discussed in previous sections for each alternative.
- MA 8 (Pinyon-juniper Woodlands on Greater than 40% Slope) - Management indicator species for pinyon-juniper woodlands on greater than 40% slope are the same as those for MA 7. A discussion of the effects of implementation of the alternatives can be found for these species above.
- MA 10 (Grassland and Sparse Pinyon-juniper Above the Rim) - No MIS were identified for MA 10
- MA 11 (Verde Valley) - No MIS were identified for MA 11.
- MA 12 (Riparian and Open Water) - As described for riparian-dependent sensitive species, actions that impact riparian areas may impact the MIS identified for riparian and open water. The impacts to soils and riparian vegetation are described under both

Soil and Watershed and the Aquatic Habitat and Species effects summary.
- MA 15 (Developed Recreation Sites) - No MIS were identified for MA 15.

Mitigation

The following are mitigation measures for implementing any of the alternatives that allow for livestock grazing use on the 13-Mile Rock Range Allotment for the next 10 years.

Mexican spotted owl and peregrine falcon:

Meet the intent of the grazing guidelines listed in the Mexican Spotted Owl Recovery Plan by continuing to:

- Monitor grazing use by livestock and wildlife in "key grazing" areas (riparian areas (MA 12) and pine/oak types (MA 3) (Appendix B, Table B-7). If cattle show an increasing utilization trend, then change the management strategy to reverse the trend. If wild ungulates show an increasing utilization trend, the Forest Service would work with the AG&FD to reverse this trend.
- Implement and enforce grazing utilization standards to attain good to excellent range conditions in "key areas" over time.
- Restore degraded riparian communities to good conditions by maintaining or promoting three age classes in woody vegetation. If the mid-age class is absent, 5% utilization or less is required to promote three structural stages. If all three classes are present, utilization of 20% or less on woody vegetation is acceptable.

Reduce animal concentrations and trampling of vegetation which may impact prey species forage and cover, follow the guidelines listed in Appendix B, Table B-6 for placing salt or mineral blocks.

Eliminate potentially disturbing activities, such as branding, gathering or construction activities, in Mexican spotted owl habitat or near peregrine nesting areas during their breeding season (between March 1 and August 31).

Coordinate grazing on the 13-Mile Rock Range Allotment with the Buckhorn Range Allotment and other allotments to the north, so that all allotments are grazing northern pastures during the same year, or southern pastures during the same year.

Aquatic Habitat and Species

This analysis of effects addresses the proposed management actions as they pertain to native fish habitat found within the Verde River and West Clear Creek. The native fishes (species of concern) are listed below according to the stream course within which each species is currently found, or for which historic habitat exists.

Table 7. Native Fish Species of Concern

Verde River	West Clear Creek
Colorado Squawfish	Gila Trout
Razorback Sucker	Spikedace
Loach Minnow	Roundtail Chub
Roundtail Chub	Speckled Dace
Desert Sucker	Desert Sucker
Sonora Sucker	Sonora Sucker
Longfin Dace	Longfin Dace

Alternative 1

In January, February (Winter pasture) and March (Heifer pasture), when livestock water from restricted areas of West Clear Creek, the timing and magnitude of streamflow is essentially dictated by snowmelt. Given that little to no effects occurs to the stream banks, there is no increase in stream width, decrease in stream depth, or reduction of shore depth. There would also be no change in water velocity or sediment transport capability of the water column. Any grazing that may occur during this time would be on dormant vegetation. More than likely, the woody vegetation would not be browsed (as verified during a March and July inspection; discussed in the fisheries assessment in the Project Record). Therefore, all woody vegetation would be available for production of shade producing foliage, providing the maximum protection from increased water temperatures through solar radiation. The isolated and minimal watering by a few livestock from the Winter Pasture, and the restricted use by the herd in the Heifer Pasture, would not impact a large enough area to alter the water column and channel morphology or change the sediment processing capability of the water column, substrate composition, and productivity of fish prey (macro invertebrates), or stream habitat complexity from its existing condition. However, livestock use of West Clear Creek is expected to produce an increase in fecal coliform bacteria to the water column.

Use of the water lanes in the Heifer pasture in June, by even a few head mother cows and their new born calves, could present a impact to the riparian vegetation that is now established within the water lanes. The newly established vegetation provides an added attractant of forage and thermal cover for livestock during June, and the mother cows and calves would likely stay in the small, vegetated portions of the water lanes, if allowed.

All effects to the Verde River from the livestock grazing operation would be indirect, so long as the cattle are confined within the Wingfield Mesa pasture fences. The indirect effects would stem from the potential for a change in runoff patterns and movement of soil into the river through erosion of disturbed sites. Given that the majority of the Wingfield Mesa soils (TES Mapping Units 382, 383) are in satisfactory condition and on flat terrain,

soil movement is expected to be minimal. The greatest threat of soil erosion is from the unsuited soil type (TES 350) bordering the Verde River. These soils erode naturally, but livestock disturbance would exacerbate the erosion, to what degree is not known.

Maintenance of all structural range improvements (pasture fences, earthen tanks, pipelines, wells, water storage tanks and exclosure fences) would aid in the distribution and management of the livestock, thereby providing a very positive effect for the protection and appropriate use of the riparian areas. Except for the water lane fencing in the Heifer Pasture, there would be no direct effects to riparian areas, or to the stream channels that provide fish habitat, from the maintenance of structural range improvements. Because the water lane fencing in the Heifer Pasture is placed out of the main channel, maintenance should occur at a time when water is not flowing through the water lanes. If water does flow through the water lanes at the time of maintenance, then resetting posts and moving around in the water may create a short duration disturbance to any fish that may be present at the time, and their habitat.

The scattering of a grass and forb seed mix on productive soils over the allotment would provide a positive effect on water quality through reduction of potential erosion of soil off site.

Alternative 2

Excluding cattle grazing from the allotment for a 10 year period is a favorable alternative for the riparian and aquatic resources. Although the riparian zone along West Clear Creek are in relatively stable conditions (as describe under Alternative 1), the absence of livestock would eliminate all possible chances for unauthorized grazing within those riparian/stream course areas which are outside the allowable access points. Similarly, this alternative would prevent the accidental use and setback of the riparian areas associated with the Verde River and Cottonwood Springs. Implementation of this alternative would eliminate the addition of fecal coliform bacteria to the aquatic systems from livestock associated with this allotment. However, humans using the riparian corridor for recreation and wildlife would continue to add fecal coliform bacteria to the aquatic system.

The “no livestock grazing” under Alternative 2 would eliminate soil compaction in livestock concentration areas, and possible soil disturbance on the steeper slopes, and allow plant litter to accumulate. Litter accumulations protect the soils by lessening the impacts of rain. This protection, coupled with elimination of soil disturbance and compaction from concentrated hoof action would help to improve infiltration of moisture into the soil, and lessen the potential for additional sediment flows into the stream courses. A reduction in soil movement into the stream courses would slow the infilling of the stream channel substrates, removing the potential for an indirect effect on macro invertebrate habitat.

All of the 1,000 acres proposed for browse burning under Alternative 2 is within the Winter pasture, and within a portion of the Black Mountain Canyon sub watershed to West Clear Creek. Much of the browse burn area occurs on the steep slopes of TES MU 430, which is rated as having a moderate to severe erosion hazard. However, both the Soils and

Watershed Specialist and Forest Soil Scientist assigned to this project state that the amount of rock on these sites would hold the soil in place during and after the burns. Therefore, the impact to soils, and to the watershed, from the proposed prescribed burning in the browse component is not a concern. Regrowth on the browse plants is expected to occur the following growing season.

Alternative 3

Effects to the riparian areas and fish habitat associated with West Clear Creek and the Verde River are the same as those stated for Alternative 1, with the one exception of the proposed division of the Winter pasture into two smaller pastures (Winter West and Winter East). In effect, this would shorten by half the amount of time cattle would use West Clear Creek as a water source. Use of the western end would be restricted to February, as opposed to January and February under Alternative 1. This action could pose a negative effect by concentrating the entire herd in a smaller area adjacent to West Clear Creek if more cattle discover, or need to use the water in West Clear Creek. Any increase in the livestock use at this area would likely increase trampling on streamside vegetation, and pollution of the stream with fecal coliform bacteria.

The fence construction proposed for the division of the Winter Pasture is more than 2 miles up drainage from West Clear Creek. This construction would be a low impact activity, and any ground disturbance would not be transported down drainage to fish habitat in West Clear Creek.

The grass and forb seeding and the cut, lop, and scatter of junipers would likely benefit the watershed conditions for the West Clear Creek and Fossil Creek watersheds. These treatments are expected to maintain or improve watershed conditions by reducing soil movement, increasing vegetative interception of rain, increasing soil moisture storage and reducing water runoff. Effects from the browse burning would be the same as those stated under Alternative 2.

Alternative 4

Overall, Alternative 4 provides the least amount of potential effects to the riparian area and fish habitat associated with West Clear Creek and the Verde River of the livestock grazing alternatives. The effects from the livestock grazing strategy are the same as that stated for Alternative 3. Maintaining the current fence alignment between the Heifer and Cactus pastures, as proposed under Alternative 4, would keep livestock use a good distance from the edge of West Clear Creek. This would eliminate the potential at this site for direct and indirect effects to the aquatic habitat in West Clear Creek.

Alternative 4 also provides for burning fewer acres of browse within the Winter Pasture than Alternatives 3 or 5. Eliminating the 300 acres from the burn proposed under Alternative 4 reduces the potential for effects from the transport and input of ash, sediment, and nutrients to the fish habitat in West Clear Creek. Approximately 700 acres of browse burning are proposed under this alternative, and the potential for transport of an undeterminable quantity

of ash, sediment and nutrients still exists, if the right moisture event following the burn.

Alternative 5

Except for the following discussion, the effects from the livestock grazing strategy, browse burning and grassland maintenance are the same as stated for Alternative 3. Using the four Wingfield Mesa pastures on a rest rotation system is expected to be beneficial, given the yearlong rest on one of the four mesa pastures each year. However, during those years when any of the Wingfield West, Northwest, or East pastures are rested, cattle could be concentrated for up to 35 days in the South pasture, which includes a large component of unsuited soils near the Verde River. If livestock use on the unsuited soils is greater than what is considered incidental use, the result could be increased erosion and sediment movement into the river.

From a riparian area/fish habitat health viewpoint, the tobosa "monoculture" on Wingfield Mesa is serving to prevent any potential soil movement into the stream channels of West Clear Creek and Verde River. Improving the diversity of the vegetative composition and controlling the encroaching woody vegetation with the burning proposed under Alternative 5 is not expected to change or improve the Mesa's watershed condition.

Realigning the fence at the east end of the Heifer pasture to include the south end of the Cactus pasture creates the potential for impacts to soils and vegetation in the newly expanded portion of the pasture, and for livestock trespass into nearby West Clear Creek. The concern about livestock trespass would probably occur only for as long as it takes the cattle to become used to the lack of water at this end of the pasture. A positive effect of realigning the Heifer/Cactus pasture fence is the inclusion of additional acreage within the Heifer Pasture and better distribution of the herd during the March graze period. With the improved distribution, overall indirect impacts may be reduced.

Grazing impacts to macro invertebrates

Macro invertebrates, including insects, crustaceans, mollusks and freshwater earthworms, are components of the aquatic environment that provide an essential food source for fish. Because of their strict habitat requirements, macro invertebrates are very useful as indicators of changes in aquatic habitat. Future macro invertebrate sampling, when compared with sampling data from 11 years ago, is expected to show improvements in aquatic habitat conditions resulting from changes in rangeland management over the past 10 years on both the 13-Mile Rock and Buckhorn allotments that border West Clear Creek. The proposed livestock grazing strategies for the next 10 years on the 13-Mile Rock allotment, as described under Alternatives 1, 3, 4 and 5, have the same level of direct effects to West Clear Creek. Direct use of West Clear Creek by livestock, at a limited amount of stream channel during winter months, poses little to no effect to macro invertebrate habitats. There would be no potential for impact from livestock under Alternative 2.

The greatest risk to macro invertebrate habitats is from the potential indirect effects of sedimentation and the addition of organic enrichment. However, risks from indirect effects

are considered to be very low, given the low probability of soil movement off the allotment and the filter strip that buffers the allotment from the stream channel.

Mitigation for aquatic habitats

If livestock are found grazing riparian/aquatic habitats outside of established graze periods and/or fenced boundaries, immediate corrective actions need to occur (permittee compliance monitoring). The permittee or Ranch Manager needs to spend a disproportionately higher amount of time tending to livestock when they graze adjacent to riparian areas than any other pasture on the allotment. If the Ranch cannot allocate the time needed to safe guard the riparian and aquatic ecosystems found in or adjacent the allotment, then the respective pasture(s) (Heifer, Winter, Wingfield Northwest, Wingfield West and Wingfield South) should not be grazed by livestock.

If, through the creation of a West Winter Pasture, cattle use of West Clear Creek causes an unacceptable amount of trampling or breakage on the riparian vegetation, or fouling of the water, management of the Winter Pasture would need to be reassessed (key area utilization monitoring).

Maintenance of stock ponds on the allotment should be done during the fall, winter, or early spring seasons to avoid impacts to Chiricahua leopard frog adults, tadpoles and eggs (terms and conditions of the grazing permit).

Recreation Use And Visual Quality

Continued livestock grazing on the allotment would not impact current or expected level of developed or dispersed recreation use, as long as the fences are well maintained and impacts to vegetation are within current levels. The proposed fence in the Winter pasture under Alternatives 3, 4 and 5 would not impact recreation use because the location is very remote and does not cross any heavily-use roads or trails. Recreation use is not expected to increase if livestock are removed from the allotment, as proposed under Alternative 2. Recreation use will continue to increase over time as the population of the Verde Valley and the Phoenix metropolitan area increases, whether livestock grazing use is continued or not continued.

The prescribed burning under Alternatives 2 , 3, 4 and 5 within the Winter and Tanque Aloma pastures is not expected to impact recreation use because the burning would occur in relatively remote areas, and during the hot summer months when recreation use is minimal. Some of the burn areas would be visible from SR 260, but the negative impacts would be short term with recovery expected within 1 year. The prescribed burning under Alternative 5 on Wingfield Mesa would be easy to see from SR 260 and the adjacent residents during, and for a short time after, the two burn periods. Full recovery of the vegetation and visual quality is expected within only a few months.

Projects to maintain the savannah-like grasslands in the mid elevation pastures, proposed under Alternatives 2, 3, 4 and 5, are expected to create both positive and negative short-term

impacts to recreation use and visual quality. The lop and scatter within the pinyon-juniper grassland areas would result in scattered, small tree skeletons across the treatment areas that would persist for several years. Eventually these trees would break down or be hidden from view by tall grasses. Visitor use in these areas is primarily during the fall and spring hunting seasons, so the concerns for visual quality impacts are minimal. The Christmas tree cutting proposed under Alternatives 4 and 5 would provide a traditional, family-oriented recreation opportunity for the public, while meeting resource needs for controlling encroaching woody vegetation. The scarify and seed treatments proposed under Alternatives 3, 4 and 5 would create an obvious disturbance to the area until the seeded vegetation becomes established. Once the vegetation is fully established, these areas would blend visually and ecologically with the surrounding area.

