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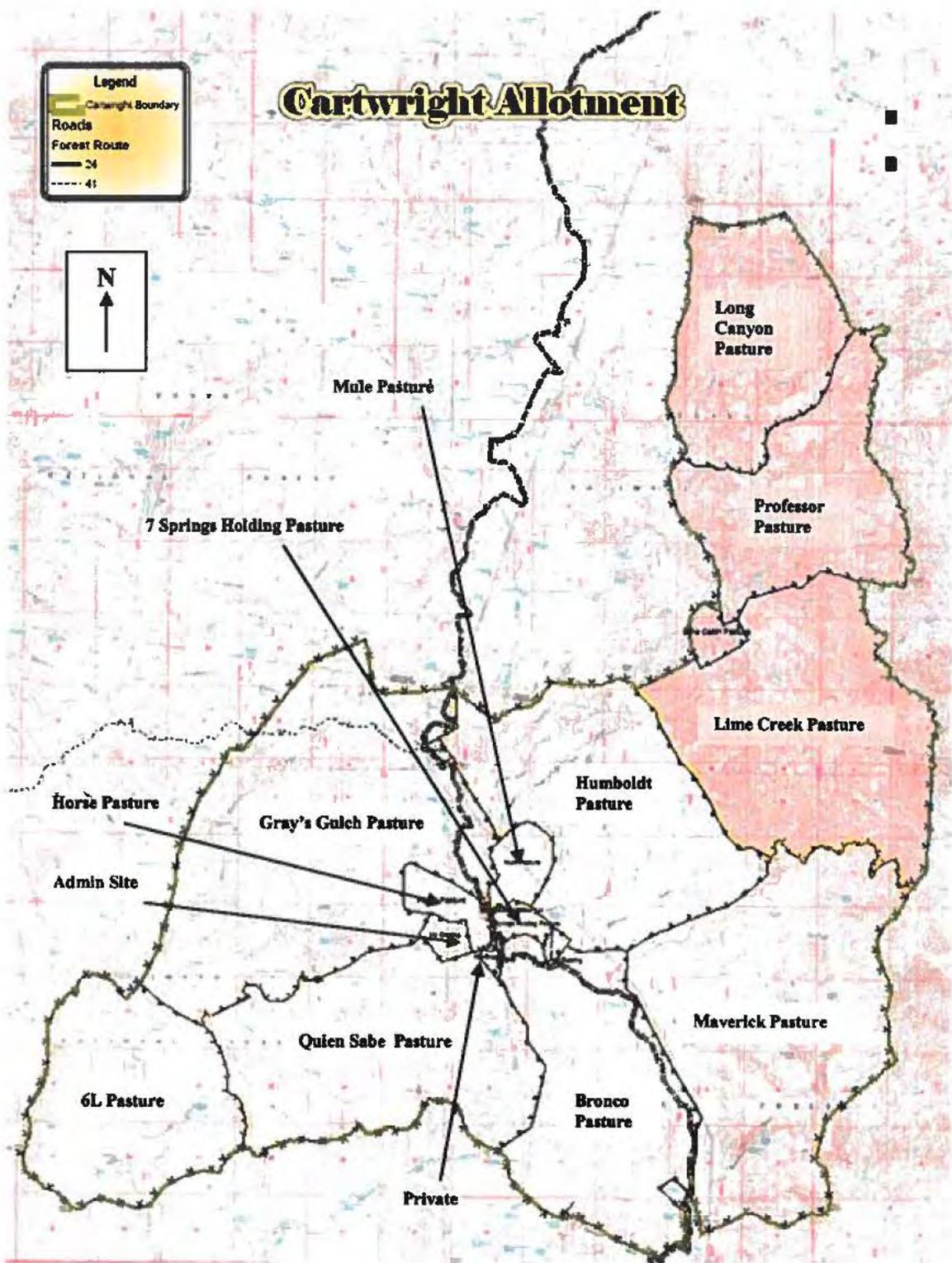
Southwestern
Region



Environmental Assessment for Cartwright Allotment

Tonto National Forest





Summary

The Tonto National Forest land Management Plan has identified lands contained within the Cartwright livestock allotment as being suitable for grazing. To comply with the Rescission Act of 1995 (Public Law 104-19), which directed the Forest Service to complete a National Environmental Policy Act (NEPA) analysis and decisions on all allotments and to incorporate relevant management direction to meet agency objectives, an Environmental Assessment (EA) was written on the Cartwright allotment. The NEPA requires us to do new analysis when there is a significant change to the environment; in this case the Cave Creek Complex (CCC) Fire occurred in 2005 significantly altering the landscape of the allotment. An interdisciplinary team (IDT) was formed on the Forest to conduct the analysis. Comments from interested parties were solicited to help develop this assessment, and a proposed action was developed. After further conversations with the permittee an additional alternative was prepared.

The Cartwright Allotment is located in Maricopa and Yavapai Counties on the Tonto National Forest, seven air miles NNE of Carefree, Arizona and approximately 30 miles north of Phoenix. This allotment has a history of grazing by domestic livestock dating back to the late 1800's. The allotment includes approximately 56,000 acres within three sub drainages (fifth code watersheds) of the Salt and Verde rivers and occurs in Management Area 1F of the Tonto National Forest Plan (USDA 1985, as amended). The vegetation on the allotment is extremely variable and consists of Sonoran Desert scrub, semi-arid grassland, chaparral, and juniper savannas. Small areas of riparian vegetation occur in drainages. Topographical features range from nearly level valley and elevated plains to very steep mountains and escarpments. A variety of resources exists within the allotment and was analyzed by specialists from the Tonto NF through the use of both recent data collection and the use of historic information.

This EA presents the results of the analysis of the environmental effects of grazing on current resource conditions that occur on the allotment. Current permitted livestock numbers for the allotment allow for up to 400 adult cattle year-long and additional yearling progeny of the adult cattle (not a fixed number) for five months. This represents a reduction of the numbers of cattle permitted in 2005 from 640 adult cattle and 336 yearling cattle. The permittee has been running reduced livestock numbers for the past several years due to ongoing forest and statewide drought conditions and the effects of the 2005 CCC Fire. Three alternatives developed during the analysis process consider some form of continued grazing use for the Cartwright allotment using adaptive management techniques. One alternative considers the removal of livestock from the allotment.

This analysis is supplemented by a Biological Assessment drafted by the Cave Creek Ranger District wildlife biologist and reviewed by the US Fish and Wildlife Service. It also includes specialists' reports which are contained in the Project Record.

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Chapter 1: Purpose and Need for Action

This action proposes to continue authorizing livestock use within the project area under updated management direction designed to achieve management objectives and move existing resource conditions toward desired conditions. The Tonto National Forest Land Management Plan (1985) has determined that lands within the management area that contains Cartwright Allotment are suitable for domestic livestock grazing.

The need for this action is to comply with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations and to incorporate relevant management direction to meet agency objectives. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. Livestock grazing on the Cartwright Allotment was previously analyzed with an Environmental Assessment and Decision Notice dated June 7, 1989. NEPA requires us to do new analysis when there is a significant change to the environment, i.e. the 2005 Cave Creek Complex (CCC) Fire. The Cartwright Allotment has been identified as a high priority for NEPA analysis by the Tonto National Forest due to concerns regarding threatened and endangered species, and the possible effects current management was having on them.

Background and Project Location

The Cartwright Allotment encompasses approximately 56,000 acres NNE of Carefree, Arizona in Maricopa and Yavapai Counties, Arizona (Map 1). The Seven Springs Recreation Site is located in the middle of the allotment. The lower Verde River-Horseshoe and Bartlett Reservoirs (a few miles to the east) watershed makes up the eastern portion of the allotment. The Camp Creek Recreation Residence area is located on the south boundary of the allotment. This allotment lies within portions of T7N, R4, 5, 6E; T8N, R4, 5, 6E; and T9N, R5 and 6E, on the Cooks Mesa, Rover Peak, Humboldt Mountain and New River Mesa quadrangles. The allotment is within the Tonto NF Land Management Plan (LMP) Management Area 1F. Management emphasis for 1F is on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed so as to improve them to a satisfactory or better condition, and to improve and manage the included riparian areas. The resource objective is to improve livestock forage production and wildlife habitat diversity, as well as to achieve the desired resource condition (a mosaic within the total type) that provides for a mix of successional stages.