Cultural Resources

Site condition at any point in time is the result of a number of natural factors and a variety of environmental modifications brought about by human actions. Therefore, site condition is not fixed, but represents a stage along a continuum of change over time. This change can be thought of as a decay process of slow change from the original state. Site preservation represents an attempt to slow the decay processes. Such attempts cannot reverse or halt the decay curve, but may serve to slow or stop the process for a period of time for a particular force.

Livestock grazing has occurred in the Southwest since European contact, and has been a permitted activity on the Forest since its inception in 1906. In addition, wild ungulates ranged free, potentially in substantial numbers, throughout time. Effects to cultural resources occurred as a result of this situation and are considered *status quo*, or the existing situation.

The current and proposed livestock grazing strategy for the 13-Mile Rock Range Allotment (Alternatives 1, 3 and 4) continues the tight control on the times (season and length of time) animals are in the areas without increasing the number of animals permitted. Management of livestock under these alternatives would result in continuation of the *status quo* for cultural resource management. Under Alternative 2, no livestock grazing would occur and therefore the *status quo* would be continued for cultural resources. All alternative include other actions for watershed and vegetation management that could impact specific cultural resource sites. Mitigation measures are listed below to insure there is no effect to cultural resources from these actions.

Mitigation Measures

To insure the *status quo* is continued, management practices that tend to concentrate livestock (and most likely wild ungulates) such as salting, haying, construction of waters, etc., would be located away from known cultural resource sites. This mitigation requirement would be included in each year's Annual Operating Plan and would be a topic of discussion at the annual meeting with the permittee.

Ground disturbing activities, such as construction of range improvements, haying and seeding, lop and scatter of junipers, Christmas tree cutting and burning, require a separate archaeological survey and clearance report prior to implementation. These activities would be managed for no effect to cultural resources.

Social Concerns

Under Alternatives 1, 3, 4 and 5, the social contribution of this ranch and livestock grazing use would continue in the Verde Valley and Northern Arizona. Those who depend on ranching and those who believe ranching and livestock grazing are a valid use of public lands, these alternatives would continue the contribution of ranching to the rural sense of community and the life-style typical of this area. Under Alternative 2, livestock grazing use would be eliminated for the next 10 years, and with it would be eliminated the social contributions of this ranch to the community. Also, the Ranch manager and his family may be forced to leave the community in search of employment elsewhere if this ranch no longer exists. The day-workers would likely be able to find other part-time work in the community, and would not leave.

For those who disapprove of livestock grazing use on public lands, selection of Alternative 1, 3, 4, or 5 would likely be poorly received, even if the potential or actual impacts of livestock use are mitigated or are considered minor. For these people, only Alternative 2 addresses their economic, social, or environmental concerns.

Changes in how the livestock are managed on the allotment under Alternatives 3, 4 and 5 may not be noticeable to the general public. However, the various projects listed under Alternatives 2, 3, 4, and 5, such as lopping and scattering of junipers, Christmas tree cutting and particularly the prescribed burning, would be evident to the community and to those driving through the area while the projects are taking place. Forest Service personnel can explain and show how encroaching juniper, mesquite and cat-claw reduce wildlife habitat and forage in the grassland communities, and how and why ground cover vegetation protects soil and water quality. Making Christmas trees available under Alternatives 4 and 5 would meet a traditional need in the community, and while providing a cost-effective way to manage the grasslands. Public contacts during the project would also provide an excellent opportunity for the Forest Service to explain the need for grassland maintenance and general forest and wildland etiquette.

Economic Influences

Under Alternatives 1, 3, 4 and 5, livestock grazing use would continue on the allotment, with corresponding economic contributions to the community and the Counties (Table 5). The Ranch manager and occasional day-workers would continue to gain economically, as would businesses in the Verde Valley that cater to the ranch's needs and the needs of the families associated with the Ranch. Yavapai and Coconino Counties would also continue to gain economically, in the form of payments from the Federal government in lieu of taxes. Though the contribution is not large from this ranch alone, the amount is substantial when

combined with contributions associated with all the income-producing uses of Forest Service lands (livestock grazing, logging, firewood sales, campground fees, etc.) in the Counties.

Table 8 Direct and indirect jobs and payments in lieu of taxes generated by the 13-Mile Rock Range Allotment for each management alternative.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt. 5
Direct and indirect jobs*	6.3	0	6.3	6.3	6.3
Payments to counties (PILT)**	$1,650	0	$1,650	$1,650	$1,650

*1.14 jobs/100 head (R3 estimate; 1995)
**Payment in lieu of taxes; 25% of 1999 grazing fees ($1.35/HM)

Under Alternative 2, livestock would not use the allotment, and there would be a loss in the number of direct jobs and contributions to the Counties associated with this operation. A loss in the number of indirect jobs is also likely, but may not be as substantial as presented here, as long as other ranches and private individuals continue to support the businesses that supply the same needs.

Investment Analysis

Quantifiable factors, such as economic costs and outputs, and projected animal unit months (AUMs) and head months (HMs), were used to describe some of the economic effects of livestock grazing use on the 13-Mile Rock Range Allotment. A model called *Quick-Silver* was used to calculate the estimated economic costs and benefits of each alternative (USDA 1999d). The estimates are based on a variety of quantitative assumptions, including actual current values and full use of the permitted livestock numbers, which may change over time. Therefore, the projections presented in Table 6 below best serve as an indicator of change, rather than a precise measurement. A list of the values, units and investment periods used for the analysis is provided in Appendix D, Table D-1. A complete listing of the costs and benefit assumptions and a summary of the annual receipts and expenditures over the 10 year planning period are available in the Project Record.

Table 9 Analysis of the investments and quantifiable benefits of management alternatives proposed for the 13-Mile Rock Range Allotment for the 10 year planning period.*

Alternative	1	2	3	4	5
All Partners					
B/C Ratio	1.43	0.00	1.08	1.16	1.06
Present Net Value ($)	$187,500	-$ 72,726	$ 45,350	$ 85,167	$ 33,573
PV-Benefits ($)	$625,589	$ 0	$625,588	$627,088	$627,088
PV-Costs ($)	- $438,089	-$ 72,726	-$580,239	- $541,922	- $593,515
**Ranch ** **					
B/C Ratio	1.32	NA	1.29	1.29	1.28
Present Net Value ($)	$132,585	NA	$123,932	$123,932	$122,065
PV-Benefits ($)	$550,430	NA	$550,430	$550,430	$550,430
PV-Costs ($)	- $417,844	NA	- $426,498	-$426,498	-$428,365
USFS * **					
B/C Ratio	3.71	0.00	0.49	0.66	0.46
Present Net Value ($)	$ 54,914	-$ 72,726	- $ 78,581	-$ 38,765	- $ 88,491
PV-Benefits ($)	$ 75,159	$ 0	$ 75,159	$ 76,659	$ 76,659
PV-Costs ($)	- $ 20,245	-$ 72,726	-$153,741	- $115,424	-$165,150

*Discount Rate %: 4.0000

**The Ranch is required to share equally in the cost of structural improvements on the allotment.

***The Forest Service is required to share equally in the cost of the structural improvements on the allotment, and is required to fund, through allocated funds, cost share funds or grants, implementation of non-structural vegetation, soil and watershed and wildlife habitat improvements such as prescribed burning, lop and scatter and seeding.

Alternative 1

The greatest economic gains for the Forest Service and the Ranch for this 10 year planning period are realized under Alternative 1. Under this alternative, the only costs to the ranch are those associated with continuing to operate under the current management requirements, maintaining existing structures, and paying grazing fees. Likewise, the Forest Service costs are those associated with the current level of administration and monitoring required to allow livestock use on the allotment. The Forest Service receives benefits from the grazing fees paid by the permittee, and the Ranch received benefits from the value of the livestock grazed each year.

Alternative 2

The least economic gains are shown for Alternative 2, which does not allow for permitted livestock grazing use on the allotment for the next 10 years. Under this alternative, the

Forest Service no longer receives grazing fees from the allotment, but does incur costs from fence maintenance at Cottonwood Spring, along the Verde River and adjacent private lands at Verde Lakes, periodic monitoring, inspections and general administration, and fence removal in antelope habitat areas. There are also costs involved in proposed projects in browse and grassland areas to maintain or improve wildlife habitat and vegetation and watershed conditions.

There are no costs or benefits allocated to the Ranch because there is no livestock grazing permitted. However, there are hidden costs to adjacent ranchers who must assume responsibility for maintaining allotment boundary fences that were previously assigned to this allotment's permittee. The costs would be distributed to the Hackberry/Pivot Rock, Buckhorn and Fossil Creek allotment permittees.

Alternative 3

Alternative 3 is the Proposed Action and shows a positive PNV for all partners (Ranch and FS combined), but a negative value for the Forest Service alone. The combined value, though positive, is approximately one quarter the PNV shown for Alternative 1. The benefits received by the Forest Service are the same, but the costs are higher because of the proposed fence construction (Winter pasture), browse burning, and grassland maintenance in the pinyon-juniper/grassland areas. The costs to the Ranch are also higher because the Ranch must pay ½ the cost of constructing the fence in the Winter pasture.

Alternative 4

Under Alternative 4, the Present Net Value (PNV) is higher than under Alternative 3, but still substantially lower than under Alternative 1. The costs and benefits to the Ranch are the same as Alternative 3, but the benefits to the Forest Service are greater with the receipts from Christmas tree sales. The costs to the Forest Service are lower than under Alternative 3 because the acres of browse burning and grassland maintenance are reduced.

Alternative 5

Under Alternative 5, the PNV for all partners is the lowest of the four alternatives that allow livestock grazing. The benefits to the Ranch are the same under these alternatives, but the cost are slightly higher under Alternative 5 than Alternatives 3 and 4 because of the additional cost of relocating a short stretch of fence in the Heifer pasture. The economic benefits to the Forest Service under Alternative 5 are the same as those under Alternative 4. However, the costs to the Forest Service are higher due to full implementation of the browse burning and grassland maintenance in the pinyon-juniper/grasslands, and the added grassland burning proposed for Wingfield Mesa.

Environmental Justice and Americans with Disabilities Act (ADA)

The Forest Service looked at the social, economic**,** and environmental impacts of this project and determined that none of the alternatives considered in this analysis would have a disproportionate impact on any minority population in the immediate area, within the surrounding counties, or in the Northern Arizona region. In addition, there are no impacts to Americans with disabilities from implementation of the livestock grazing alternatives (Alternatives, 1, 3, 4 and 5) or from removing livestock grazing from the area for 10 years (Alternative 2).

CHAPTER 5 – MONITORING

This chapter describes the resource monitoring required to allow continued livestock grazing on the 13-Mile Rock Range Allotment, including monitoring of:

- trespass livestock from adjacent private lands and the adjacent Forest;
- permittee compliance with the terms and conditions of the 10 Year Term Grazing Permit;
- vegetation, soil, water, air and wildlife;
- cultural resources and;
- recreational uses and visual quality.

Monitoring is perhaps the most important part of any project implementation. This is where we learn if the job is getting done correctly, and it the desired and expected conditions are being reached. Monitoring is also an opportunity to learn from our mistakes and successes, and to make credible changes as needed in this and future projects. This use of monitoring, learning and making changes is called "adaptive management".

This monitoring plan is intended to provide a means to evaluate changes to the resource, based on implementation of the selected alternative. If the selected alternative is to continue livestock grazing use, then monitoring of permittee compliance and livestock management impacts would apply. If Alternative 2 (no livestock grazing for 10 years) is selected, then only limited monitoring would be needed to determine the rate of riparian recovery at Cottonwood Spring, and the impacts of wildlife use and of the watershed and vegetation improvement projects.

Permittee Compliance

The District Range Staff will monitor permittee compliance with the terms and conditions of the livestock grazing permit throughout the year. Compliance would be enforced, including livestock numbers, grazing scheme (time and location) forage utilization and maintenance of structural improvements.

Rangeland Vegetation

The Parker 3-Step Clusters sites will be read prior to the next NEPA process, scheduled for 2009, by the District Rand Staff or a rangeland monitoring crew. In addition, frequency plats will be set at the Parker 3-Step sites during the first year of this management plan, and read at least every 3 years thereafter.

Forest Plan Amendment 11 requirements

In compliance with Amendment 11 of the Coconino National Forest's Land Management

Plan, (LMP), forage utilization monitoring cages are installed on the 13 mile Rock Range Allotment (Appendix B, Table B-5). These forage monitoring cages are installed in representative "key area" locations on productive soils, 0 to 15% slopes, approximately 20 to 500 acres in size, and minimum of 0.25 to 1.0 miles away from livestock water sources. The cages are used to monitor forage utilization on designated "key species" in "key areas" during three crucial periods of the grazing season: immediately before livestock entry, immediately after the livestock graze and at the end of the forage growing season.

Because the Winter Pasture's riparian (MA 12) cage is immediately at the water's edge on West Clear Creek and is frequently subjected to washing away during normal spring run-off and/or summer monsoon rain flood event(s), the Forest Fisheries Biologist, District Range Staff and the grazing permittee will monitor this key area by inspection and survey of the riparian habitat annually immediately after livestock are removed from this pasture.

Allotment-wide utilization monitoring: grazed pastures

Other grazing utilization monitoring will be completed by the ranch personnel throughout the grazing periods, with some instruction and review from the District's Range Staff Officers. A Forage Utilization Monitoring Form (Appendix B, Table B-7) will be provided to the permittee in the AOP each year. The permittee is responsible for monitoring the forage utilization for each pasture used during the year, including actual livestock numbers, pasture graze periods, stage of plant growth, (fast, slow, dormant) and average utilization of all forage species by pasture before livestock entry, following livestock graze and end of growing season and average grazing utilization percentage within the pasture's "key area(s)". Under this intensive management system livestock grazing utilization must not exceed 40% average use (all ungulates) within each pasture at the end of the growing season, and must not exceed 40% in MSO protected habitat areas at any time during the grazing season. Livestock will be moved to the next pasture scheduled for grazing if the utilization approaches the 40% level.

If this monitoring shows a trend toward higher than acceptable forage utilization by either livestock or elk, the District will coordinate with the grazing permittee and/or the AG&FD to bring use within acceptable limits determined through this planning process.

Allotment-wide utilization monitoring: ungrazed pastures

In addition, rested pastures would be monitored each year by the District Range Staff Officer, or a range monitoring crew, at the end of the growing season to monitor range recovery in the absence of livestock. This monitoring would show if recovery is taking place and at what level, and would document elk utilization levels in the pastures not grazed by livestock. A simple pace transect would be used to monitor utilization, recovery, species composition and species preference.