Access to the allotment is obtained from Forest Road 24. Elevations on the allotment range from approximately 2,220 feet near where Lime Creek leaves the allotment to 5,200 feet on the summit of Humboldt Peak. The vegetation on the allotment is extremely variable and consists of Sonoran Desert scrub, semi-arid grasslands, chaparral, and juniper savannas. Small areas of riparian vegetation occur in drainages.

Climate on the Cartwright Allotment is characterized by a bimodal precipitation pattern with about 60 percent occurring as frontal systems in the winter from December to March and about 40 percent occurring as monsoons in the summer from July to September. Summer storms can be more intense than winter storms but are generally of shorter duration and of smaller aerial extent.

Climate gages near the allotment include Carefree (WRCC 2007), Cave Creek at Spur Cross, and Seven Springs (FCDMC 2006). The Carefree gage has the longest period of record (1962-present) and the normal annual precipitation is 13.28 inches (NOAA 2007). The other two gages have fairly short periods of record: Cave Creek at Spur Cross 1993-present and Seven Springs 1981-present. The Carefree gage indicates six out of the last ten years (1997-2006) have had below normal precipitation, with two of those years being below 50% of normal. At the same gage, eight of the ten years 1996-2005 have seen warmer than average temperatures. The other two gages have too short a record to determine an accurate average precipitation, though 2006 was dry compared to the other years.

The Cartwright Allotment has a history of livestock grazing from the 1800's. The Cartwright family moved to the Seven Springs ranch in the late 1800's and was the permittee of record since the Tonto NF was created until 1980. Part of their family history was inscribed next to a petroglyph-covered panel near Lime Creek cabin. Total animal months (HMs) records were kept starting in 1909 when stocking was 18,850 HMs. Stocking increased to a high in 1918-1920 of 31,030 HMs. The largest decline in HMs was in 1945 when numbers went from 21,129 HMs to 9200 HMs where they stayed until 1954.

The September 24, 2001 Term Grazing Permit was for 640 adult cattle yearlong and 336 yearlings from January 1 through May 31. In 2001 the allotment was grazed with 354 mature cows and 149 yearlings. All livestock were removed from the allotment by May 31, 2001. The allotment was rested between May 31, 2001 and March 1, 2005. A new permittee purchased the base property December 17, 2004 with the current Term Grazing Permit signed on February 7, 2005. That Term Grazing Permit currently is for 300-400 adult cattle yearlong and yearling progeny of the adult cattle from January 1 through May 31 (not a fixed number). The new permittee put ten cattle and two horses on the allotment from March 1, 2005 until June 21, 2005 when the Cave Creek Complex Fire started. The total HMs for the adult cattle on this allotment under the current permit is 4800 HMs. The exact yearling progeny HMs cannot be added in as the allowable number is not a fixed number in the permit due to variability in calf crops. For example, if there was a 50% crop of calves in a given year, if the calves are allowed to be carried over as yearlings starting January 1st, yearlings would add on 700 HMs for a total of 5500 HMs, ($400 \times 50\% = 200 \times .7 \text{ {yrlg factor}} = 140 \times 5 \text{ mos.} = 700$; $700 + 4800 = 5500 \text{ HMs}$).

Billing records indicate that numbers of cattle on the Cartwright Allotment in the past ten years ranged from a high of 9164 HMs to a low of zero. Actual use records for the allotment are sporadic and were not incorporated into this assessment. Before 2005 the allotment was managed under a two-herd yearlong cow/calf/yearling system with carryover of natural increase to May 31 each year. Before 1989 the major part of the allotment was used by most of the herd yearlong, with no scheduled moves, and the Lime Creek basin area was used by about 100 head in a three pasture rotation system. The Lime Creek basin area incorporates the three pastures (Long Canyon, Lime Creek and Professor Pastures) that the current permittee has agreed to exclude from grazing under all the alternatives. After the Allotment Management Plan was completed in 1989, fencing and water developments were constructed on the allotment, and a rest-rotation grazing system was put into effect with two separate herds. Due to the extended

drought, cattle were destocked in October 2001. Ten cows and two horses were grazed on the allotment in 2005 from March until June when the Cave Creek Complex Fire started.

Public Involvement

The Cartwright Allotment Management Plan and EA proposal has been listed in the Schedule of Proposed Actions (SOPA) since October 1998. This analysis was put on hold for a period of time and then initiated in April 2007. A scoping document for the proposed action was sent to the public on April 9, 2007. The purpose of the document was to describe the proposed action to any interested/affected parties, and solicit comments from those who may have concerns with the proposed action. The scoping document was sent to 50 individuals, 33 private organizations, 11 tribes, 1 university professor, 23 state/county/community officials, 5 federal agencies and 3 congressional delegates. From these scoping activities, ten letters were received. The Forest performed a content and analysis on this information and the information gained through internal scoping. The comments received and content analysis is located in the Project Record

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action and were included as issues. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council for Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detail study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project record.

Significant Issues Tracked:

Issue	Monitoring for the Issue
1. Cattle remove native vegetation which is replaced by non-natives resulting in soil erosion and compaction in desert ecosystems.	Read clusters, compile soil quality, photo point monitoring.
2. Cattle grazing results in introduction of non-native vegetation resulting in type conversion.	Read clusters, photo point monitoring, range monitoring and inspections.
3. Presence of cattle in riparian areas causes changes in species composition and structure leading to bank erosion and lost sensitive species habitat.	Regeneration of woody species-trend measurement; measure density change and changes in canopy cover by species; cross sections/greenline to greenline widths; photo point monitoring.
4. Moderate to heavy cattle grazing on moderately steep to steep chaparral slopes that are recovering from recent fires could result in slower recovery of shrub species and remove herbaceous species and result in increasing erosion.	Photo point monitoring; litter and basal area information; range monitoring.

Existing Condition-Soils and Vegetation

The largest documented change in vegetative condition occurred between the 1954 and 1963 readings, during a time of extremely heavy grazing (utilization) coupled with a severe summer drought in 1960. Forage plants were not able to maintain their previous density under these adverse conditions. Large areas of bare soil became available for invader species (i.e. catclaw, mesquite, prickly pear) to move in. In 2005 the noxious weed, Malta starthistle (*Centaurea melitensis*) was discovered along roadways and in Humboldt Pasture.

Trend monitoring data exists from clusters that were read in 1963-4, 1985, 1977, 1985, 1994, 1998, 2000, 2006, and 2007 depending on the location of the cluster. Cluster data collection is spaced approximately ten to twenty years apart for rereading. Existing clusters were reread over a period of time from 2006-2007. Clusters were reread in 2006/2007 to document changes occurring since the 2005 CCC Fire. All of the sites that were sampled had been affected by the fire to varying degrees, and all sites occurred in semi-desert grasslands. Prior to the fire, most locations contained moderate amounts of juniper and various shrub species. The junipers were not resprouting or recruiting at the time of these visits. Many shrub species were resprouting and a few were recruiting as well, particularly acacia and mimosa. Additional shrubs present included mesquite, menodora, Turbinella oak, sugar sumac, and false mesquite. Perennial grass recruitment and resprout varied from site to site, but all established perennial grasses were vigorous. Seed heads were abundant on side-oats grama. Other species observed included green sprangletop, Arizona cottontop, cane beardgrass, curly mesquite, spidergrass, purple three-awn, vine mesquite, tobosa, and hairy grama. Of the eight clusters showing a vegetative condition from very poor to good, six clusters showed an upward trend, one cluster had a stable trend and one cluster in the 6L Pasture indicated a downward trend.

The Cartwright Allotment had been heavily impacted by livestock grazing for many years and had very little management until the early 1980's. The most heavily impacted areas were the central, flatter portions of the allotment in the vicinity of FR 24. Other heavily used areas were the flats and associated riparian areas near the larger drainages: Lime Creek, Long Canyon, and Cave Creek. With the exception of Skull Mesa (remote with little water) nearly all areas on slopes of less than 15% were heavily impacted. Slopes of greater than 15% had been less impacted than the flats. In recent years, because of improved management and complete removal of livestock in 2001, conditions on the allotment have improved. The areas that have had heavy impacts in the past now have better grass cover and improved soil conditions. Parts of the allotment were affected by the 2005 Cave Creek Complex Fire. Some areas have recovered from the fire while some, specifically chaparral areas, have not.