Riparian areas

Most of the allotment's riparian and open water areas (West Clear Creek, Verde River, and

Cottonwood/Mesquite Springs) are fenced to control livestock grazing use and management. These very important and diverse areas will still be closely monitored during and after the grazing use period each year by the District Range Staff and the permittee to insure proper allowable use is met. Where livestock continue to have access to a very small area of West Clear Creek during the winter dormant period, a 20% or less utilization of woody species is acceptable if all three classes of riparian vegetation are present; only 5% use is allowed in riparian areas if the mid age class is absent. If no livestock grazing is permitted, as proposed under Alternative 2, riparian areas would be periodically monitored for vegetative conditions, impacts from wildlife and possible unauthorized or trespass livestock use.

Noxious weeds

The Ranch Manager will monitor for noxious weed occurrence during normal grazing operations each year, and will remove plants as prescribed by the Forest Service. All occurrences will be noted on a map and reported to the Forest Service. In addition, areas disturbed during prescribed burning, scarifying, and seeding, or lop and scattering projects will be monitored after project implementation (as per mitigation requirements) for the occurrence of noxious weeds.

Soil Condition And Water Quality

The District Range Staff will monitor the implementation of Best Management Practices during livestock grazing activities (permittee compliance, key area and forage utilization) and during prescribed burning activities. Notes will be taken to track any problems with implementation. The District Watershed Staff will provide assistance by providing clarification of specified Best Management Practices.

Monitor soil condition to assess changes in physical properties related to soil function. Soil condition monitoring would concentrate on such items as soil compaction, nutrient cycling, and soil erosion. Monitor changes in vegetation such as species diversity in the different vegetative layers (i.e. tree, shrub, forb and grasses (Parker 3-step, frequency plots, key area and forage utilization)). Primary responsibility is with the District Range Staff and the District Watershed Staff and if necessary, with assistance from the Forest Soil Scientist.

Information obtained from monitoring would be used to adjust Best Management Practices as needed to improve management of soil and water resources. The monitoring information and recommended changes in Best Management Practices would be made available to the Arizona Department of Environmental Quality. Primary responsibility is with the District Range Staff, District Watershed Staff, and Forest Soil Scientist. Direct water quality monitoring in the responsibility of the ADEQ.

Air Quality

All prescribed burning specified by all alternatives would be conducted by qualified prescribed burn personnel according to a site-specific burn plan. ADEQ would administer daily approval

of all ignitions according to regulation specified in the Forest and Range Management Burn Rules.

Wildlife

In all alternatives, implementation monitoring of the Allotment Management Plan and/or site specific projects for the selected alternative, and effectiveness monitoring for vegetation, soil condition and water quality would determine if wildlife habitat conditions are improving and meeting objectives (Key area and forage utilization, Parker 3-step, frequency plots). Monitoring for specific T&E species would continue to be conducted by the Forest Service and AG&FD throughout the 10-year planning period.

Aquatic

In accordance with LMP requirements, macro invertebrate monitoring will occur on a 5-year interval at sites selected within Toms Creek, Clover Creek, West Clear Creek and possibly Cottonwood Springs, but is not a condition for implementation of this project. If at all possible, monitoring sites will include those sampled in 1987 in West Clear Creek and Clover Creek, and 1991 in West Clear Creek. Additional sites would be located by the Forest Fisheries Biologist within the identified stream courses. Site selection would attempt to capture a representative sampling of stream habitat conditions found in the various reaches of the stream courses named above. Sampling method will follow the protocol described in Chapter 5 (Aquatic macro invertebrate Surveys) of the Intermountain Region's Fisheries Habitat Surveys Handbook (R-4 FSH 2609.23). Samples will either be collected by the Forest Fisheries Biologist, or by a field crew under the supervision of the Forest Fisheries Biologist. A baseline sampling will occur during the field season of the year 2000. Subsequent monitoring of the selected sites will occur in the year 2005 at the same time of year as those collected in 2000. Cost of sampling eight sites is estimated at $3,280.00 (high end estimate) for the year samples are taken.

The Arizona Game and Fish Department will continue to conduct the monitoring on the fisheries resources within West Clear Creek. Fish sampling may be expanded to Toms Creek and Clover Creek.

Riparian vegetation monitoring will be conducted through the annual riparian area (key area) monitoring done by the District Range Conservationist, Forest Fisheries Biologist, and grazing permittee. Because the riparian condition is largely controlled by major flood events, and not a direct impact of livestock grazing, monitoring of the riparian condition would not be a requirement of the allotment analysis/allotment management plan. The references to major flood events are those similar to the February 1993 flood created by heavy rains on a good snow pack. The best of watershed conditions will not prevent, or lessen the flow experience by West Clear Creek in 1993.

Recreation Use And Visual Quality

The District Recreation Staff and the Campground Hosts will coordinate with the District Range Staff Officer to report any livestock trespass into Clear Creek Campground and/or day use area. The District Range Staff Officer will respond immediately and appropriately. Any reported instances of conflicts between dispersed recreation activities and livestock use, including fence vandalism, gates left open or livestock in camping areas, will be documented and responded to appropriately.

The District Range Staff Officer and District Fire Management personnel will monitor public response to prescribed burning activities and impacts to visual quality, including short and long-term impacts. Refer to the mitigation actions for prescribed burning in Chapter 4.

Cultural Resources

Four prehistoric sites, representing multi-roomed pueblos, ephemeral Yavapai and or Apache sites and caveates, will be periodically monitored to detect any changes in impacts by livestock. The archaeologists for the Beaver Creek and Long Valley Ranger Districts will establish sample plots on these selected sites, and will collect baseline information including mapping, photographing the sites and recording detailed information on an Archaeological Site Condition Evaluation Form (Thorne et al. 1987), or equivalent. The Forest will then assess the long-term effectiveness of the approved grazing strategy on maintaining the *status quo* for cultural resource. In addition, any sites within intensively grazed pastures will be periodically monitored by the District Archaeologist throughout the life of the grazing permit to document individual site condition.

CHAPTER 6 – LIST OF PREPARERS

Name, Title/Specialty	Office Location
Janie Agyagos, Wildlife Biologist	Beaver Creek/Sedona RD, Sedona, AZ
Elizabeth Blake, NEPA Specialist	Blue Ridge/Long Valley RD, Happy Jack, AZ
Richard Boston, Archeologist	Beaver Creek/Sedona RD, Sedona, AZ
Jerry Bradley, Zone Range Conservation Staff	Beaver Creek/Long Vly RD, Beaver Creek, AZ
Eric DeWitt, Ranch Manager	13-Mile Rock Range Allot., Camp Verde, AZ
Richard Fleishman, Watershed Ecologist	Blue Ridge/Long Valley RD, Happy Jack, AZ
Elizabeth Humphrey, Wildlife Biologist	Blue Ridge/Long Valley RD, Happy Jack, AZ
David Lutz, Noxious Weed Specialist	Supervisor's Office, Flagstaff, AZ
Debbie Noel, Habitat Management Specialist	Arizona Game & Fish Department, Reg. II
George Robertson, Forest Soil Scientist (previous)	Supervisor's Office, Flagstaff, AZ
Wm. Stafford, Recreation Staff	Beaver Creek/Sedona RD, Beaver Creek, AZ
Debbie Steen, Recreation Staff (previous)	Beaver Creek RD, Beaver Creek, AZ
Donald Ward, Soils and Watershed Specialist	Beaver Creek/Sedona RD, Sedona, AZ
Mark Whitney, Forest Fisheries Biologist	Supervisor's Office, Flagstaff, AZ

CHAPTER 7 – LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONSULTED AND/OR PROVIDED COPIES OF THIS ENVIRONMENTAL ASSESSMENT

The Forest Service consulted with the following agencies and tribes during the planning process for concurrence on proposal and impacts of implementation:

- Arizona Game & Fish Department, Region II, Flagstaff, AZ
- US Fish and Wildlife Service, Ecological Services, Phoenix, AZ
- State Historic Preservation Office, Phoenix, AZ
- Hopi Tribe
- Yavapai-Apache Nation
- Yavapai-Prescott Tribe
- Coconino National Forest, Planning

The mailing list for this project included 87 individuals, organizations and cooperating agencies interested in the rangeland management of the 13-Mile Rock Range Allotment area. The responses to the proposed action, summary of those responses and disposition by the Planning Team are available in the Project Record.

Comments received from the public during the 30-Day Public Comment Period would be included in an Appendix to the final EA, and will be used by the Deciding Official as important input to the planning process.

REFERENCES

Arizona Department of Environmental Quality (ADEQ). 1996. Notice of Final Rulemaking. Title 18, Chapter 2, Article 15. Forest and Range Management Burns. Phoenix, AZ. 1998. Draft Arizona Water Quality Assessment 1998. Phoenix, AZ.

Congressional Sportsmen's Foundation. 1998. Funds generated by sportsmen for state fish and wildlife conservation. Prepared for CSF by Southwick Associates.

Dickson, J.G. (ed). 1992. The Wild Turkey - Biology and Management. A National Wild Turkey Federation Book. Stackpole Books. Harrisburg, PA. 463 p.

Dorum, D.B., K.L. Young, and T.B. Johnson. 1996. Fish survey results of selected streams with the Gila, Verde, and Little Colorado River Basins. Technical Report. Nongame and Endangered Wildlife Program. Arizona Game and Fish Department, Phoenix, AZ.

Envirotech. 1993. Aquatic and fisheries resource assessment of the West Clear Creek ecosystem. Unpubl. rpt. for the Coconino National Forest. 161pp.

Fish, Paul R. and Suzanne K. Fish. 1977. Verde Valley Archaeology: Review & Prospective. Museum of Northern Arizona Research Paper 8, Anthropology Research Report 8. Flagstaff, AZ.

Girmendonk, A.L. and K.L. Young. 1997. Status review of the roundtail chub (*Gila robusta*) in the Verde River Basin. Technical Report 114. Nongame and Endangered Wildlife Program. Arizona Game and Fish Department, Phoenix, AZ. 95pp.

Guthery, F.S., C.A. DeYoung, F.C. Bryant, and D.L. Drawe. 1990. Using short duration grazing to accomplish wildlife habitat objectives. Proc. of the 43rd Annual Meeting of the Society for Range Management. Can Livestock be Used as a Tool to Enhance Wildlife Habitat? USDA Forest Service, General Technical Report RM-194. September 1990. pp. 7-24.

Kubacki, M.F. 1998. Statewide fisheries investigation survey of aquatic resources. Middle Verde River Management Report. Unpubl. rpt. by the Arizona Game & Fish Department. Federal Aid Project F-7-M-40. 11pp.

Liles, T.A. 1995. Movement and spatial inter-action of stocked rainbow trout with native fishes in the Verde River. Unpbl. rpt. by the Arizona Game & Fish Department, Region III. Heritage IIPAM Project No. I93056. 9pp.

Miller, Wm. H. and John Brock. (unpublished) Factors influencing elk-cattle interaction in central Arizona. Arizona State University. Tempe, AZ. 1995. Final report on elk and livestock grazing interactions on the Long Valley Ranger District, Coconino National Forest. Arizona State University and USDA Forest Service.

Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix. 293pp.

_____, W.L. 1993. A review of fishes of the Coconino National Forest region, Arizona. Final report submitted to the Coconino National Forest, Flagstaff, Arizona. 43pp.

Pilles, Peter J. Jr. 1981. The Southern Sinagua. Plateau 53(1): 6-17.

Schmidt, J.L. and D.L. Gilbert. 1978. Big Game of North America, Ecology and Management. Wildlife Management Institute. Stackpole Books. Harrisburg, PA. 494 p.

Schuhardt, S. 1989a. Stream surveys 1987 - 1988. Unpbl. rpt. by Arizona Game & Fish Department (Region II) and the Coconino National Forest. 71pp.

Schuhardt, S. 1989b. Stream surveys 1989. Unpbl. rpt. by Arizona Game & Fish Department (Region II) and the Coconino National Forest. 41pp.

Sullivan, M.E. and M.E. Richardson. 1993. Functions and values of the Verde River riparian ecosystem and an assessment of adverse impacts to these resources. U.S. Fish and Wildlife Service. 364pp.

Thorne, Robert M, Patricia M. Fay and James J. Hester. 1987. Archaeological Site Preservation Techniques: A Preliminary Review. Technical Report EL-87-3. US Army Engineering Waterways Experiment Station. Vicksburg, MS.

USDA, Forest Service. 1985. Fisheries habitat surveys handbook - Chapter 5 (Aquatic macro invertebrate Surveys). USDA Forest Service Intermountain Region Handbook (R-4 FSH 2609.23) pp 5.12-1 - 5.16-3.

_____ 1987a. Thirteen-Mile Rock, Wingfield Mesa, and Tule-Toms Creek Allotment Management Plan, Beaver Creek and Long Valley Ranger Districts. Coconino National Forest, AZ.

_____. 1987b. Coconino National Forest Land and Resource Management Plan. Coconino National Forest. Flagstaff, AZ.

_____. 1987c. Aquatic ecosystem inventory - macroinvertebrate analysis - annual progress report. Unpublished report, submitted to the Coconino National Forest. 31pp.

_____. 1988. Range Analysis and Management Handbook. R-3, Forest Service Handbook 2209.21. Amendment 14. April 1988.

_____. 1991a. Coconino National Forest Terrestrial Ecosystem Survey (TES). Flagstaff, AZ

_____. 1991b. Aquatic ecosystem inventory - macroinvertebrate analysis - annual progress report. Unpbl. rpt. submitted to the Coconino National Forest. 47pp.

_____. 1991c. Memoradum of Understanding between Arizona Game and Fish Commission, State of Arizona and United States Forest Service, Department of Agriculture. Forest Service Mannual, 2610 Part I; R-3 Supplement 2600-91-1.

_____. 1998a. Assessment of Ongoing Grazing Activities, Coconino National Forest, 13-Mile Rock Range Allotment. March 1998. Flagstaff, AZ.

_____. 1998b. Annual Operating Plan: 13-Mile Rock Range Allotment, Coconino National Forest, Beaver Creek and Long Valley RDs, AZ.

_____.1998c. Mitigation for the Mexican spotted Owl and Peregrine Falcon On Grazing Allotments for Annual Operating Plans. Coconino National Forest, AZ.

_____. 1998d. Noxious Weeds Strategic Plan, Working Guidelines: Coconino, Kaibab and Prescott National Forests, AZ.

_____. 1999a. Decision Memo. Fisheries Fencing Along Lower West Clear Creek, 13-Mile Rock Range Allotment Area, Beaver Creek Ranger District, Coconino National Forest, Yavapai County, AZ. January 1999.