Soil condition data were originally collected from 1992 through 1994 and a modified Terrestrial Ecosystem Survey (TES) report was written for the Cartwright Allotment in 1995. The 1995 report lists 34% of the allotment in unsatisfactory soil condition and 2.5% in an impaired condition. Most of the unsatisfactory soils occurred on slopes of less than 15% and showed signs of compaction and erosion. Areas with less than satisfactory soil conditions were a result of past management practices. Since the 1995 report was written, soil conditions on the Cartwright

Allotment have improved. The allotment has been destocked since October of 2001 which has allowed recovery. An inspection conducted in 2007 shows increased grass cover and better surface soil structure. Not enough data was collected to quantify changes in soil conditions; however, most grasslands and open juniper savannas now have a fair to good cover of perennial grass. The main exceptions are areas of expanding clay soils (Vertisols and Vertic subgroups) that have mostly annuals grasses with few perennials. The 2005 Cave Creek Complex Fire affected soil conditions. Many steep chaparral slopes that had satisfactory soil condition prior to the fire are currently classified as impaired because of a lack of ground cover. These areas cover about 10% of the allotment. It may take several more years for these areas to recover. For a definition of soil condition categories, please refer to Appendix A,

The allotment contains 5,636 acres of Sonoran Desert vegetation. Of this amount, 2,663 acres occur in the Lime Creek Pastures (Long Canyon, Professor, and Lime Creek) that would be excluded from grazing under the proposed action. The 6L pasture, proposed for use as a grass bank, contains 929 acres of desert vegetation. Under the proposed action, 2,000 acres Sonoran Desert vegetation would be included in pastures that would be part of the scheduled rotation and of this total; only about 40% occurs on slope of less than 40% and would likely to be affected by grazing. The Cave Creek complex fire burned 2,743 acres of Sonoran Desert vegetation of which 1,622 acres occur in pastures proposed for rotational grazing. About 65% of these acres occur on slopes greater than 40% leaving about 550 burned acres on slopes likely to be affected by cattle grazing.

About 80% of the allotment was within the burn perimeter of the 2005 Cave Creek Complex Fire. About 45% of the allotment experienced low burn severity and about 25% had moderate severity. 10% was within the burn perimeter but classed as unburned or underburned. Less than 1% had high burn severity. Major vegetation types within the burn included Sonoran desert scrub, semi-desert grasslands, open juniper woodlands, and chaparral. Most of the Sonoran Desert that burned experienced low burn severity. However even with low burn severity, high mortality of non-fire-adapted species such as saguaro and paloverde can occur. In semi-desert grasslands and juniper savannas, most of the burn was low severity with significant amounts of moderate severity. Inspections of these ecosystems in 2007 show a good recovery of herbaceous vegetation but mortality of trees and shrubs such as juniper, mesquite, and prickly pear was moderate to high. Woodlands with moderate to high burning severity experienced high mortality of overstory plants, but good recovery of herbaceous vegetation has occurred. About 45% of the moderate and high burn severity occurred in chaparral vegetation. In these areas nearly all of the overstory vegetation was destroyed, however, most of the species in this vegetation type are adapted to fire and have resprouted. Some browse species such as desert ceanothus will grow from seeds and are sensitive to grazing for the first few years following re-establishment. Most of the burned chaparral areas still have unstable watershed conditions. Ground cover is below pre-fire conditions and erosion rates are still high. It will take several more years for the watershed to stabilize.

The analysis area is predominately a Juniper/Grassland area surrounded by chaparral and Semi-desert Scrub fuel types. The chaparral fuel type is Turbinella Oak which has a historic fire return interval of 75 to 100 years. The grass fuel type has a historic fire return interval of 7 to 10 years. The presence and abundance of annual grasses varies each year and is dependent upon

precipitation levels. The abundance of grasses increases the potential for wildland fire to have an effect on the analysis area at any time throughout the year. In 2005 the Cave Creek Complex Fire burned approximately 80% of the Cartwright Allotment thus disrupting the natural fire regime (natural fire return interval) for the analysis area. Fifty-six fires, varying in size from .2 to 248,655 acres, have burned parts of Cartwright Allotment since 1993.

Due to the sudden change in fuel loading, fire return intervals and burn severity from the Cave Creek Complex, the Cave Creek Ranger District does not plan to use prescribed fire in the analysis area for an undetermined amount of time. In the future, when appropriate, the district does plan to reintroduce prescribed fire back into the area.

Existing Condition – Riparian and Hydrologic features

The Camp Creek-Lower Verde River watershed encompasses a small portion in the southeast of the allotment. The headwaters of Camp Creek originate here and eventually flow into the Verde River below Bartlett Reservoir.

The Cave Creek-Arizona Canal Diversion Channel watershed makes up the remainder of the allotment. Cave Creek, formerly a tributary of the Salt River and now channelized (off the Forest) into the Arizona Canal, drains the western two-thirds of the allotment. Critical riparian reaches, similar to upland key areas, are those stream channels/ springs/ riparian areas selected to indicate achievement of management objectives. They are representative, responsive to changes in management, contain key riparian species, and are accessible to livestock (Interagency Technical Team 1996). Nine critical reaches within this allotment were selected. They are listed by pasture in the table below (Table 1). The selection of these critical areas is based on analysis of over 80 miles of intermittent and perennial stream channels on the Cartwright Allotment

Critical reaches were rated as trending from unstable, to impaired, to stable, with several reaches indicating improvement in the past eight years. (Grove, Mason 2007 specialist report)

Table 1: Summary of critical reaches including channel condition and stream type by pasture.

Stream Name	Pasture	Stream Type	Condition	Date
Cave Creek #4 – below 6L Ranch	6L	Bc	Unstable	4-8-98
Cave Creek #6 – above group site	Grays Gulch	F B	Impaired Stable	8-23-99 5-22-07
Cave Creek #8 – above Cramm Mtn.	Grays Gulch	F	Impaired Slightly Impaired	2-2-00 5-22-07
Cave Creek # 12 – just above group site	Grays Gulch	B	Impaired	9-10-02
Cave Creek #10 – below Ashdale	Quien Sabe	Bc	Not assessed	1-10-92
Cave Creek #3 – below Ashdale	Quien Sabe	F Bc	Not assessed Unstable	7-21-92 6-27-97
Camp Creek #1 –	Maverick	Bc	Impaired	4-26-96

above exclosure				
Camp Creek #5 – above exclosure	Maverick	F F F	Unstable Not assessed Not assessed	9-26-96 9-8-02 1-31-05
Seven Springs Wash #2 – by upstream fence	Bronco	C Bc C Bc	Impaired Impaired Not assessed Not assessed Impaired	4-19-96 3-19-98 4-18-02 1-31-05 5-22-07
Walnut Spring	Humboldt	G	Not assessed	5-15-98
Walnut Spring Canyon #1 – above fence	Seven Springs Holding	B B	Impaired Not assessed Slightly Impaired	3-31-98 9-28-02 5-22-07
Walnut Spring Canyon	Mule Holding	B	Not assessed	5-22-2007

Following are descriptions of the critical reaches only.

Cave Creek

Humboldt Pasture: The channel is boulder and cobble dominated with bedrock outcrops. Tree species include Arizona sycamore, velvet ash, red and Goodding willows and Fremont cottonwood. Seep willow is the most common shrub, tamarisk is present, and herbaceous species include deergrass, waterbent grass, rabbit foot grass, rush species, American bullrush, spikerush, veronica, Bermuda grass, and red brome. There are no recent observations of Cave Creek in this pasture. However, because its topography and flow regime are similar to the reach of Cave Creek in the upper Gray's Gulch Pasture, it has probably responded to non-use with an increase in riparian vegetation species diversity and cover.

Upper Gray's Gulch Pasture: The reach was visited in the spring of 2007. The stream channel is currently a stable "B" type. Both riparian vegetation and stream channel condition show an upward trend. Photographs document the re-establishment of riparian tree seedlings and saplings, and a building floodplain with streambanks. Herbaceous riparian vegetation cover has increased dramatically (ocularly estimated between 50 – 75%). Emergents have narrowed the channel and created undercut streambanks. This area has not been grazed since 2000.

Quien Sabe Pasture: In 1999, Cave Creek in this pasture was classified as a "Bc" stream type (Rosgen 1996). Livestock distribution is difficult to manage in this pasture because of cattle's preferential use of the Cave Creek riparian area. Photopoints and field observations in 2007 document streambank building and canopy cover and density increases in riparian vegetation.