_____. 1999b. Annual Operating Plan: 13-Mile Rock Range Allotment, Coconino National Forest, Beaver Creek and Long Valley RDs, AZ.

_____. 1999c. In Draft. Environmental Assessment for the GoodEnough/Tule 20K Analysis Area. Long Valley Ranger District, Coconino National Forest, Coconino County, AZ.

_____. 1999d. Quick-Silver. USDA, Forest Service. North Central Research Station, East Lansing, MI.

USDI, Bureau of Land Management. 1998. Riparian area management - process for assessing proper functioning condition. Technical Reference 1737-9. 51pp.

USDI, Bureau of Land Management and USDA, Forest Service. 1994. Rangeland Reform ‘94. Draft Environmental Impact Statement.

USDI, Fish and Wildlife Service. 1984. Endangered and threatened wildlife and plants; proposed determination of experimental population status for certain introduced population of Colorado squawfish and woundfin. Federal Registration 49:14149-14152.

GLOSSARY

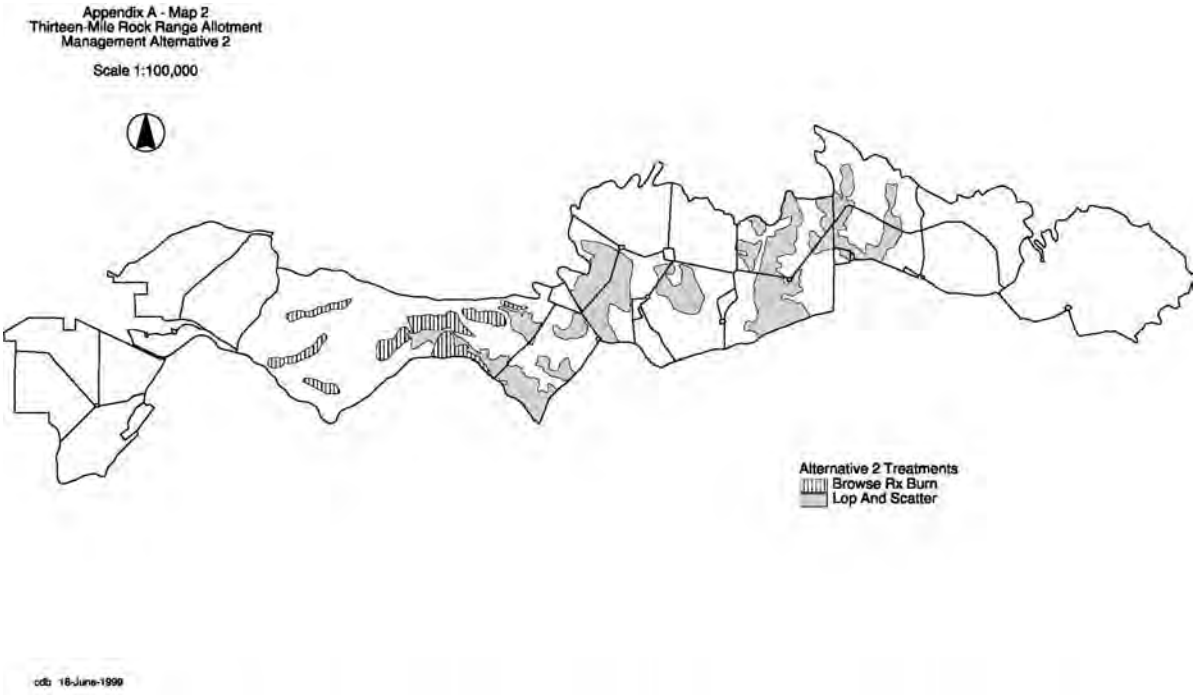
Animal Unit Month (AUM)
The quantity of forage required by one mature cow and calf, (1,000 lbs animal), or the equivalent, for one month.
Benefit/Cost
The total discounted benefits of an activity divided by the total discounted costs.
Head Month (HM)
The equivalent of one animal (or cow and calf) for one month; used to calculate grazing fees.
Management Intensity Levels (Grazing)
Level A: Livestock grazing is eliminated or restricted to situations where it would meet other resource objectives, such as fuel hazard reduction in recreation areas. Areas managed under Level A are not counted in determining livestock forage capacities.
Level C: Livestock grazing is controlled through structure improvements and by physical moving of livestock. Long-term capabilities are balances with use by adjusting numbers of livestock. Any forage improvement is generally the result of meeting other resource management objectives, such as wildlife habitat improvements.
Level D: Areas under Level D management are managed intensity for livestock grazing within an overall multiple-use concept. Any structural or nonstructural (forage) improvement technique may be used as long as it fits with the natural environment. Reasonable and approved management techniques are applied to sustain capacity and use at high levels.
Present Net Value
"The difference between the discounted values (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area." (36 CFR 219.3)
Range Capacity Levels
No Capacity: Lands those are incapable of being grazed by domestic livestock under reasonable management goals. Examples include areas under natural conditions that are not capable of producing vegetation, soils that are not capable of producing more vegetation than is needed to prevent excessive erosion rates, and slopes over 45 percent.
Potential Capacity: Lands not undergoing accelerated erosion, but requiring access, water developments, or other improvements to bring them up to full capacity.
Full Capacity: Lands that are presently stable because effective ground cover is holding soil loss to an acceptable level and are, therefore, suited for grazing and can support a livestock operation.
Rangeland
Land which supports vegetation and soil suitable for livestock grazing use. Vegetation is routinely managed through manipulation of grazing rather than cultural practices.
Soil Condition Categories
Ecological land units are assigned a soil condition category indicating the status of the soil function. These categories indicate soil function disturbances both natural and human influenced. Planned management activities provide opportunities necessary for sustaining soil productivity. TES categories of soil function are: **Satisfactory**, **Unsatisfactory** and **Unsuited**.

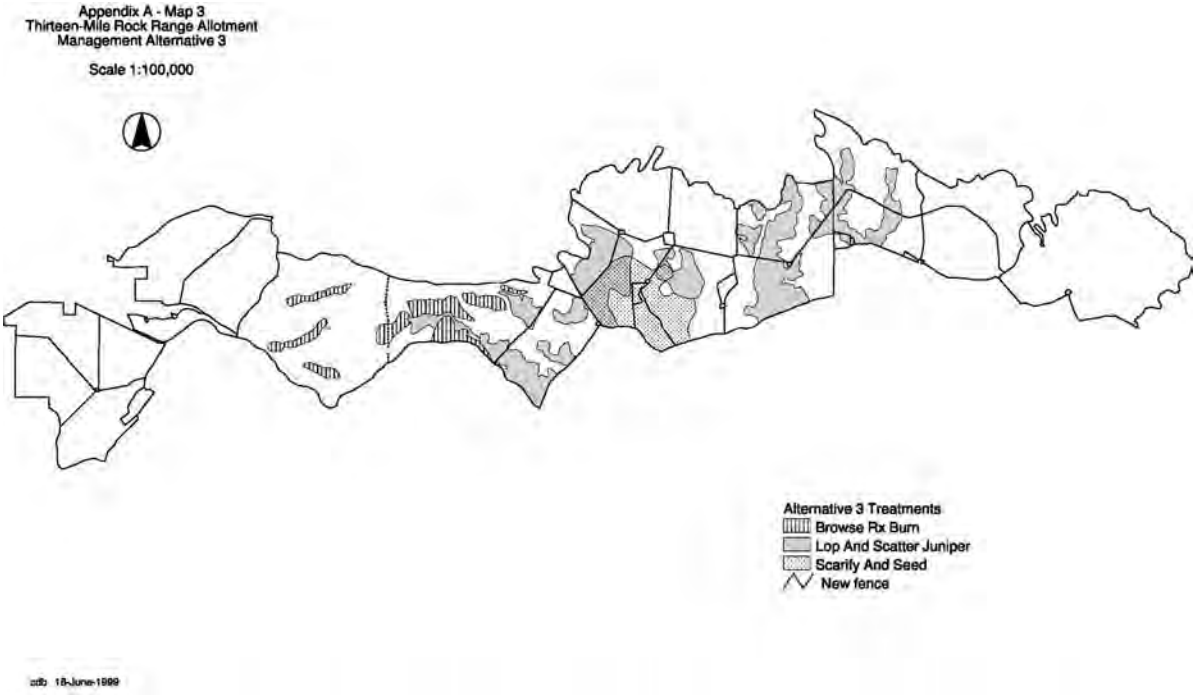
Satisfactory - indicates that soil function is being sustained and the soil is functioning properly.
Unsatisfactory - indicates that a loss of soil function has occurred and the result is its inability to maintain resource values, sustain outputs and recover from impacts. Soils in this category are recovered by improved management practices or restoration designed to recover soil function.
Unsuited - indicates that the natural soil function is incapable of maintaining resource values, sustain outputs and recover from impacts. Soils in this category severely limit most management activities.

APPENDICES

- Appendix A - Vicinity Maps and Alternatives
- Appendix B - Tables
  - Table B-1 Pasture Use Pattern For 1997-1999
  - Table B-2 Parker 3-Step Range Cluster Potential Natural Community Comparisons
  - Table B-3 Permitted Livestock Numbers From 1976-1999
  - Table B-4 Production Estimates and Calculated Livestock Forage Use
  - Table B-5 Noxious Weed Species Surveyed During 1999
  - Table B-6 Mitigation For Salting and Mineral Supplements
  - Table B-7 Location of Forage Utilization Monitoring Cages
  - Table B-8 Livestock Forage Utilization Monitoring Form
- Appendix C - Wildlife, Fish and Plants
- Appendix D - Public Comments During 30-Day Comment Period

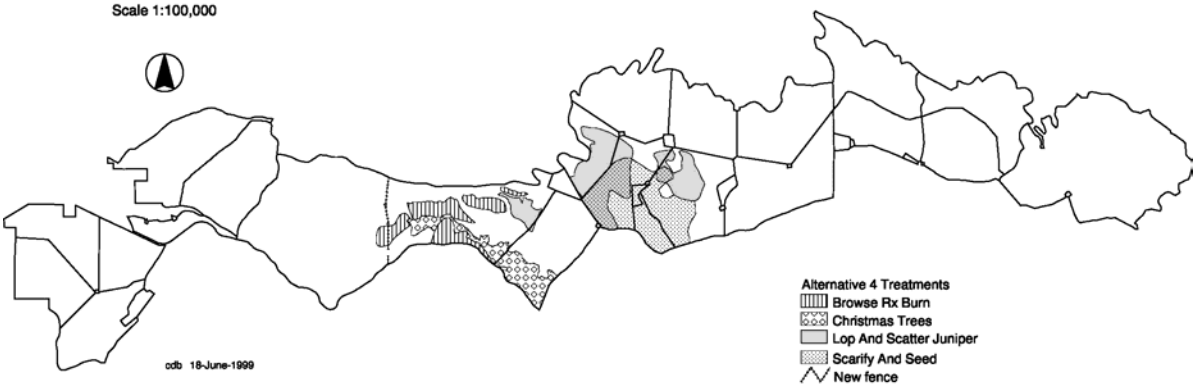
APPENDIX A – Vicinity Maps and Alternatives





Appendix A - Map 4
Thirteen-Mile Rock Range Allotment
Management Alternative 4

Scale 1:100,000



Appendix A - Map 5
Thirteen-Mile Rock Range Allotment
Management Alternative 5

Scale 1:100,000

APPENDIX B – Tables

Table B-1. Pasture use pattern for 1997-1999 on the 13-Mile Rock Range Allotment.

Pasture	Acres	1997 Graze Da	1998 Graze Dates	1999 Graze Dates
Winter (14)	7,218	12/15/96-2/28/97	1/1-2/28	1/1-3/10
Heifer (23)	497	3/1-3/20	3/1-3/20	3/11-3/30
Wingfield East (20)	886	3/21-4/10	3/21-4/10	4/1-4/10
Wingfield NW (19)	1,175	4/11-4/30	4/11-4/30	5/7-6/2
Wingfield West (21)	1,152	5/1-5/20	5/1-5/20	4/22-5/6
Wingfield South (22)	1,150	5/21-6/10	5/21-6/10	6/3-6/13
Wingfield East (19)	886	Rest	6/11-6/15	6/14-6/24
Heifer (23)	497	6/11-6/15	6/16-6/21	6/25-6/30
Winter (14)	7,218	Rest	6/22-6/27	7/1-7/10
Tanque Loma (15)	1,649	6/16-6/21	6/28-7/2	7/11-7/26
Mav. Basin West (13)	819	Rest	7/3-7/8	Rest
Mav. Basin North (11)	1,587	Rest	7/9-7/13	Rest
Mav. Basin South (12)	1,204	6/22-7/1	Rest	7/27-8/15
Tin Can North (09)	1,279	Rest	7/14-7/19	Rest
Tin Can South (10)	1,747	7/2-7/11	Rest	8/16-8/30
Meadow Canyon N. (07)	1,556	Rest	7/20-7/31	Rest
Meadow Canyon S. (08)	1,912	7/12/722	Rest	9/1-9/20
Tule North (05)	1,673	Rest	8/1-8/10	Rest
Tule South (06)	1,067	7/23-8/1	Rest	9/21-9/30
Wilbur North (03)	1,755	Rest	8/11-8-20	Rest
Wilbur South (04)	1,043	8/2-8/10	Rest	10/1-10/15
Toms (01)	4,074	8/11-9/10	8/21-9/10	Rest
Wilbur North (03)	1,755	Rest	9/11-9/26	Rest
Wilbur South (04)	1,043	9/11-9/20	Rest	10/16-10/21
Tule North (05)	1,673	Rest	9/27-10/11	Rest
Tule South (06)	1,067	9/21-10/10	Rest	10/22-11/05

Pasture	Acres	1997 Graze Da	1998 Graze Dates	1999 Graze Dates
Meadow Canyon N. (07)	1,556	Rest	10/12-10/26	Rest
Meadow Canyon S. (08)	1,912	10/11-10/30	Rest	11/6-11/20
Tin Can North (05)	1,279	Rest	10/27-11/10	Rest
Tin Can South (06)	1,747	10/31-11/19	Rest	10/21-11/20
Mav. Basin N&W(11,13)	2,416	Rest	11/11-11/30	Rest
Mav. Basin South (12)	1,204	11/20-12/10	Rest	11/21-12/10
Tanque Loma (15)	1,649	12/11-12/31	12/1-12/31	12/11-12/31
Winter (14)	7,218	1/1-2/28	1/1-2/28	1/1-2/28
Bobs (18)	1,823	Rest	Rest	Rest
Cactus (17)	1,794	Rest	Rest	Rest
Headquarters (24)	57			
Holding1 (24)	327			
Salmon Holding (25)	87			

Table B-2. Parker 3-Step Range Cluster and Potential Natural Community comparisons for the 13-Mile Rock Range Allotment.

Toms/Tule

	1962		1969		1980		1999	
Cluster #	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil
C 1	VP↓	P→	P↑	G→	P↓	P→	P→	P→
C 2	VP↓	F→	P↑	G→	P↑	F→	P→	F→
C 3	P↓	F→	P↑	E→	P→	F→	P→	F→

Range Condition rating: VP=very poor; P=poor; F=fair; G=good; E=excellent.
Arrows indicate direction of trend.

TES/Parker comparison

TES Soils 520 Cluster 1

	TES		Parker Data		
	Natural (%)	Tolerable(%)			Current(%)
Rk-Frg	45	30	B-soil	15	30
Litter	55	20			
Veg BA	10	20			
Veg. Ground Cover	65%	10%			40%

Current ground cover is 62% of natural potential and 4 times tolerable ground cover.
Species composition is less than natural potential and seral stage is mid-seral.

TES Soils 578 Cluster 2

	TES	Parker Data

	Natural (%)	Tolerable (%)	Current (%)
Rk-Frg	30		4
B-soil	5		24
Litter	70		44
Veg BA	10		28
Veg. Ground Cover	80%	25%	76%

Current ground cover is 90% of natural potential and 2.9 times tolerable ground cover.
Species composition is less than natural potential and seral stage is mid-seral.

TES Soils 492 Cluster 3

	TES		Parker Data
	Natural (%)	Tolerable (%)	Current (%)
Rk- frg	40		18
B-soil	35		26
Litter	10		17
Veg BA	15		40
Veg. Ground Cover	25%	10%	57%

Current ground cover is 2.28 times natural potential and 5.7 times tolerable ground cover.
Species composition is less than natural potential and seral stage is early to mid-seral.

13-Mile Rocl

	1954		1958		1965		1980		1998		1999	
Cluster #	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil
C 4	----	----	F →	F→	F→	F→	----	----	----	----	F→	G→
C 5	----	----	VP↓	VP↓	P↑	P↑	----	----	P→	F→		
C 6	P↓	F→	P↑	G↑	----	----	G↑	F→	----	----	P→	G→
C 7	P↓	F→	P→	F↑	----	----	G↑	G↑	----	----	F→	G→
C 8	P↓	F↓	P↑	F↑	----	----	F↑	F→	----	----	P→	F→
C 9	P↓	P↓	P→	P→	----	----	P→	F→	----	----	VP↓	P↓
C 10	P↓	F↓	P↑	F↑	----	----	P→	F↓	----	----	P→	F→
C 11	P↓	P↓	P→	P↑	----	----	F↑	P↑	----	----	P→	G→
C 12	P↓	P↓	P↑	F↑	----	----	F→	F→	----	----	F→	F→
C 13											P→	F→

Range Condition rating: VP=very poor; P=poor; F=fair; G=good; E=excellent.
Arrows indicate direction of trend.

TES/Parker comparison

TES Soils 492 Clusters 8, 9, 10, 11

	TES		Parker Data - Current (%)				
	Natural (%)	Tolerable (%)	C8	C9	C10	C11	Avg
Rk-frg	40		3	27	17	22	17
B-soil	35		52	37	37	28	38
Litter	10		6	5	7	17	9

Veg BA	15		39	30	40	23	33
Veg. Ground Cover	25%	10%	45%	35%	47%	40%	42%

Current ground cover is 1.7 times natural potential and 4.2 times tolerable ground cover.
Species composition is less than natural potential and seral stage is mid-seral.

TES Soils 383 Cluster 4

	TES		Parker data
	Natural (%)	Tolerable (%)	Current (%)
Rk-frg	40		5
B-soil	35		46
Litter	10		38
Veg BA	20		11
Veg. Ground Cover	30%	5%	49%

Current ground cover is 1.6 times natural potential and 10 times tolerable ground cover.
Species composition is less than natural potential and seral stage is late seral

TES Soils 430 Cluster 13

	TES		Parker data
	Natural (%)	Tolerable (%)	Current (%)
Rk- Frg	60		50
B-soil	25		17
Litter	10		15
Veg BA	10		18
Veg. Ground Cover	20%	20%	33%

Current ground cover is 1.65 times natural potential and 1.65 times tolerable ground cover.
Species composition is less than natural potential and seral stage is mid to late seral.

TES Soils 462 Cluster 6

	TES		Parker data
	Natural (%)	Tolerable (%)	Current (%)
Rk-frg	55		24
B-soil	20		28
Litter	15		2
Veg BA	10		46
Veg. Ground Cover	25%	10%	48%

Current ground cover is 1.9 times natural potential and 4.8 times tolerable ground cover.
Species composition is less than natural potential and the seral stage is early seral due to recent PJ grassland maintenance treatments.

13-Mile Rock continued:

TES Soils 520 Cluster 12

	TES		Parker data
	Natural (%)	Tolerable (%)	Current (%)
Rk-frg	55		22
B-soil	15		31
Litter	50		40
Veg BA	10		7
Veg. Ground Cover	60%	20%	47%

Current ground cover is 80% of natural potential and 2.4 times tolerable ground cover. Species composition is less than natural potential and the seral stage is early to mid-seral.

Wingfield Mesa

	1953		1958		1965		1980		1998		1999	
Cluster #	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil	Veg.	Soil
C 1	----	----	F↑	G↑	F→	G→	----	----	P→	F→	----	----
C 2	----	----	----	----	F↑	G↑	----	----	F↓	F↓	----	----
C 3	----	----	P→	P→	P→	P→	----	----	P→	F→	----	----
C 4	P↑	P↓	P↓	P→	F↑	F→	P↓	F→	P→	F→	----	----
C 6	----	----	----	----	P→	P→			----	----	P→	F→

Range Condition rating: VP=very poor; P=poor; F=fair; G=good; E=excellent. Arrows indicate direction of trend.

TES/Parker comparison

TES Soils 382 Clusters 1, 2, 5, 6

	TES		Parker data - Current (%)				
	Natural (%)	Tolerable (%)	C1	C2	C5	C6	Avg.
Rk-frg	20		6	5	22	52	21
B-soil	55		44	52	49	53	48
Litter	10		43	35	20	56	30
Veg BA	20		11	17	9	9	9
Veg. Ground Cover		30%	5%			54%	42%
	29%	65%	39%				

Current average ground cover is 1.4 times natural potential and 8.4 times tolerable ground cover. Species composition is less than natural potential and seral stage is late seral.

TES Soils 383 Clusters 3, 4

	TES		Parker data - Current (%)		
	Natural (%)	Tolerable (%)	C3	C4	Avg.
Rk-frg	35		9	11	10
B-soil	40		61	38	50

Litter	10		22	24	23
Veg BA	20		8	27	18
Veg. Ground Cover	30%	5%	30%	51%	41%

Current average ground cover is 1.36 times natural potential and 8.2 times tolerable ground cover.
Species composition is less than natural potential and seral stage is late seral.

Table B-3. Permitted livestock numbers from 1976 to 1999 on the 13-Mile Rock Range Allotment.

Year(S)	Permitted Numbers	Allotment Name	Permitted Season Of Use
1976-1980	310	13 Mile Rock	1/1-12/31
1981-1982	310	13 Mile Rock	1/1-12/31
	125	Wingfield Mesa	1/1-5/31
	125	Wingfield Mesa	11/1-12/31
	140	Tule/Toms	6/1-10/31
	(425 - 450)		
1983-1987	310	13 Mile Rock	3/1-2/28
	125	Wingfield Mesa	1/1-5/31
	125	Wingfield Mesa	11/1-12/31
	140	Tule/Toms	6/1-10/31
	(425 - 450)		
1988	310	13 Mile Rock	3/1-2/28
	140	Wingfield/Tule/Toms	6/1-10/31
	50	13 Mile Rock/Wingfield and Tule/Toms	3/1-2/28
	(500)		
1989-1990	310	13 Mile Rock	3/1-2/28
	140	Wingfield/Tule/Toms	6/1-10/31
	100	13 Mile Rock/Wingfield and Tule/Toms	3/1-2/28
	(550)		
1991-1999	550	13 Mile Rock (Includes Wingfield and Tule/Toms).	3/1-2/28
	(550)		

Complied by Bradley and Blake February 1999.

Table B-4. Production estimates and calculated livestock forage use for the 13-Mile Rock Range Allotment, using *estimated* forage production from the Terrestrial Ecosystem Survey (TES) and current field surveys and observation.

Pasture Name	Ave. Number days	x 20lbs/day	x 550 head	Available forage	Remaining forage	Percent livestock use
Northern tier of pastures						
Toms/GE	20	400	220,000	1,195,762	975,762	18%
Wilber N↑	10	200	110,000	412,130	302,130	27%
Wilber N↓	15	300	165,000		137,130	40% *
Tule N↑	10	200	110,000	863,025	753,025	13%
Tule N↓	15	300	165,000		558,025	19% *
Meadow↓	12	240	132,000	1,214,150	1,082,150	11%
Meadow↓	15	300	165,000		917,150	14%
TinCanN↑	15	300	165,000	971,780	806,780	17%
TinCanN↓	15	300	165,000		641,780	17%
Mav.B.N↑	5	100	55,000	610,025	555,025	9%
Mav.B.N↓	15	300	165,000	1,209,030	1,044,030	14%
Mav.NW↓	20	400	220,000	1,559,055	1,379,055	14%
Tanque Aloma↑	5	100	55,000	1,234,580	1,179,580	5%
Tanque Aloma↓	30	600	330,000		849,580	30%
Winter↑	5	100	55,000	1,582,515	1,527,415	4%
Winter↓	60	1,200	660,000		75,750	42% *
Heifer↑	5	100	55,000	408,915	353,915	13%
Heifer↓	20	400	220,000		133,915	54%
WingfieldE	20	400	220,000	1,162,185	942,185	19%+
WingfieldE	5	100	55,000		887,185	6%+
Wingf NW	20	400	220,000	1,693,530	1,473,530	13%+
Wingf W	20	400	220,000	1,273,740	1,053,740	17%+
Wingf S	15	300	165,000	220,500	55,500	74% +**
TOTAL			4,092,000	14,994,052		27%
Southern tier of pastures						
Wilber S	15	300	165,000	256,315	91,315	64% *
TuleS↑	10	200	110,000	597,055	487,055	18%
TuleS↓	5	100	55,000		432,055	9%
MeadowS↑	20	400	220,000	1,641,560	1,421,560	13%
↓	15	300	165,000		1,256,560	10%
TinCanS↑	15	300	165,000	2,034,620	1,869,620	8%
↓	15	300	165,000		1,704,620	8%

Pasture Name	Ave. Number days	x 20lbs/day	x 550 head	Available forage	Remaining forage	Percent livestock use
MavB.S↑	20	400	220,000	1,606,570	1,386,570	14%
↓	20	400	220,000		1,166,570	14%
Tanque L↑	15	300	165,000	1,234,580	1,069,580	13%
↓	20	400	220,000		849,580	18%
TOTAL (+winter pastures			3,740,000		14,654,270	26%

*Actual use in the Wilbur N and S, Tule N and Winter pasture includes browsing on shrubs, as well as grazing on grasses and forbs. In particular, use in the Winter pasture is heavy on browse and moderate on perennial grasses. This is not indicated in th calculated capacities above, because forage production is calculated only on perennial grass production. Thus, calculated forage use vs production capacity shows higher percent livestock grazing use than is actually occurring in these pastures. Annual monitoring is needed to validate use and should include browse use in terms of AUMs.
**Use in the Wingfield Mesa South pasture is perennial grasses, annual grasses and browse. Calculated use does not show annual grass and browse use. Production and utilization data would indicate true use on perennial grass utilization.

Production utilization studies were completed for Wingfield Mesa in 1983, prior to completing the fencing along the Verde River and at Cottonwood Spring and dividing the area into 4 pastures. The 1983 PU study shows higher production in 1983 than the conservative estimates of TES. The estimates made here reflect the improvements in production on Wingfield Mesa since 1983.

Monitoring data shows the actual utilization on all pastures is currently less than 40% for all grazing ungulates at the end of the growing season. The estimates above should not be used as actual total production, but as estimates only and moderated using the monitored utilization information found in the permit folder and the Project Record.

Table B-5. Noxious weed species surveyed for in 1999 on the 13-Mile Rock Range Allotment.

Alhagi pseudoalhage - camelthorn
Brassica tournefortii - weedy mustard
Centaurea diffusa - diffuse knapweed
Centaurea maculosa - spotted knapweed
Centaurea solstitialis - yellow star thistle
Onopordum acanthium - scotch thistle
Linaria dalmatica - toadflax
Euryops multifidus - resin bush
Euphorbia escula - leafy spurge
Cirsium vulgare - bull thistle

Centaurea (Acroptilon) repens - Russian knapweed

Any ground disturbance, and especially severe ones, offer a good breeding ground for noxious weeds. Since they generally out-compete native plants, they only need their seeds transported to a disturbed site to get established. Seeds can be transported by people, vehicles, animals or wind. A healthy habitat of native plants is the best deterrent to the spread of noxious weeds so roadsides, logging sites, tanks, corrals, burned areas and recreation sites are especially vulnerable. There are many other "weedy" species of plants, some native, and these too prefer disturbed areas.

Table B-6. Mitigation for salting/mineral supplements to avoid livestock concentrations within or adjacent Mexican spotted owl protected activity centers (PAC) within the 13-Mile Rock Range Allotment.

Pasture Name	Salting/Mineral Supplement Mitigation
Meadow Canyon South	South of Section 5 Tank only
Wilber South	No salt/mineral supplements w/in 0.20 miles of Wilber Canyon or Wilber Canyon tributaries
Toms	Only at Pothole, Ida's, Back and Dead Tanks
Wilber North	Only at Wilber and Bueno Tanks
Tule North	Only within 0.25 miles of Forest Road #142B
Meadow Canyon North	No salt/mineral supplement allowed

No salt/mineral supplements would be placed in mountain meadows or riparian areas or within 0.25 miles of riparian areas or mountain meadows. Salt/mineral supplements would not be placed in non-riparian drainages in the ponderosa pine (MA3) areas, unless needed for a watershed restoration project.

Table B-7. Location of the forage utilization monitoring cages to comply with Amendment 11 of the Coconino National Forest Land Management Plan.

Pasture Name	Management Area	Legal Description
Winter	12 (Riparian)	T13N, R6E, Section 16, NW1/4 SW1/4
Tule South	3 (Pine/Oak/Grass)	T13N, R8E, Section 4, NE1/4 NW1/4
Tule South	3 (Pine/Oak)	T13N, R8E, Section 11, NE1/4 SW1/4
Toms/Good Enough	3 (Pine/Oak)	T13N, R8E, Section 12, NE1/4 NW1/4

Table B-8. Livestock forage utilization monitoring form.