Lower Gray's Gulch Pasture: The channel is an impaired "F" with an upward trend. The area has been rested since 2000. A field visit in 2007 indicated that the emergent herbaceous vegetation is increasing, trapping sediment and widening the riparian area at the greenline. There is a high density of cottonwood, willow, ash and sycamore seedlings and saplings.

6L Pasture: The stream is intermittent in this pasture with perennial pools. A stream inventory and assessment was done in 1998 on Cave Creek below the private land boundary. This reach was a "Bc" type stream (Rosgen 1996) with unsorted sediments. There are a few (approximately 15% of the reach) large cutbanks contributing a considerable amount of sediment to the stream during high flows with little vegetation to protect the banks and trap sediment, consequently the width/depth ratio is very high. The reach was rated unstable. The stream had downcut abandoning the old floodplain with a few remnant large Fremont cottonwoods, willow, and ash located high above the existing channel. Above this old floodplain was a mesquite bosque. Along the greenline and the poorly developed floodplain, there were a few hedged seedlings and saplings of cottonwood, ash, red and Goodding willows and sycamore. Seep willow was the most common woody species. Tamarisk is present. The herbaceous component included trace amounts of deergrass, cat-tail, water bent grass, Bermuda grass, American bullrush, monkey-flower, and non-native clovers.

Walnut Spring Canyon

Mule Holding Pasture: This lower reach near its confluence with Cave Creek burned in the Cave Creek Complex fire. Observed in 2007, many of the sycamores along the channel are resprouting. In the upper unburned reach, herbaceous riparian vegetation was abundant, although the channel showed little change from previous visits. Walnut Spring Canyon is primarily a "B" type stream. Much of the channel is stable bedrock. This pasture has been used mostly by horses.

Seven Springs Holding Pasture: The channel is similar to the upstream part of the reach in the Mule Holding Pasture, although more herbaceous vegetation was observed in this pasture in the spring of 1998. Cattle use of riparian vegetation and physical impacts to streambanks were also observed.

Humboldt Pasture: Walnut Spring is a tributary to Walnut Spring Canyon. The spring is developed and has a small enclosure around it. The spring is just across the road from Walnut Spring Canyon and the perennial reach extends upstream for approximately 100 yards. The stream is narrow (2-15 ft.) and the banks are mostly bedrock. The vegetation includes a large amount of deer grass which showed high use by cattle in May 1998.

Seven Springs Wash

Upper Bronco Pasture: The lower half mile of the channel lies in a canyon and supports riparian vegetation. Water is perennial from the springs just above the pasture boundary. The stream is a "Bc" type (Rosgen 1996) in impaired condition (Mason and Johnson 1999). The stand is currently dominated by a dense sapling and pole thicket of ash, willow and sycamore. The Cave Creek Complex Fire burned most of the Seven Springs Wash watershed. In July 2005, a monsoon storm occurred in the vicinity of Camp Creek and Seven Springs Wash. Flooding on Seven Springs Wash caused some loss of riparian vegetation in this reach and deposition of large amounts of sediment. The vegetation is recovering, but the channel remains impaired because of excess sediment.

Camp Creek

Maverick Pasture and Exclosure: Riparian vegetation above and within the exclosure is dominated by red and Gooddings willows, and Fremont cottonwood, seep willow, deergrass, with Bermuda the dominant understory species above the exclosure. The vegetation within the exclosure has higher cover and density, and a narrower channel. Since the fire and subsequent flooding, the channel has received a pulse of sediment both within and outside the exclosure. There was high mortality of vegetation in the entire reach. Recovery is occurring slowly.

Existing Condition – Wildlife and Aquatics

Game species that occur on the allotment include mule deer, white-tail deer, mountain lion, black bear, javelina, coyote, gray fox, bobcat, raccoon, Gambel's quail and dove. Nongame species include rock squirrels, desert cottontail and jackrabbit, and a variety of birds, rodents, reptiles and amphibians.

Sensitive species that may occur on the allotment include: common black hawk, Arizona Bell's Vireo, Western red bat, Townsend's big-eared bat, lowland leopard frog, Arizona Southwestern toad, Sonoran desert tortoise, and obsolete viceroy butterfly. The allotment provides suitable occupied habitat for the endangered Gila topminnow within Lime Creek. Eighteen Management Indicator Species (MIS) including aquatic macroinvertebrates may occur on the allotment. (Willard 2007 specialist report)

Approximately one mile of Cave Creek, downstream from Seven Springs Picnic Area provides potential flycatcher habitat. Potential flycatcher habitat is characterized by existing multi-layered riparian vegetation, perennial flows or moist soils, low stream gradient (2% or less), and available flood plains and suitable substrate for establishment of additional riparian vegetation. Lime Creek is within 3 miles of occupied flycatcher habitat within the upper portion of Horseshoe Reservoir and portion of Verde River near Ister Flat.

Table 2 reflects threatened, endangered or sensitive species and potential habitat that are known to occur on the Cartwright allotment.

Table 2: TES Species or Potential Habitat Known to Occur on the Allotment.

Federally Listed Threatened, Endangered, FS Sensitive Species		Project Area Status
Gila Topminnow (<i>Poeciliopsis occidentalis occidentalis</i>),	E	S
Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>)	E	PH
Forest Service Sensitive Species		
Common Black-hawk (<i>Buteogallus anthracinus</i>)	FS-S	S
Arizona Bell's Vireo (<i>Vireo bellii</i>)	FS-S	S
Lowland Leopard Frog (<i>Rana yavapaiensis</i>)	FS-S	S
Arizona Southwestern Toad (<i>Bufo microscaphus microscaphus</i>)	FS-S	S
Sonoran Desert Tortoise (<i>Gopherus agassizii</i>)	FS-S	S
Western Red Bat (<i>Lasiurus blossevillii</i>)	WC, HP	S
Townsend's Big-eared Bat (<i>Corynorhinus townsendii</i>)	HP	S
Obsolete Viceroy Butterfly (<i>Limenitis archippus</i>)	FS-S	S

Key:

E = Federally Listed as Endangered, under Endangered Species Act (ESA)

FS-S = on Regional Forester's Sensitive Species List

WC = Wildlife of Special Concern in Arizona (Draft 1996)

HP = High Priority Species; "at risk of imperilment" (Western Bat Species Regional Priority Matrix 1998).

S = Species known to occur in the analysis area, or in the general vicinity of the area.

PH = Potential Habitat identified based upon species mobility and existing habitat characteristics.

The list was developed from personal knowledge of the area by the Cave Creek District biologist, the Forest Fisheries Biologist, District Records, and the AGFD Heritage Nongame Data Management System data base. The District Biologist also communicated with AGFD non-game personnel.

Table 3 reflects management indicator species that occur or are likely to occur on the Cartwright allotment. Management indicator species were selected during the Forest Planning process to adequately monitor implementation of project actions on wildlife habitat and species diversity. These indicator species reflect general habitat conditions or significant habitat components which are of value to these and other species with similar habitat needs. Management indicator species for the Tonto National Forest are listed in Appendix G (page 249) of the Tonto Plan.

Table 3: Management Indicator Species for the Cartwright Allotment

Habitat Type	Indicator of :	Tonto Status
Woodland		
Ash-throated flycatcher	Ground cover	Stable
Gray vireo	Tree density	Unknown
Plain (juniper) titmouse	General woodland conditions	Stable
Common (northern) flicker	Snags	Stable
Rufous-sided (spotted) towhee	Successional stages of pinyon-juniper	Stable/increasing
Chaparral		
Rufous-sided (spotted) towhee	Shrub density	Stable/increasing
Black-chinned sparrow	Shrub density	Stable
Desert Grassland		
Savannah sparrow	Grass species diversity	Decreasing
Horned lark	Vegetative aspect	Stable/increasing
Desert Scrub		
Black-throated sparrow	Shrub diversity	Stable/increasing
Brown (canyon) towhee	Ground cover	Stable
Low Elevation Riparian		
Summer tanager	Tall mature trees	Decreasing
Hooded oriole	Medium-sized trees	Stable

High Elevation Riparian		
Hairy woodpecker	Snags, cavities	Stable
Gray squirrel	General riparian	Stable
Warbling vireo	Tall overstory	Stable
Western wood pewee	Medium overstory	Stable
Black hawk	Riparian streamside	Stable
Aquatic		
Macroinvertebrates	Fisheries habitat water quality	unknown

Existing Condition – Recreation

The recreation resource base within the Cartwright Allotment analysis area includes 6 public recreation sites, a 35 mile non-motorized trail system, including 3 trailheads, dispersed camping sites, part of the Great Western trail (24 road), a permitted hang gliding ramp on Humboldt Mountain and, 8 recreation residences lots (Summer Homes) within and 35 lots just outside the allotment boundaries. Items driving recreation use such as springs, riparian vegetation providing shade, historic structures from the CCC era and the proximity to the Phoenix Metropolitan Area have resulted in a steady increase in recreation use in the last decade.