Allotment Name: Year:

Pasture Name	LMP Mgmt Area	Graze Period	Livestock Numbers	* Plant Growth	**Before Livestock	**After Livestock	**End of Growing Season	**Key Species	% Use on Key Area

* **D** = Dormant **S** = Slow Growth **F** = Fast Grow

APPENDIX C – Wildlife, Fish And Plants

Table C-1. Management Indicator Species (MIS) identified for Management Areas (MA) on the 13-Mile Rock Range Allotment.

MA 1 (West Clear Creek Wilderness) - No management indicator species were identified for MA 1.

MA 2 (Verde Wild and Scenic River) - Management indicator species for this management area include macroinvertebrates and the yellow-breasted chat.

MA 3 (Ponderosa Pine and Mixed Conifer) - Management indicator species identified for ponderosa pine and mixed conifer include turkey, goshawk, pygmy nuthatch, elk, Abert's squirrel, red squirrel, hairy woodpecker, and Mexican spotted owl. T

MA 4 (Ponderosa Pine and Mixed Conifer on Greater than 40% Slope) - Management indicator species identified for ponderosa pine and mixed conifer on greater than 40% slopes are the same as those identified for MA 3 (Ponderosa Pine and Mixed Conifer). .

MA 6 (Unproductive Timber Land) - Management indicator species identified for unproductive timber land include elk, Abert's squirrel, mule deer, and hairy woodpecker. .

MA 7 (Pinyon-juniper Woodlands on Less than 40% Slope) - Management indicator species identified for MA 7 include plain titmouse, mule deer, and elk.

MA 8 (Pinyon-juniper Woodlands on Greater than 40% Slope) - Management indicator species for pinyon-juniper woodlands on greater than 40% slope are the same as those for MA 7.

MA 10 (Grassland and Sparse Pinyon-juniper Above the Rim) - No management indicator species were identified for MA 10.

MA 11 (Verde Valley) - No management indicator species were identified for MA 11.

MA 12 (Riparian and Open Water) - Management indicator species identified for riparian and open water include cinnamon teal, Lincoln's sparrow, yellow-breasted chat, Lucy's warbler, and macroinvertebrates.

MA 15 (Developed Recreation Sites) - No management indicator species were identified for MA 15.

APPENDIX D – Public Comments During 30-Day Comment Period

The following are the Forest Services' response to comments received during the 30-Day Public Comment Period to the Preferred Alternative for rangeland management of the 13-Mile Rock Range Allotment.

Forest Guardians:

1) *Forest Guardians believes the EA describes unacceptable watershed and riparian conditions that are directly attributable to past, present and proposed livestock grazing on the allotment. They firmly believe that a period of long-term rest is necessary to ensure the long-term productivity of the site is restored.*

Forest Service response:

As documented in the EA (Chapter 1, page 4; Chapter 3, page 41 and Chapter 40) 86% of the entire allotment is currently in satisfactory watershed condition and 14% is in unsatisfactory watershed condition. Of the acres in satisfactory watershed condition, approximately 985 acres are along the Verde River, West Clear Creek and Cottonwood Spring, and are not available for livestock grazing. Implementation of the Preferred Alternative (Alternative 5) will move approximately 2,798 acres additional acres into satisfactory watershed condition. The result will be 92% of the allotment in satisfactory watershed condition. Analysis shows that implementation of Alternative 2 (no livestock grazing use) would result in the same changes in the watershed condition by the end of 10 years as those expected under the Preferred Alternative. However, the gains will occur more quickly with implementation of the Preferred Alternative. In addition, Arizona Department of Environmental Quality (ADEQ) reports all three 5th code watersheds within this allotment are identified as in Full Support of designated uses, and none are Water Quality Limited Waters (ADEQ 1998; EA, Chapter 3, page 44; Project Record # 12). The Forest Service believes these reports and the analysis describe acceptable watershed conditions within the 13-Mile Rock Range Allotment and adjacent areas.

As documented in the Project Record, Chapter 1 - Purpose and Need (pg 5) and Chapter 3, page 44, West Clear Creek, Clover Creek, Toms Creek and Meadow Canyon riparian areas were surveyed, and are rated as in Proper Function Condition. Cottonwood Spring, which is now fully excluded from livestock grazing, was not formally surveyed, but is not considered to be fully functional at this time. West Clear Creek, Cottonwood Spring and the Verde River riparian areas are excluded from livestock use, except for approximately ¼ mile of West Clear Creek in the west end of the Winter pasture. This area is protected by a rocky corridor, grazed during the dormant cold season (Jan. and Feb. currently, Feb. only in Preferred Alt.), and closely monitored for all uses and impacts. The Forest Service believes there are no detrimental impacts to the riparian areas on the allotment under current livestock grazing management, and that implementation of the Preferred Alternative will ensure even further improvements in these areas in the future.

2) *Forest Guardians believes no term permits should be reissued until the Forest Service conducts a thorough analysis of the allotment's suitability for grazing, as defined in Forest Service regulations. …grazing suitability is something completely different than grazing capability…*

Forest Service Response:
This site-specific rangeland management planning process is consistent with 36 CFR 219.20(a) requirements for grazing on suitable acres and with the Coconino National Forest Land Management Plan standards for lands suitable for livestock grazing. The Forest Plan standards and guidelines for lands suitable for grazing were applied during this analysis, including slope (steepness), soil erosion potential and minimum forage production. Other areas already excluded from grazing on this allotment included the Clear Creek Campground, Verde River corridor, Cottonwood Spring and most of West Clear Creek. These areas are included in the total acres of the allotment, but are not included in those available for livestock use. Under the Preferred Alternative, these areas will continue to be unavailable to livestock, through fencing or physical barriers, and are not considered in the

available forage production and livestock capacity estimates.

3) *Forest Guardians feels that the Forest Service appears to be arguing on page 56 of the EA that in the absence of livestock grazing, the allotment's condition will suffer from simultaneous overuse by elk and over-rest.*

Forest Service Response:

The Forest Service has, and will continue to have, concerns about potentially heavy grazing by elk in key sensitive areas "such as cool season [forage] dominated areas, or palatable browse areas" and riparian areas, with or without livestock use on the allotment. The Forest Service and the Permittee can control livestock use – forage utilization, time of year and length of graze - but cannot control impacts from elk use except with the help of Arizona Game & Fish Department (AG&FD). At this time, the impact from elk use is heavy in Toms Creek area and some browse areas in the mid and lower elevation pastures, but the impact of elk use is not heavy throughout the allotment. However, there is a noted trend of year-round elk use in riparian areas in the lower country, most notably at the Verde River and in lower West Clear Creek, which are not considered historic elk habitat. The Forest Service and AG&FD will continue to monitor the elk occurrence, populations and use in these and other sensitive areas. The AG&FD feels, and the Forest Service concurs, the current elk populations within this allotment are currently at manageable levels. However, the Forest Service's concern will continue. As stated in Chapter 1 – Purpose and Need. Proposed Action (pg 10), the FS will continue to work with the AG&FD to maintain elk numbers at levels that are compatible with our objectives for vegetation, soils and habitat for other wildlife species.

Areas where "over-rest" is a potential concern are the lower elevation where snowpack and naturally occurring fires rarely occur. The "over-rest" referred to in the EA is related not only to livestock use, but also to any kind of disturbance to vegetation that removes or disturbs the old leaf biomass. Without some physical disturbance factor, such are snowpack, fire or grazing, plants will move rapidly toward a late seral stage. We have seen this in other areas of the Forest where there is no disturbance factor. When a disturbance does occur, the old plant material is either removed in part or entirely, or becomes part of the on-the-ground vegetative litter. Given our experience on like areas of the Apache Maid Allotment, Hackberry Allotment and Fossil Creek Allotment where livestock did not graze and other disturbance factors did not occur, we expect to see deterioration of grass plants over time, movement toward late seral stage vegetation and loss of ground cover vegetation that protect soils without disturbance. In areas where some physical disturbance occurs, this would not be the case.

4) *Forest Guardians believes the Forest Service is biased in it's portrayal of recreationists as the culprit in allowing livestock trespass into the Verde River corridor by cutting fences.*

Forest Service Response:

The statement in the EA about recreation users cutting fences and trespassing into the Verde River corridor is based on past and current problems with recreation users, especially those who reside in the adjacent private property. The FS has repeatedly cited recreationists who cut fences or drove through the road closures to access the Verde River. In fall 1999, recreation users in 4WD vehicles trespassed into the Cottonwood Springs Riparian Exclosure, damaging vegetation, soils, and water quality. We did not mean to imply that there are never cases of ranchers cutting fences. However, in the case of this allotment, the damage and trespass has been repeatedly traced directly to recreation users. The Ranch is responsible for maintenance of these fences and faces loss of the permit for non-compliance (not repairing fences and keeping livestock in designated area) and for damaging government property (fences, resources). This permittee has a good record of compliance with the maintenance requirements and the terms and conditions of the term grazing permit.

5) *Forest Guardians provided a list of requirements for the Forest Service to fulfill its obligation under NEPA "to perform a proper EA for issuance of a term grazing permit", including consideration of reasonable alternatives to the proposed action, taking a "hard look" at potential effects of the proposed action and adequately considering the cumulative impacts of the proposed action together with those of reasonably foreseeable actions.*

Forest Service Response:

The Forest Service believes it has completed a comprehensive planning process as required under NEPA, and that there is an adequate range of alternatives for this project. Alternatives are developed and analyzed based on issues, or points of debate, to the Proposed Action presented to the public in 1998. In addition to the three required alternatives for rangeland management (no livestock grazing, current management and the proposed action), two other alternatives were fully developed and analyzed and four alternatives were considered but dropped from full consideration. The issues that "drove" development of the additional alternatives, and the Forest Service responses to those issues, are listed in the EA Chapter 1 – Purpose and Need, pages 11-13). Chapter 2 - Alternatives outlines the five alternatives that were fully developed and analyzed (pages 15-27) and the two alternatives considered but not fully developed, and the rationale for dropping them (pages 27-29).

The EA documents the analysis, or the "hard look" at the environmental, social and economic effects, both as single action and cumulatively with other past, present and foreseeable actions, of implementing each of the alternatives in Chapter 4, Environmental Consequences. In addition, the Team reviewed the current (February 2000) Forest Schedule of Proposed Actions (SOPA) for projects in the foreseeable future throughout the Forest for potential cumulative impacts. A comparison of how each alternative addresses the project objectives and issues identified during public scoping is presented in Chapter 2 – Alternatives, Table 2.

6) *Forest Guardians is concerned that the Forest Service must consider and disclose adequately the cumulative impacts of the proposed action.*

Forest Service Response:

The Forest Service believes the cumulative effects of past, present and reasonably foreseeable future actions are identified for the environmental, social and economic components of the resource in Chapter 3 - Affect Environment, and in Chapter 4 - Environmental Consequences. In addition, coordination needed with other projects and uses and Best Management Practice to mitigate potential cumulative impact are presented in the EA, Chapter 2 – Alternatives.

The potential cumulative impacts identified for the analysis include: adjacent range allotments, pre-commercial tree thinning and commercial timber sales, activities proposed in the preferred alternative for the GoodEnough-Tule Butte area and possibly the Iron-Mine Maxwell area north of West Clear Creek, recreation use, roads, trails, land ownership/exchanges/agricultural uses, municipalities, prescribed and naturally occurring fires, exotic wildlife, fish and plants, noxious weeds and management by ADOT of and along Hwy 260. The cumulative effects (CE) area for soils and watersheds includes the 5th and 6th code watersheds impacted by this allotment. The CE area considered for Threatened, Endangered and Sensitive species includes the habitat areas impacted by this allotment and the habitat areas immediately adjacent the allotment. The CE area for air quality includes the Verde Airshed and the Yavapai-Apache Nation lands at Camp Verde.

The Team also reviewed the current (February 2000) Forest Schedule of Proposed Actions (SOPA) for projects in the foreseeable future throughout the Forest and pending timber sale activity in the area for potential cumulative impacts. The members of the Team addressed potential impacts from wildland fire use and wildfire, noxious weed management plan, roadless area policy, Verde Headwater Riparian Restoration Project, Outfitter/Guide Reallocation, the now-withdrawn Cottonwood Springs Riparian Enhancement, MC and Pocket Timber Sales, GoodEnough-Tule 20K Area Analysis and Ironmine-Maxwell 20K Area Analysis. Based on the specialists' findings, there is no indication that these foreseeable projects will, cumulatively, cause negative impacts to the biological, social or economic environment of the 13-Mile Rock Range Allotment area over the long-term. There may be short-term negative impacts, especially from fire and during implementation of projects, but long-term positive impacts are anticipated with expected improvement in vegetative ground cover and overstory vegetation, watershed restoration, and controlled use of roads and permitted recreation use. Documentation of the review of the current SOPA and pending timber sales is in the Project Record (#111).

7) *Forest Guardians is concerned that the Forest Service needs to identify whether the riparian habitats on the allotment are meeting the site-specific management direction for riparian and aquatic ecosystems on the forest, including assessing riparian and upland conditions, and giving preferential*

consideration to riparian-dependent resources.

Forest Service Response:

Riparian and aquatic ecosystem areas within or adjacent the allotment include Cottonwood Spring, Verde River Corridor, West Clear Creek, Toms Creek and Meadow Canyon. West Clear Creek , Toms Creek and Meadow Canyon are rated in Proper Functioning Condition; there are no current formal riparian condition surveys for Cottonwood Spring or the portion of the Verde River adjacent the allotment. Existing condition information for all these areas is provided in the Project Record and the EA, Chapter 1 – Purpose and Need, page 5 and Chapter 3 – Affected Environment, pages 41-46). Methods for assessing the conditions include riparian site visits by hydrologists, biologists, soils and watershed specialist and foresters; formal riparian surveys to determine function and existing condition and potential based on vegetation, landform/soils and hydrology; and Terrestrial Ecosystem Survey data and professional judgment based on confirmation visits.

The upland conditions are rated at 86% satisfactory at this time, and the EA documents expected improvement to 92% satisfactory with implementation of Alternative 5 (the preferred alternative), Alternative 3 (the proposed action), Alternative 4 or Alternative 2 (no livestock grazing). These improvements are most notable in the west end of the Winter pasture where the length of time livestock use the area is reduced with fencing (Alternatives 3, 4 and 5) or complete rest from livestock (Alternative 2).

Preferential consideration to resources dependent on riparian areas is given by excluding livestock from this allotment from all of the Verde River Corridor and Cottonwood Spring, and all but approximately ¼ mile of West Clear Creek are from livestock grazing impact from the 13-Mile Rock Range Allotment. The portion of WCC that is available to livestock is well armored and grazing is controlled by time (30 days), season (February) and allowable use on woody vegetation under the Preferred Alternative. Until the Winter pasture fence is installed, the area is available in January and February and used for watering only. Meadow Canyon and Toms Creek are not fenced, but are not easily available to livestock because of the steep terrain. Use in these areas is considered incidental and actually rare. All areas are monitored for use and compliance with the terms and conditions of the permit and for livestock impacts.

8) *Forest Guardian believes the Forest Service has failed to consider the appropriateness of applying certain or alternative range management prescriptions and the facilities necessary to implement those prescriptions. The feel the Forest Service did not consider use of the allotment area for the highest public benefit and did not conduct an adequate economic analysis.*

Forest Service Response:

The Forest Service fully assessed the impacts and appropriateness of the few facilities proposed during the planning process (EA, Chapters 3 and 4). The rationales for dropping four specific management options, as shown in Chapter 3, are directly related to the Forest Service determination that the economic feasibility and the impacts of those alternatives on land resources and public use are undesirable.

The Forest Service did conduct an investment analysis for each management alternative, using the QuickSilver program. The comparison of the investment costs and benefits are displayed in the EA, Chapter 4 – Environmental Consequences, pages 94-97. Dollar costs and benefits considered in the investment analysis for this allotment are shown in the Project Record and in the EA, Appendix D, Table D-1. Other economic influences and impacts are discussed on pages 57-58 and social concerns and impacts are addressed on page 56.

None of the proposed investments in structural facilities or non-structural projects (prescribed burning, seeding, juniper treatments) are required to continue livestock grazing at the current use level on the allotment. However, the investments in fencing will improve livestock distribution and, together with the investments in other resource projects, will improve or maintain vegetative ground cover, soil, watershed and desired terrestrial vegetation and rangeland conditions over time. Even under Alternative 2 (no livestock grazing), many of the same resource investments are proposed to maintain ground cover vegetation and watershed conditions and to meet wildlife needs as those proposed in the Preferred Alternative. Meeting multiple-use resource goals is of primary importance, and we feel the proposed investments are justified.

9) *Forest Guardians states there is no evidence that the Forest Service ever considered the relative environmental gains that could be achieved by closing portions of the allotment, or the entire allotment to livestock use. Nor has the Forest Service considered the valuable recreation and fisheries values, or what changes in the levels and types of recreation would result from a discontinuation of grazing in portions of the allotment or the entire allotment.*

Forest Service Response

The Forest Service did consider the impacts of discontinuing livestock grazing for 10 years in the analysis of Alternative 2 (no livestock grazing), and of excluding riparian and recreation areas, and of restricting use in pastures with limited capacity under Alternatives 1, 3, 4, and 5. We also addressed the current and expected future recreation use, including the environmental and social concerns and economic influences of recreation use in the analysis of all alternatives.

10) *Forest Guardians states that the Forest Service recognizes "the stream has an 'impaired' water quality rating …." and that "many of the designated uses are 'not fully supported due to siltation, turbidity, stream bank destabilization, and reduction of riparian vegetation from grazing.'" Forest Guardians believes the Forest Service violated the legally binding agreement to ensure all management plans meet the requirements of State Water Quality Management Plans and the Clean Water Act by failing to identify Best Management Practices.*

Forest Service Response:

The Forest did not make these statements about the water quality and designated uses within the affected watersheds. As shown in the EA, Chapter 3 – Affected Environment (page 42), and documented in ADEQ's Draft Arizona Water Quality Assessment 1998 report, all 5th code watershed within the 13-Mile Rock Range Allotment are in full support of all designated uses and none are "Water Quality Limited Waters." The Forest Service also identified Best Management Practices (BMPs) (EA, Chapter 2, page 16) and monitoring practices (EA, Chapter 5, page 90) during this planning process to ensure compliance with Arizona State and Federal Water Quality Standards.

11) *Forest Guardians feels the Forest Service provided virtually no background ecological information in the allotment EA, including in the proposed action. They further state that the Forest Service needs to determine the potential natural community (PNC) of vegetation on this allotment and describe a Desired Future Condition (DFC) for the allotment.*

Forest Service Response:

Background ecological, as well as social and economic, information for this allotment is provided in the EA, Chapter 1 – Purpose and Need, Chapter 3 – Affected Environment. The existing condition information summarized in the EA is based on information found in the Project Record, including survey data and inspection reports, resource reports and publications, Forest Service resource specialists' reports and planning meeting notes. The DFC for the allotment are described in the EA, Chapter 1 – Purpose and Need (pages 7-9) with site-specific project objectives listed on pages 9-10, and in the Proposed Action document (pages 10-11).

We used the Terrestrial Ecosystem Survey definitions of PNC for each soil type on the allotment, and compared those definitions with the current and past Parker 3-step range cluster data and with Forest Service resource specialist knowledge and reports to determine the existing condition in relation to the PNC. The comparisons are summarized in the EA, Appendix B, Table B-2 and discussed in Chapter 3 – Affected Environment (page 36-37). The impacts of implementing each alternative on the vegetation (abundance, species diversity and composition and noxious weeds), and the resulting impacts on the watershed, are discussed in Chapter 4.

12) *Forest Guardians reminds the Forest Service of the requirement to determine if and how the proposed action (Selected Alternative) will impact Federally listed Threatened and Endangered (T&E), Proposed (P) or Candidate (C) species and critical habitats that occur or may occur within*

or adjacent the allotment area prior to issuing a grazing permit.

Forest Service Response:

The Biological Assessments and Evaluations (BA&Es) of the proposed livestock grazing management, and the consultation with US Fish & Wildlife Service, for all T&E, P and C species and critical habitats that occur or may occur in or adjacent the allotment are completed (Project Record #82). In addition, consideration of the existing and desired condition, for T&E, P and C species and the analyses of the impacts of implementing each of the five management alternatives are documented in the EA in Chapter 1 – Purpose and Need (page 6); Chapter 2 - Alternatives (page 15); Chapter 3 – Affected Environment (pages 47-54); Chapter 4 – Environmental Consequences (pages 74-92); and Chapter 5 - Monitoring (page 102).

13) *Forest Guardians states that there is "no mention" of the existence of or critical role of cryptogamic soils in the EA.*

Forest Service Response:

This same comment was in the letter from Forest Guardians in response to the Proposed Action. The planning team's response is documented in Project Record and in the EA, Chapter 1 – Purpose and Need (page 13) and Chapter 3 – Affected Environment (page 43). The Forest Service soil scientist assigned to this project determined that cryptogamic soils are not a concern on this allotment, because the pinyon-juniper woodland ecosystem type is on soils derived from basalt parent materials, which do not support cryptogams.

14) *Forest Guardians believes livestock grazing, not fire suppression, is the primary culprit in forest health problems in the ponderosa pine forests, and that it is scientifically unsound to build upland waters in ponderosa pine or mixed conifer forest without, at a minimum, reducing livestock numbers.*

Forest Service Response:

We agree there is literature indicating past overgrazing by livestock has impacted the health of the ponderosa pine forest, as has fire suppression, road construction, past logging and concentrated recreation use. The livestock grazing use on the 13-Mile Rock Range Allotment, and other allotments on the Coconino National Forest, is now and will continue to be controlled and limited to appropriate seasons and use levels (as concurred by US Fish & Wildlife Service). Our monitoring information on this and other range allotments shows that maintaining the historic openness and uneven ages of ponderosa pine type through projects such as the now-approved Good Enough/Tule tree thinning and prescribed burning are important to overall forest health. Chapter 3 of the EA is a summary of the resource conditions in the ponderosa pine type on this allotment; the impacts of implementing each alternative in the ponderosa pine ecosystem, both as a singular action and cumulatively with other uses and management actions on this area are presented in Chapter 4.

No additional waters or other structural improvements are proposed in the Preferred Alternative in the ponderosa pine type (EA, Chapter 2 – Alternatives. The waters already within the pine type were constructed 8-50 years ago under the previous Allotment Management Plans, and are meeting the needs of livestock and wildlife in the area. The only exception is New Tank, which was fenced in 1999 to exclude livestock use as potential habitat for Chiracuaha leopard frog. A new tank that provides water for both the 13-Mile and the adjacent Pivot Rock Allotment was constructed nearby to replace the excluded tank.

15) *Forest Guardians believes the impact of fences, water development and other associated developments need to be fully analyzed. They are concerned about impacts of barbed wire fences on mortality rates of raptors and other bird species, and the perceived benefits of water development to wildlife.*

Forest Service Response:

Fences on the 13-Mile Rock Range Allotment include both barbed wire and electric fences. Nearly all of the barbed wire fences meet wildlife standard, and those that do not will be upgraded under the Preferred Alternative. Only one new fence (3.0 miles) and one fence realignment (0.7 miles) are proposed under the Preferred Alternative, and will be constructed of barbed wire to wildlife standards. The impacts of the fences and waters on wildlife are fully analyzed and documented in the Project Record and the EA, Chapter 4 – Environmental Consequences.

16) *Forest Guardians believes the impacts of livestock grazing use on soil condition, potential erosion, and vegetation and litter and riparian condition were "either not examined, or were not examined in sufficient detail." They are asking for information on the condition of the entire allotment, the erosion rates and if standards are being met.*

Forest Service Response:

As stated in the EA, Chapter 1 – Purpose and Need and Chapter 3 – Affected Environment, approximately 86% of the allotment area is currently rated as having satisfactory soil conditions and 14% is rated as having unsatisfactory soil conditions. Soil condition is an evaluation of watershed condition. Under the Preferred Alternative, we anticipate the proposed changes in livestock management and site-specific projects will move to approximately 92% in satisfactory soil condition and only 8% in unsatisfactory soil condition in the allotment area. The impacts of past, current and anticipated livestock grazing use and other management actions on soil, watershed, vegetation and riparian conditions are presented in Chapters 1, 2, 3 and 4 of the EA. In addition, existing condition survey reports an inspection reports are available in the Project Record.

Below is a brief summary of the direct impacts of livestock grazing on the riparian areas within the allotment boundaries.

West Clear Creek: All but a rock-protected ¼ mile is fenced (since 1999) or restricted by physical boundaries. No direct current or future impacts where fenced/bounded. Little/no direct impacts at rock-protected site with dormant, cold weather season graze
Cottonwood Spring: Fenced since 1995 – No future direct impacts. The area is recovering from livestock trespass in 1996 and 1998, but was damaged in fall 1999 by recreational vehicles/users.
Verde River Corridor: Fenced since 1987– No direct current or future impacts from this allotment.
Meadow Canyon: Physical barrier-No/minimal livestock impact, but heavy recreation use
Toms Creek: No access from this allotment – No direct current or future impacts

17) *Forest Guardians reminds the Forest Service that a cultural resource clearance is required for all "surface disturbing projects", not just for future grazing improvements, as per Section 106 of the National Historic Preservation Act and a memo from the Chief of the US Forest Service dated October 9, 1991.*

Forest Service Response:

A Cultural resource clearance report is complete and located in the Project Record for on-going livestock grazing use on the 13-Mile Rock Range Allotment. Conditions of the clearance include specific requirements for placing salt, hay, or water sources (no additional waters are planned) away from cultural resources, and for conducting a separate archaeological survey and clearance prior to implementation of ground disturbing activities, such as new fence construction, prescribed burning, juniper removal or focused soil scarification.

Jeff Burgess:

1) *Mr. Burgess does not believe the Preferred Alternative (proposed action) complies with the spirit of the legal requirements for ecological assessment of grazing lands and the 1996 regional amendment for Forest Plans in Arizona and New Mexico, which are incorporated in Amendment 11 of the Coconino NF Land Management Plan. He asked specifically for information on the current conditions and trends, and if the Forest Service used appropriate measurement techniques to determine the current condition.*

Forest Service Response:

The Forest Service conducted extensive assessment and analyses of range conditions and trend, and related this to soil and watershed conditions, current vegetation (abundance, species), potential for the sites, and seral stage. Information used includes past conditions and goals documented for the 1987 Allotment Management Plan, monitoring data and reports, site visits, Annual Operating Plans (AOP), permittee compliance reports, range inspections since 1987, 1994 Terrestrial Ecosystem Survey (TES) data and recent site visits to validate or update condition information, current and past Parker 3-step cluster data on representative areas across the allotment, key area and forage utilization monitoring data, water quality reports from Arizona Department of Environmental Quality (ADEQ), and the professional judgment of Forest Service specialists in hydrology, soils and watershed, range, vegetation, fisheries habitat and wildlife biology. Representatives from the Arizona Game and Fish Department (AG&FD) and the Ranch also lent their site-specific knowledge of conditions and use trends on the allotment.

The existing ecological conditions and trends for the resources and human uses on this allotment and surrounding area are documented in the EA, Chapter 1 and Chapter 3 and in the documentation of site visits, range inspections, monitoring data and specialist reports in the Project Record. The desired conditions, project objectives, and management alternatives developed to move toward those desired conditions, which meet the concern that the Forest Service must identify 'lands in less than satisfactory condition" and "appropriate action planned for their restoration", are documented in the EA, Chapter 1 and Chapter 2. The ecological, social and economic impacts of implementing each of five (5) management alternatives are presented in the EA, Chapter 2 and Chapter 4 and planned monitoring to determine if the selected alternative is implemented and is meeting the project objectives is presented in Chapter 5.

1-A) *Mr. Burgess says Table B3, Appendix B provides confusing data on current range condition on the allotment, and feels the forage utilization level for each pasture cannot be determined without first knowing the current condition.*

Forest Service Response:

Table B3, Appendix B shows the permitted numbers for the allotment area for the past 25 years, but does not show any range condition data. Perhaps Mr. Burgess was referring to Table B2, Appendix B, which lists the results of the Parker 3-Step Range Cluster data for representative areas (vegetation type and soil type). This table shows condition and trend for each year the data was collected at each cluster site. Table B2 also shows a comparison of current Parker 3-Step data with the Potential Natural Community (PNC) as defined by TES for the soil type at the cluster site. The Parker 3-Step information is collected for representative areas of the allotment, but not for each pasture. Range inspection reports are available to show pasture-specific conditions and movement, or trend, toward meeting goals for the rangelands.

1-B) *Mr. Burgess is concerned that the 1987 AMP established goals for the allotment that included "reducing oxidized feed" and "increasing plant interspace fill-in", and does not believe there are appropriate measurement techniques for these parameters.*

Forest Service Response:

The goals for reducing oxidized feed (old, decadent leaf biomass), and increasing plant interspace fill-in (increasing live vegetative ground cover) are as appropriate today as in 1987 for some areas of the allotment. Measurement techniques to show movement toward meeting those goals are standard measurements of plant biomass, % bare ground, and plant vigor.