Western Area Power Administration (WAPA) maintains the 345 KV Transmission lines that dissect the allotment. There are eight parcels of private property and patented mining claims within the allotment. A potential exists for two of the eight parcels to be acquired by the Forest Service as part of the Resolution Copper Land Exchange. The two parcels are LX Bar and 6L properties totaling 300 acres. There are no active mine claims on National Forest Lands within the allotment boundary. However, recent mining claims have been located in the Grey's Gulch area, but no Plan of Operation or Notice of Intent to Operate has been received by the Forest Service. The former Bearup mining claim (near Cramm Mountain) has had soil & holding water (heap leach) hazmat characterization completed and a final hazard mitigation plan will be implemented when funding permits. The road to the Bearup heap leach pond has been gated to prevent vehicle access to area.

The Seven Springs Recreation Area (SSRA) is located about 17 miles northeast of Carefree, and 50 miles northeast of Phoenix, Arizona. This popular year-round destination receives heavy recreational use on weekends and holidays, with some seasonal variation, and light use during the week. SSRA includes five separate recreation sites located along a one mile corridor of Forest Road 24. From south to north, these include Seven Springs Picnic Ground/day use area, CCC Campground, Cave Creek Trailhead (which access 5 trails covering 32 miles), and Cave Creek Group Site. The fifth site, informally known as Juniper Site, is an undeveloped area located north of Cave Creek Group Site and used by overflow campers and equestrians.

The Camp Creek Recreation Residence area consists of 43 lots, each authorized by Forest Service Special Use Permit. The lots are stream front oriented along approximately 1.5 miles of Camp Creek and two side drainages of Grapevine and Columbine Creeks. Lots located along the

side drainages are all within 300 feet of Camp Creek. There are four lots on Columbine Creek and 3 lots on Grapevine drainages, with the remainder on Camp Creek. The Cave Creek Complex Fire of 2005 burned 11 residences, one of which has been relinquished back to the Forest Service. The remaining burned residence permit holders have requested to rebuild. The NEPA analysis for rebuilding these residences and renewal of all 43 lots under permit is currently being analyzed, with a decision expected by 2008.

The Bronco trailhead is located about 13 miles northeast of Carefree, and 47 miles northeast of Phoenix, Arizona. Facilities consist of 6 metal horse pens, manure bin, solar powered well providing stock water, parking for 40 vehicles with trailers and vault toilets. This trailhead is the primary and closest access point for equestrian access to the Cave Creek Trail System and provides the only horse pens and stock water in the entire trail system. Unlike the SSRA, the vegetation and surrounding area are considered general desert, with little shade. This destination receives heavy recreational use on weekends and holidays, and light use during the week, with almost no use during the hottest summer months. Adjacent to the Bronco Trailhead is an existing stock holding pen that is maintained by the Cartwright allotment permit holder. Since the Bronco trailhead facility was opened for use in 1998, no known use of the stock holding pen by the permittee has been noted.

Commercial recreation use within the project area is limited to few operations and businesses, most of which are related to horseback riding on the Seven Springs Trail System or Off Highway Vehicle (OHV) tours to the Humboldt Mountain top view point.

Existing Condition – Heritage Resources

The Cartwright Allotment contains hundreds if not thousands of prehistoric archeological sites representing the occupation and agricultural modification and use of this area by people related to the Hohokam archeological tradition over a period of 8,000 to 10,000 years. It also contains hundreds of historic sites reflecting its use and occupation by Yavapai and Apache hunters, gatherers, and farmers, Anglo and Hispanic ranchers and stockmen, miners and prospectors, the Works Progress Administration, the Civilian Conservation Corps, and the U.S. Forest Service.

Only a small fraction of the allotment has been intensively surveyed to produce an inventory of heritage resources. Known heritage properties include a wide range of features, from standing wooden structures (within the Ashdale Administrative site) to collapsed and buried pithouses. The great majority of these features, however, consist of collapsed stone masonry structures, various water control devices such as check dams and terraces, roasting pits for the processing of agave, and petroglyphs hammered into the surfaces of rock outcrops and boulders. There are also a variety of features associated with mining and ore processing. Many other prehistoric and historic archeological sites are represented by nothing more than a scatter of artifacts on the ground surface.

No traditional cultural properties, native plant gathering areas or tribal sacred sites are currently known to be located within the allotment as identified by Tribal members.

Desired Condition - Soils and Vegetation

The 1987 Tonto National Forest Plan (p 44) articulated the following desired conditions for this area:

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

Forest Service Manual (FSM) Direction also states:

- 2550.1 – Authority 1, The Multiple use-Sustained Yield-Act states that management of the National Forests must provide “sustained yields in perpetuity without impairment of the productivity of the land.”
- 2550.3 – Policy “Manage forest and rangelands in a manner that will improve soil productivity.”

Forest Service Handbook (FSH) Direction reads:

- 2521.03 Policy: “Manage terrestrial ecosystems and NFS watersheds to protect soil productivity and hydrologic function. Implement soil and water conservation measures with management activities to maintain satisfactory or optimum watershed conditions.”

The intent of FSH 2509.18-99-1 is to maintain or restore soils to satisfactory condition. Rates of recovery will differ depending on several factors such as magnitude of past soil loss, inherent soil properties, current vegetative ground cover, and type of ecosystem. The desired conditions for soils are to:

- Maintain soils currently in satisfactory condition.
- Manage for upward trend of the soils that are in impaired condition.
- Manage soils that are in unsatisfactory condition to achieve impaired condition.

Grazing by domestic livestock can impact species composition (the proportion of plant species in relation to the total on a given area), cover (basal and canopy) and vigor (the relative robustness of a plant in comparison to other individuals of the same species) (Interagency Technical Reference 1996). Shifts in these vegetation attributes have been the greatest in four plant communities: Sonoran Desert, grasslands, chaparral, and juniper woodlands. Desired conditions for these vegetation communities are for:

- Grasslands (especially the flatter slopes), to increase the foliar canopy cover, basal cover, and vigor of grass species that decrease under grazing pressure.
- Chaparral, to increase the foliar canopy cover and vigor of “A” shrub species.
- Juniper woodland/savanna, to increase all of the above attributes.
- Sonoran Desert, to increase the cover of species that decrease under grazing pressure. Create conditions that allow for establishment and survival of saguaro seedlings.

FS Handbook 2209-21 provides guidelines and scorecards for determining appropriate soil and vegetation trends in various vegetative types. This trend method identifies changes in basal area of perennial plants, total ground cover, species composition, and vigor and assigns a score to help identify whether trends are downward, stable, or upward based upon previous

measurements using the same method. This is the procedure used for the data gathering documented in the first paragraph under Existing Condition- Soils and Vegetation.

Desired Condition - Riparian and Hydrologic features

The 1985 Tonto National Forest Plan (pp 41-44) articulated the following desired conditions:

- Achieve 80% of potential riparian overstory crown coverage;
- Rehabilitate 80% of the potential shrub and overstory canopy cover in riparian areas;
- Manage cottonwood and sycamore stands so that by 2030, over half of these areas include all age classes;
- Re-establish riparian vegetation in severely degraded but potentially productive riparian areas; and
- Avoid channel changes or disturbance of stream channels and minimize impacts to riparian vegetation.

The Forest Plan also incorporates the following desired conditions (pp. 19-20) stated in the 1983 Regional Guide for the Southwestern Region:

- Manage riparian areas to protect the productivity and diversity of riparian-dependent resources...;
- Improve all riparian areas to satisfactory or better condition by 2030, with 25% of riparian areas in satisfactory condition by 2000. Satisfactory conditions are specified below:
 - Maintain 80% natural shade over water surfaces;
 - Maintain 80% of natural bank protection;
 - Maintain the composition of sand, silt and clay within 20% of natural levels; and
 - Maintain three age classes of woody plants with 10% in seedling and saplings age classes.