> 1-C) *Mr. Burgess is concerned that the Forest Service is estimating forage utilization levels, rather than measuring actual use by the currently permitted number of livestock. He is further concerned that the Forest Service is not measuring actual use at the appropriate time. He states that the forage utilization level is supposed to be made when the cattle leave the pasture, not at the end of the grazing season. Mr. Burgess would like to know the level of forage utilization , by all ungulates, when the cattle left the allotment's pastures in 1997 and 1998.*

Forest Service Response:

In the EA, Table B-4, Appendix B shows the estimated forage use by livestock only, based on TES conservative estimated forage production, average estimated forage use/day/cow and total permitted livestock numbers. Table B-8 shows the monitoring form designed to show actual use (overall and on identified key species) for each grazed pasture. This form is used each year to show the actual graze period, livestock numbers, plant growth stage during the graze period, and forage utilization before livestock enter the pasture (shows utilization other than by livestock use), after livestock leave the pasture (livestock use and other ungulate use) and at the end of the growing season (recovery since livestock use, even with possible other ungulate use). The Forest Service began using this type of form in 1997 for some allotments, and on the 13-Mile Rock allotment in 1998. Utilization information for 1997 is based on the Annual Range Inspection for 1997, as documented by the Range Conservation Staff Officer. The forage utilization form for 1998 shows current forage utilization, with 525 head, in each grazed pasture before livestock (Range: no use (0-10%)), after livestock (Range: light (11-25%) to moderate (26-50%)) and at the end of the growing season (Range: no use (0-10%) or moderate (26-50%)). The number of livestock actually using the allotment may vary from the permitted number each year, depending on resource conditions and permittee preference. The number of livestock actually using this allotment generally ranged from 450 head to 550 head over the past 12 years, with a minimum of 50 head in 1993 and 75 head in 1994 for the "convenience of the permit holder". The actual use numbers for the past 24 years are listed in the Project Record and were used during planning. The forage utilization monitoring form completed for 1998 and the updated form for 1999 and future AOPs are shown in the Project Record.

According to the Forest Service Range Handbook, utilization is to be measured at the end of the growing season. However, to be sure livestock are moved at appropriate times, and to assure forage is available for wildlife grazing and cover, plant recovery and litter production, forage utilization is measured before livestock enter (wildlife grazing use only), after livestock use (livestock use mostly) and at the end of the growing season (total use). The Regional Interagency Consultation Team concurred that this forage utilization monitoring strategy meets the intent of the Regional Amendment and Amendment 11 of the Coconino NF's Land Management Plan.

> 1-D) *Mr. Burgess is concerned that the 40% forage utilization level proposed does not meet the intent of the Regional Amendment and Amendment 11 of the Coconino NF's Land Management Plan, and that this level may be too high to sustain the resources over time. He would like to know how we identified the appropriate maximum forage use levels for the allotment's pastures.*

Forest Service Response:

General guidelines in the Regional Amendment and Amendment 11 to the Coconino Forest Plan are for allotments without site-specific analyses. The Forest Service consulted with the Regional Interagency Consultation Team (FS and FWS) on the Preferred Alternative's grazing strategy, resource project plans, actual, estimated and planned forage utilization rates and impacts on Mexican spotted owl (Amendment 11) and eight other Threatened and Endangered species. The final consultation package and BA&Es, with signatures of concurrence from the Consultation Team, are located in the Project Record. The Consultation Team concurred on

the 40% forage utilization level "on key species and overall in each pasture at the end of the growing season" with the exception "in the MSO PACs and in MSO protected and restricted habitats, where the total utilization will not exceed 40% at any time (before and after livestock grazing, and at the end of the growing season). Currently, livestock use if managed for light to moderate total forage utilization at the end of the growing season and implementation of future grazing use is based on a total forage utilization level of 40%. Our expectation, and the Consultation Team's concurrence, is that the graze ½, rest ½ strategy in the mid and upper elevation pastures and the short periods of use during the growing season, coupled with long periods of rest (20-22 month between grazes), dormant season grazes in the Winter and Heifer pastures, and rest rotation strategy on Wingfield Mesa, will assure plant recovery and adequate root reserves to maintain the vegetation. This expectation is based on past utilization monitoring and range inspections that show minimal or no regraze on plants when livestock are moved before the forage regrowth is available, and plant recovery under long periods of rest. Indeed, Holechek's 1999 review states that moderate grazing provides for some improvement over time and does maintain the resource over time. In addition, Paulsen and Ares (1961) show tobosa grasslands, such as those on Wingfield Mesa and the Heifer pasture, are best maintained at utilization levels of 40 to 55%.

As a note, Holechek et al. (1999) show 35% utilization as the minimum for moderate utilization, whereas the monitoring the Forest Service conducts for this and other allotments shows 26% as the minimum for moderate utilization. Therefore, what is considered to be in the lower moderate range by the Forest Service would actually be considered light utilization by Holechek et al.

2) *Mr. Burgess is concerned that this plan could be described as a high intensity-short duration grazing scheme, which is prohibited by the Coconino's Forest Plan "due to the failure of the nearby Red Hill Cell experiment."*

Forest Service Response:

The overall grazing strategy that bases length of graze on plant growth periods and light to moderate forage utilization has been in place since 1987 on this allotment. The Preferred Alternative proposes to continue this basic strategy, except in the Wingfield Mesa pastures. Based on monitoring of actual forage use, and on very conservative estimated production and forage utilization calculations, the permitted livestock numbers and forage utilization levels are easily below the "higher forage utilization levels" Mr. Burgess equates with time-controlled grazing schemes. The graze periods proposed here are coupled with low to moderate forage utilization levels that include the impact of both livestock and wildlife ungulates. Forest Service specialists in rangeland management, botany, soils, watershed, hydrology, fisheries and wildlife biology and Fish & Wildlife Service wildlife biologists and botanists have assessed the current condition here, and concur that the proposed livestock grazing strategy is appropriate for this area.

In addition, the Forest Plan does not, as Mr. Burgess states, "prohibit implementation of time controlled grazing systems", but instead states that "No new high stock density time control **grazing cells,** are initiated until monitoring and evaluation of the Red Hill Cell has been completed in 1989. **New cells** are predicated on the results of the Red Hill Cell monitoring evaluations." The Forest Plan further states: "Manage allotments at the C through D level of Management Intensity in existing allotment management plans (AMP)…."

The management strategy that the Forest Service proposes to continue for the 13-Mile Rock allotment is at Level D and was under an "existing allotment management plan" prior to Record of Decision for the Coconino's Forest Plan. The proposal is not to create a new "high stock density time control grazing cell", or even to increase the forage utilization or livestock numbers on this allotment. Indeed, the proposal is to continue the overall livestock management strategy, with some modifications, and to more closely monitor the forage utilization in the future and adjust the length of graze as needed to assure the approved 40% utilization level is met. In addition, the monitoring and evaluation of the Red Hill Cell was completed and documented in draft reports in 1989, as required, but the final report was not issued. Using the draft reports and what we have learned since that time about livestock and elk use, social acceptability and economic feasibility of managing this level of grazing intensity, the Forest is now finalizing the evaluation report. The final report is expected to be complete and available to the public in April 2000. The study is not characterized as a failure in the report, but as an opportunity taken to learn about the appropriate intensity of livestock management systems and our ability to manage such system. We also learned much about wildlife and wildlife habitat management, and to use what we learned to

adapt livestock grazing strategies to be more compatible with the needs for sustainable vegetation, soil and water, wildlife habitat and human use.

3) *Mr. Burgess questions the proposal to use livestock to scarify soils and plant seed in the Maverick Basin South, Tin Can South, Winter, Heifer and Wingfield Mesa pastures. Burgess cites Thurow's (1999) publication on the role of drought in range management where Thurow discusses livestock trampling and the potential for wind erosion "when the soil has been churned to dust" as evidence that the proposed action is not appropriate as a means to increase ground cover in these areas.*

Forest Service Response:

The actions proposed will not be implemented under drought conditions, which is the focus of the publication cited by Mr. Burgess. Scarifying under drought conditions would be irresponsible and would in no way be a successful implementation of the project or the intent of improving vegetative ground cover. Perhaps the treatment methods are not stated clearly enough in the proposal, which is likely the cause for concern. The areas proposed for focused scarification and seeding are in the Maverick Basin South and Tin Can South pastures only. Seeding during the normal course of livestock grazing use is proposed for small, discontinuous areas within the Winter, Heifer and Wingfield Mesa pastures. In these three areas, the plan is to seek out areas of bare ground or those with limited cool season forbs and grasses, scatter seed and let the livestock plant the seed as they walk through the areas.

The areas within the Maverick Basin South and Tin Can South pastures proposed for scarification and seeding using livestock are in low-lying swales where soil conditions are currently satisfactory. There is ground cover on these areas, but the species diversity is limited and bare ground is greater than desired. The plan is to scatter the appropriate seed mix, and then to herd the livestock through the area when the soil are dry. The intent is to avoid scarifying when soils are wet and could become compacted from hoof action. The object is not to churn the soil to dust, but only to break up the soil to allow the seed to penetrate below the surface. We do not anticipate deep soil scarification, and there is not much wind or soil erosion concern in these swale areas. The planning team discussed using a Dixie harrow to scarify the soil, but the potential for increasing the size of impacted area and introducing noxious weeds, and the expense of conducting the necessary cultural resource surveys and of renting the equipment were considered reasons to use the less expensive, better controlled impact of livestock.

We do not believe this technique is risky – in fact we have had success with this technique in other areas, such as Wickiup Draw on the Walker Basin Range Allotment. The impacts to the soil and vegetation of this proposal and of no action are discussed in the EA, Chapter 4. We expect this project will move the area toward desired conditions more quickly than if left alone.

4) *Mr. Burgess approves of the rest periods built into the pasture rotations. However, he believes the Forest Service would have a better opportunity to improve with a conventional grazing system rather than what he sees as a strategy based strictly on time controlled grazing.*

Forest Service Response:

The grazing strategy we are proposing is based on season and length of graze that is tied to plant growth stage, long periods of rest based on plant recovery needs and forage utilization of 40% or less. The current grazing strategy for the allotment also uses these principles, though grazing is managed for "light to moderate (up to 50%) forage utilization. The overall strategy has been in place for 10 years and is generally working well. However, requirements have changed for Mexican spotted owl habitat and new information shows a more appropriate level for long term sustainability of the rangeland resource is at the lower, 40% level. The planning team and the Rangers evaluated the past use (>10 years ago) on the allotment, when a conventional rest rotation system and regimented seasonal use was in place. The Rangers decided the current strategy was indeed allowing better use and distribution, resulting in improved conditions and impacts than under the previous system. The Rangers believe the management changes proposed in the Preferred Alternative would move closer to meeting the Forest Plan goals for all resources.

Debbie Noel, AG&FD

1) *Ms. Noel, and the AG&FD, recognized the improvements in the data collected and presented between the Proposed Action presented in 1998 and the current EA. The additional data helped the AG&FD have greater confidence in the ability of the proposed grazing strategy to maintain and continue to improve the rangeland resources on the 13-Mile Rock Range Allotment.*

Forest Service Response:

We are pleased the data presented here has answered the Department's earlier concerns and questions, as documented in the EA, Chapter 1.

2) *AG&FD is concerned about the statement about elk use in the absence of livestock grazing and the potential for deterioration of vegetation over time due to elk use only.*

Forest Service Response:

This concern was addressed in the previous response to the Forest Guardians comment #3. The Forest Service and AG&FD are working to manage the impacts of both livestock and elk through this planning effort, elk hunt and management recommendations and by cooperatively monitoring use and impacts of these ungulates. As stated in the Proposed Action and the EA, the Forest Service and AG&FD will continue to work together in the future.

3) *AG&FD is concerned that the prescribed burning proposed for the tobosa grasslands on Wingfield Mesa may result in a decline in range conditions. Ms. Noel recommends small test plots of prescribed burning at different times of the year and with various soil and air moisture regimes to determine the most effective treatment of tobosa grass without risking a decline in range condition or complete conversion to a tobosa monoculture.*

Forest Service Response:

There is a substantial body of documented research and prescribed burning trials in tobosa grasslands in the Southwest and specifically in the Agua Fria Grasslands of Central Arizona. The AG&FD partially funds the prescribed burning projects in the Agua Fria grasslands. The objectives of the prescribed burning proposed for the 13-Mile Range Allotment include removing the old, decadent leaf biomass to stimulate growth and increase palatability to livestock, increase use on tobosa and decrease use on other species to increase diversity and decrease the dominance of tobosa grass, and to reduce the occurrence of woody vegetation encroaching into the grassland. These objectives need to be accomplished with minimal impact to the Class 1 Airsheds of the Verde Valley and the Yavapai-Apache Nation in Camp Verde. Studies by Neuenschwander, et al. (1975, 1978), Boren (1985), Britton, et al. (1983) and Wright (1969, 1971,1972) and personal communications with the Resource Staff Officer at the Verde Ranger District, Prescott National Forest support the proposal for prescribed burning in June. These reports document the historically incidence of naturally occurring fires in tobosa grasslands and the effectiveness of prescribed burning in meeting our stated objectives. The decline in range conditions that is a concern for the AG&FD has not occurred in these studies. In fact, forage conditions improved and forb production either had no response or responded favorably to spring burning. In addition, as stated in the EA, Chapter 4, smoke impacts are best mitigated in the Class 1 airsheds of the Verde Valley and Yavapai-Apache Nation in Camp Verde and the long-term smoke production and smoldering does not

occur in these vegetation types under the high temperatures and low relative humidities typical in late June. These conditions and season are referred to as Best management Practices in the Forest and Range Management Burn Rules, administered by the Arizona Department of Environmental Quality (ADEQ). The proposed burning will take place in two seasons; monitoring for effectiveness of the treatment will be evaluated after the first burn event and adjustments will be made if needed when the second burn is implemented.

4) *The AG&FD requests that pinyon not be included in the proposed Christmas tree cut on 400 acres in the Winter and Tanque Aloma pastures because pinyon has a high value for wildlife.*

Forest Service Response:

Pinyon are scattered throughout the proposed Christmas tree cutting area, and adjacent, areas of allotment. Our experience with Christmas tree cutting is that the density of trees will be reduced somewhat, and that cutting will be generally concentrated near the existing roads. The public generally prefers pinyon to juniper for Christmas trees and, if the offering is to be successful in meeting our goals for grassland maintenance and service to the public, both species will be offered. The expected reduction in the number of pinyons is not expected to impact wildlife forage or cover values to any substantial degree in this area. The Forest Service expects improvements in ground cover and forage availability in these winter wildlife habitat areas, and benefits from openings interspersed with cover.

5) *AG&FD is also concerned that the public will create "wildcat roads" in the Christmas tree cutting area, and recommends that any of these roads be properly and permanently closed to further use by recreationists.*

Forest Service Response:

The public may drive off the roads to get their Christmas trees. However, this area is generally too rough for cross-country driving, and the permits will contain language specifying that off-road driving is not permitted to protect soils and vegetation. We do recognize that some people may "discover" the area when they come to get their Christmas trees, and may come back to recreate there. If new roads are created and evident after the Christmas tree cut, the tracks will be disguised to the casual observer using brush and litter to discourage future use. Though the potential impacts will be monitored and documented, currently there are no plans to expend additional Forest Service funds to close off-road use in this area.