Desired conditions for critical reaches include both short-term and long-term time frames. The most important short-term desired conditions are to:

- Maintain residual herbaceous vegetation along the greenline or streambanks whenever precipitation is expected;
- Minimize the annual impacts to seedling and sapling riparian woody species; and
- Limit physical impacts to alterable streambanks and greenlines.

The most important long-term desired conditions are to:

- Optimize riparian tree and shrub establishment, especially following episodic, regional winter storms;
- Increase the density, vertical and horizontal canopy cover of woody riparian tree species;
- Increase the proportion of obligate and facultative riparian species;
- Maintain or increase canopy cover of herbaceous species to at least 50%;
- Decrease the greenline to greenline width; (The greenline is the first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. *Winward 2000*)

- Optimize the establishment of floodplains and streambanks; and
- Improve stream channel function and stability.

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

The attainment of Tonto Forest Plan desired conditions for riparian vegetation are critical for achieving two important goals:

1. maintaining and improving wildlife and/or aquatic species habitat,
2. and achieving stream channel proper functioning condition (Barrett et al, 1993). The most common conditions limiting proper functioning condition of stream channels are high width-depth ratios, and excessive erosion or deposition. The recovery of riparian vegetation is essential for attainment of stability or proper functioning condition for many stream types.

The Arizona Department of Environmental Quality (ADEQ) evaluates the water quality status of waters within the state in a Nonpoint Source Assessment Report (2006). Cave Creek is the only drainage within the allotment that has been evaluated for the 2006 report. Water quality standards for Cave Creek is intended to protect the designated uses of aquatic and wildlife-warm water fisheries (A&Ww), full body contact recreation (FBC), fish consumption (FC), and agricultural livestock watering (AgL). Samples collected at two sites in 2006 indicate Cave Creek is "Attaining all uses".

Desired Condition-Wildlife and Aquatics

General wildlife resource goals for the Tonto National Forest are outlined on page 20 of the Tonto National Forest Plan (USDA 1986) and include providing for species diversity, maintaining viable populations of existing species, improving habitat for selected species, and managing to increase population levels of threatened and endangered species. Forage use by grazing ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species. In riparian areas across the allotment, regeneration of vegetation to achieve multiple age classes and complex vegetative structure for fish and wildlife habitat is desired.

Specific management objectives for big game species are identified in the Tonto Resource Land Management Plan and the Wildlife 2006 Strategic Plan (Arizona Game & Fish {AGFD} 2001). Strategic Plan goals for game species (including big and small game) include the following: 1) Maintain, enhance, and restore populations of game wildlife to provide for recreational opportunities, including wildlife viewing. 2) Minimize adverse impacts to wildlife and wildlife resources.

Desired Wildlife Condition for Cartwright includes:

- Increase habitat diversity and quality for aquatic and terrestrial species through proper range management, prescribed fire and wildlife habitat improvement projects. Appropriate use levels of forage within the uplands, and correct timing of grazing will permit further recovery of herbaceous and shrub layers, and provide improved habitat conditions for mule deer, white-tail deer, mountain lion, black bear, javelina, coyote, gray fox, bobcat, raccoon, Gambel's quail and dove, rock squirrels, desert cottontail and jackrabbit, and a variety of birds, rodents, reptiles. Appropriate use levels of forage within riparian and spring areas, in addition to correct seasonal use, will allow further recovery of herbaceous and woody species and promote improved habitat conditions for riparian obligate and aquatic species.
- Manage the desert scrub type to emphasize production of javelina, Gambel's quail, and mule deer (USFS, 1985). Desirable plant species include calliandra, filaree, sugar sumac, ratany, prickly pear cactus, saguaro seeds, spring annuals, agave chrysantha, seeds of Palo Verde / catclaw, jojoba / and juniper. Increase in such plant species will provide additional forage and hiding / resting cover for wildlife species.
- Manage the pinyon-juniper type to emphasize production of mule deer (USFS, 1985). Juniper browse and berries are utilized by the species, generally in the fall. Increase in such plant species will provide additional forage and hiding / resting cover for wildlife species.
- Manage chaparral type to emphasize the production of whitetail deer (USFS, 1985). Desirable plant species include Turbinella oak, skunk bush, mesquite, yellow-leaf siltassel, catclaw acacia, holly-leaf buckthorn, calliandra, filaree, sugar sumac, and buck brush, ratany and juniper. Increase in such plant species will provide additional forage and hiding / resting cover for wildlife species.
- Maintain a minimum of 30% effective ground cover for watershed protection and forage production, especially in primary wildlife forage producing areas. Where less than 30% exists, it will be the management goal to obtain a minimum of 30% effective ground cover (USFS, 1985).
- Coordinate with range to achieve at least 80% of the potential riparian overstory crown coverage (USFS, 1985).
- Coordinate with range to achieve utilization in the riparian areas that will not exceed 20% of the current year annual growth by volume of woody species. (Limiting use to < 50% of terminal leaders on the top 1/3 of plants that are accessible to livestock (<6 feet tall) is used as surrogate guideline because use by volume is extremely difficult to measure where use on terminal leaders is quick and repeatable. Use of 50% of terminal leaders on the top 1/3 of plants is equivalent to approximately 20% of annual growth by volume.)

- Rehabilitate at least 80% of the potential shrub cover in riparian areas through the use of appropriate grazing systems and methods (USDA, 1985).

Desired Condition – Heritage Resource

Based on a history of observation and consultation with the State Historic Preservation Officer (SHPO), managed grazing is not considered in and of itself to constitute an effect on heritage resources when the grazing strategy is designed to match herd size with capacity and distribute livestock as evenly as possible across the allotment in order to avoid localized concentrations of animals and the resultant impacts to soils and vegetation associated with intense trampling.

Permit numbers by themselves do not cause adverse effects to heritage resources. They result from the timing, duration, frequency, and intensity of livestock use and can be completely independent of permitted numbers. Changes in grazing strategy are likewise not considered to have an effect provided that whatever new strategy is implemented does not alter these conditions. Adverse effects can be foreseen if a proposed grazing strategy were to introduce livestock into an area not known to have been grazed historically. They may also be expected when a grazing strategy proposes shifting to a more intensive system where higher permitted numbers or high intensity/short duration schedules would concentrate livestock into confined areas where either the absolute or relative stock density would cause a significant increase in surface disturbances due to trampling that would be above previous or existing levels. This could result in either direct or indirect adverse effects depending on the degree of trampling resulting from localized concentration and on the presence or absence of heritage resources in the concentration area, the nature of the resource and its resistance to such impacts, and the distance to other heritage sites. For the most part, these conditions tend to be associated with the construction of range improvements designed to provide water or to concentrate and hold stock for roundup or shipping. Thus, the greatest potential for direct adverse effects to heritage resources is associated with the construction of range improvements and the access roads needed to build and maintain them.

Chapter Two – Proposed Action and Alternatives

This chapter describes and compares the alternatives considered for the management of the Cartwright Allotment. This section presents the alternatives in comparative form, in order to define the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Mitigation and monitoring measures incorporated into the alternatives are also described and in conjunction with the alternatives, they address the issues listed on page 7 of this document.

Alternatives Eliminated from Detailed Study

The No Action management alternative would have livestock grazing continued as currently permitted. Term permitted numbers are 400 adults year round plus natural increase of yearlings from January 1st through May 31st of each year. Livestock are managed in two separate herds. The first herd uses six pastures in a deferred, rest rotation grazing system. Use periods for each rotation range from 3 to 7 months per pasture with varying rests scheduled. The second herd uses three pastures (Lime Creek, Professor, and Long Canyon) in a deferred rotation grazing system. Use periods of each pasture range from 4 to 7 months followed by a rest period. The current Allotment Management Plan (AMP) does not follow Forest Plan objectives. A new permittee acquired the permit in January 2005. The livestock were removed from the allotment due to the June 2005 Cave Creek Complex Fire which burned a large number of pasture fences. The permittee is working with the District to implement a grazing plan that will better meet his needs and the needs of the resources. Thus the current management as implemented by the existing management plan was not considered.

Alternatives Considered in Detail

Alternative A

No Action/No Grazing

This alternative is required by regulation (Code of Federal Regulations 1502.8). Under this alternative, grazing would not be authorized and use of the allotment by domestic livestock would be discontinued. Permittees would be given one year from the date of the decision to remove livestock from the allotment. Existing structural improvements would remain in place but would not be maintained and may be removed. Improvements contributing to resource protection or enhancement, such as water developments important for wildlife, would be maintained where feasible using other program funds. Periodic inspection of structural improvements would be used to determine whether maintenance or removal is needed. Removal or maintenance of improvements would be authorized by a separate decision. Where necessary, maintenance of allotment boundary fences would be reassigned to adjacent permittees with the understanding that livestock are to be kept off Cartwright Allotment.

Measures applying to Alternative B, C and D

The allotment encompasses 9 pastures and several small livestock holding pastures. The following three alternatives will exclude three pastures (Long Canyon, Professor and Lime Creek Pastures) from grazing. This is supported by the current permittee. Steep topography, difficulty in managing and making pasture moves, the large quantity of fence requiring reconstruction/maintenance for the 40-60 livestock numbers grazed, and the presence of endangered species in Lime Creek and Lime Creek Spring, led the Forest Service and permittee to exclude the three pastures from grazing. The remaining pastures are separated by barbed wire or natural boundaries. However, the Cave Creek Complex Fire in 2005 damaged/burned a majority of these fences.

Alternative B The Proposed Action

The proposed action is to continue to authorize livestock grazing on the Cartwright Allotment consistent with forest plan standards, management prescriptions and monitoring requirements.

The proposed action would permit 400 head of adult cattle (bulls, cows) yearlong, plus progeny of the adult cattle, grazing at that time, as yearling carry-over from January 1 to May 31 of each year, and 10 horses to be utilized in the grazing operation. An adaptive management approach would implement a 6-pasture, deferred-rotation grazing strategy.

Table 4: Proposed Grazing Management

Allotment	Grazing System	Cattle Yearlong	Comments
Cartwright	6-pasture deferred rotation	400 adult with yearling progeny from Jan. 1 – May 31 10 horses	Reduced from 2001 permit of 640 adults yearlong with 336 yearlings from Jan. 1 - May 31 Removes second herd and 3 pastures: Professor, Lime Creek and Long Canyon Pasture

Alternative C Proposed Action with reduced numbers and a grassbank pasture

This alternative is also to continue to authorize livestock grazing on the Cartwright Allotment consistent with forest plan standards, management prescriptions and monitoring requirements. It was developed in cooperation with the current permittee. Alternative 3 is similar to Alternative 2 with two differences.

- 6L Pasture will remain in the grazing allotment. However, the pasture will be set aside as a Grassbank Pasture. This will make the alternative a 5-pasture deferred rotation system. If resource concerns, livestock requirements, or other needs result in the necessity for an extra pasture in any given year, the permittee will use 6L Pasture (to be determined in the Annual Operating Instructions). The range improvements will need to be maintained before the pasture is grazed.

- The permit numbers will be reduced to 350 adult cattle yearlong with yearling progeny from January 1 through May 31. The reduction of 50 adult cattle is because of the elimination of the herd on the Professor, Lime Creek and Long Canyon Pastures. Both alternatives will include 10 horses yearlong.

Table 5: Proposed Alternative with Reduced Numbers and Grassbank pasture.

Allotment	Grazing System	Cattle Yearlong	Comments
Cartwright	5-pasture deferred rotation	350 adult with yearling progeny; 10 horses	Reduced from proposed 400 yearlong and 10 horses; also designates 6L Pasture as a Grassbank pasture

Alternative D

This alternative is to continue to authorize livestock grazing on the Cartwright Allotment consistent with forest plan standards, management prescriptions and monitoring requirements but using a seasonal grazing strategy. It would authorize the same number of head months (HMs) but it would be for only a six month grazing period. This alternative would not specify kind or type of animal, or grazing system. It only specifies the allowable grazing time, head months, monitoring and measures that must be met.

Table 6: Proposed Alternative with Reduced Numbers and Pastures Grazing Management.

Allotment	Grazing System	Cattle Yearlong	Comments
Cartwright	5-pasture deferred rotation	4812 HMs 10 horses = 120s Total HMs = 4932	Keeps 6L as a Grassbank Pasture. Changes adult cattle year-long to AUMs for six months from October 1 thru February 28.

Mitigation Measures Common to All Alternatives except Alternative A

In response to public and agency comments on the proposal, mitigation measures were developed to ease some of the potential impacts the various alternatives may cause. The mitigation and monitoring measures apply to all of the alternatives except Alternative A.

A variety of monitoring data collected throughout the year would be used in conjunction with upland and riparian use guidelines to adjust timing, intensity, and frequency of grazing for each pasture on the allotment. This could take place either during the grazing season or at the end of the growing season. Specific schedules for monitoring would be flexible from year to year based upon resource needs which could change with climatic variations and management changes. Monitoring for plant cover, vigor, recruitment, and diversity using established techniques would ensure that wildlife needs and riparian and watershed conditions were moving toward desired conditions as outlined in Chapter I.

Pasture fences are under reconstruction. Monitoring will determine if the allotment has recovered sufficiently from the Cave Creek Complex Fire to be grazed. Initial annual stocking will authorize a reduced number of cattle, approximately 150-200 head of livestock. Monitoring

for each pasture will take place approximately mid-way through the time allocated for the pasture. This information will be used to estimate livestock use and to help determine the date livestock will be moved to the next pasture. Livestock use will be measured/estimated and documented for each pasture at the end of the growing season. This monitoring information, along with actual livestock use, may be used to adjust annual authorized use (livestock numbers or length of time grazed). If, over time, monitoring indicates there is forage and water available for additional livestock use, the number of authorized livestock could be increased to a maximum number as determined through this decision. Numbers could also be reduced dependent on resource conditions. The monitoring information will also be used in an adaptive management approach to determine if the first year's herd size of approximately 150-200 cattle needs to be adjusted in numbers for the next year.

Monitoring

The objective of monitoring is to determine whether management is being properly implemented and whether the actions are effective at achieving or moving toward desired conditions. Monitoring as described below would take place under Alternatives B, C and D.

Effectiveness monitoring includes measurements to track condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring would be done following procedures described in the interagency technical reference and the Region 3 Rangeland Analysis and Training Guide. These data are interpreted to determine whether management is achieving desired resource conditions, whether changes in resource condition are related to management, and to determine whether modifications in management are necessary. Effectiveness monitoring would occur at least once over the ten-year term of the grazing authorization, or more frequently if deemed necessary.

Implementation monitoring would occur at any time during the grazing year and would include such things as inspection reports, forage utilization measurements in key areas, livestock counts and facilities inspections. Utilization measurements are made following procedures found in the Interagency Technical Reference and with consideration of the "Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands" (PR 61). Riparian monitoring techniques are described in "Riparian Area Management Utilization Guidelines" (Grove and McBride 2002).

A variety of these monitoring data collected throughout the year would be used in conjunction with upland and riparian use guidelines to adjust timing, intensity, and frequency of grazing for each pasture on the allotment. This could take place either during the grazing season or at the end of the growing season. Specific schedules for monitoring would be flexible from year to year based upon resource needs which could change with climatic variations and management changes. Monitoring for plant cover, vigor, recruitment, and diversity using techniques described in aforementioned publications would ensure that wildlife needs and riparian and watershed conditions were moving toward desired conditions as outlined in Chapter 1.

Key areas are described in "Sampling Vegetation Attributes" (Interagency Technical Reference, 1996) as indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be a representative sample of a large

stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area, watershed area, etc., depending on the management objectives being addressed by the study. Proper selection of key areas requires appropriate stratification.

Critical reaches provide the focal point for developing desired conditions, resources objectives, a monitoring strategy and the evaluation of environmental consequences. Critical riparian reaches, similar to upland key areas, are those stream channels/springs/riparian areas selected to indicate achievement of management objectives. They are representative, responsive to changes in management, contain key riparian species, and are accessible to livestock (Interagency Technical Team 1996).

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

To mitigate resource impacts, the following practices will be implemented under all action alternatives. These measures are considered to be effective at reducing environmental impacts. They are intended to be consistent with all applicable laws and regulations, Forest Plan standards and guidelines, and the terms and conditions and conservation measures of existing biological opinions. Implementation of the mitigation measures in combination with project design criteria should avoid the occurrence of potentially significant environmental impacts.

Duration and timing of grazing: Use on the allotment will be authorized year-round using rotational grazing except for Alternative D which is for six months. Grazing management will be designed to insure that pastures receive periodic growing season rest or deferment in order to provide for grazed plant recovery. The sequence and timing of pasture moves will be based on monitoring of available water, livestock nutritional needs, ecological condition, and forage utilization. The 3 pastures connected with the second herd will be removed from grazing: Professor, Lime Creek and Long Canyon Pastures

Intensity of grazing on Uplands Vegetation: Upland forage utilization will be managed at a level corresponding to light to moderate intensity (30 to 40% of current year's growth on herbaceous material and 50% or less on browse material). This means that about ½ of the good and fair forage value plants show signs of use by livestock, that there is little evidence of livestock trailing, and that most of the accessible range in relationship to water sources shows some use. Managing for this level of use is expected to result in improved rangeland and watershed conditions and achievement of desired conditions over time. Current conditions on the allotment would be assessed through pasture inspections and recent monitoring data. Allowable use levels may vary depending on range conditions.

Soil, Water and Vegetation: The objective of Soil and Water Conservation Practices (FSH 2509.22) is to mitigate the effects of livestock grazing. Allowable use is set to meet the objectives of the Forest Land Management Plan. The amount of livestock use is determined primarily through measurement of riparian utilization (FSH 2509.22.1). This management

practice should maintain or improve the condition of riparian vegetation where riparian vegetation is presently established.

The recommended use guidelines are:

- Obligate riparian trees species – limit use to < 50% of terminal leaders (top 1/3 of plant) on palatable riparian tree species accessible to livestock (usually \leq 6 feet tall).
- Deergrass – limit use to < 40% of plant species biomass.
- Emergent species (rushes, sedges, cat-tails, horse-tails) – maintain six to eight inches of stubble height during the grazing period.

Utilization will be measured seasonally, when livestock are in the pasture. Livestock will be moved from the critical area or pasture when recommended guidelines are met.

In early seral or degraded riparian areas, plants must become re-established before applying a strategy of management through proper use.

Implementation monitoring: Utilization measurements are made following the Interagency Technical Reference (1996), McBride and Grove (2002), and Cowley and Burton (2005) or the most current acceptable method.

Effectiveness monitoring: Changes in riparian vegetation and stream channel geomorphology condition and trend will be measured at five to 10 year intervals. Protocols are described in the Interagency Technical Reference (1996), Cowley and Burton (2005), and Harrelson et al (1994), or the most current acceptable method.

Rationale for Riparian Vegetation Utilization Guidelines

Riparian tree species: There is no utilization or grazing intensity guidelines for riparian tree species, nor studies documenting effects of specific use levels in the published literature (McBride and Grove 2002). Limiting use to 50% of the leaders browsed was chosen as a surrogate guideline in place of the Tonto Forest Plan (1985) standard that limits use to 20% of tree and shrub annual production by volume. Mathematical relationships between these parameters have been established in previous studies (Stickney 1966, USDA Forest Service 1991).

Deergrass utilization: The recommended upper limit for utilization of deergrass is 40%, the same as for upland species. There are no scientific studies on the ecology or management of deergrass (*Muhlenbergis rigens*). It is a bunchgrass species that has evolved in the southwestern United States without large ungulate grazing. Capable of exceeding three feet in height, it plays a key role in trapping sediments, and reducing stream bank and greenline erosion. Clary and Kruse (2003) recommend conservative use of deergrass, especially when the riparian vegetation is in early seral ecological status (Clary and Webster 1989). For a 30 inch tall deergrass plant, 50% utilization reduces the plant to 4 inches of stubble height. This is inadequate residual vegetation especially when green line herbaceous canopy cover is usually less than 10%.

Emergent species: As with riparian tree species and deergrass, there are no scientific studies linking emergent species stubble height and stream channel protection. Clary and Kruse (2003) recommend leaving 4 – 8 inches of stubble height where there is a dense sod of rhizomatous species. This is usually not the case on the Tonto National Forest. Therefore the recommended stubble height is at least 6 to 8 inches during the grazing period.

- Necessary techniques will be used to achieve proper distribution or lessen the impact on sensitive areas. Practices include herding, salting and controlling access to waters. Salt or similar solid supplements will be placed on good feed, one quarter to one half mile from waters and salting locations will be moved annually. Placement of liquid supplements will require prior approval of the District Ranger.
- No hay or bulk feed will be placed on Forest lands unless authorized by the District Ranger in order to minimize the introduction of weed seeds.

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

- All water developments will include wildlife access and escape ramps.
- All new fencing, reconstruction and maintenance of fences will be to Forest Plan standards to provide for wildlife passage through the fence. At a minimum, this will be a 4-strand fence with smooth bottom wire 16 inches off the ground and a total height of 42 inches or less. All existing fences will be maintained to Forest Plan Standards and provide passage for wildlife through the fences.
- Reduce livestock use in riparian and spring areas during the growing season to minimize impacts to woody and herbaceous plants and alterable banks.
- Make appropriate adjustments to the Annual Operating Permit when necessary to accelerate resource recovery from drought, fire or disease.
- Manage for sufficient litter cover to minimize exposed soil, thus improving soil conditions over time.
- Watersheds will be managed so as to improve them to satisfactory or better condition.
- Manage the desert scrub type to emphasize production of javelina, Gambel's quail, and mule deer (USFS, 1985).
- Manage higher ecosystem extensions in the desert scrub type to emphasize cottontail production (USFS, 1985).
- Manage the pinyon-juniper type to emphasize production of mule deer (USFS, 1985).
- Manage chaparral type to emphasize the production of whitetail deer (USFS, 1985).

- Locate and survey all potential Gila topminnow sites. Where feasible, stock sites, monitor for success, and restock if necessary (USFS, 1985).
- Maintain a minimum of 30% effective ground cover for watershed protection and forage production, especially in primary wildlife forage producing areas. Where less than 30% exists, it will be the management goal to obtain a minimum of 30% effective ground cover (USFS, 1985).
- Coordinate with range to achieve at least 80% of the potential riparian overstory crown coverage (USFS, 1985).
- Rehabilitate at least 80% of the potential shrub cover in riparian areas through the use of appropriate grazing systems and methods (USDA, 1985).
- Provide a minimum of four waters per section in small game, and one water per section in big game key areas (USDA, 1985).
- Build range fences according to standards that provide for wildlife passage/crossing.

Wildlife Monitoring:

In order to determine if existing conditions on the allotment are moving toward desired conditions range, riparian, soils, species & habitat, and terrestrial ecosystem surveys will be utilized.

- Surveys may also be conducted for aquatic and terrestrial species and associated habitats by Forest Service, Arizona Game and Fish, U. S. Fish & Wildlife Service, Bureau of Reclamation, Christmas Bird Count participants and others.
- Ocular estimates may be utilized to determine need for additional measurements.
- Photo points may be utilized to establish baseline information and determine trend.
- Stream channel cross sections will be monitored to determine change(s) in stream morphology and composition.
- Vegetation will be monitored in critical riparian areas and key areas to document and track changes, and determine trend.

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

- All proposed range facilities will be surveyed by qualified personnel for heritage resource prior to any ground-disturbing activities. Facilities will be built or modified to avoid impacts to sites. If unrecorded sites are discovered during the course of project implementation, activities will cease and the Forest Archeologist will be notified.

- Range facilities, if needed, will be located so as to avoid concentrations of livestock on identified heritage resource sites.
- No salting will occur within or adjacent to identified heritage sites.
- If impacts from grazing (e.g. excessive trampling, cattle rubbing against and knocking down standing features) are occurring to heritage sites, measures will be taken (e.g. fencing) to protect them.

Off-Highway Vehicles (OHVs)

It is recognized that on occasion the permittee will need to use OHVs such as ATV's in the performance of his management, such as when accessing a range improvement. However, it is expected that access to range improvements for repairs/maintenance will be infrequent and any access by the range permittee to the range improvement is strongly encouraged to be non-motorized. Should the range permittee require motorized access to the range facility for maintenance or other activities directly related to ranch operation, application can be made to the District Ranger for authorization. Authorized motorized access will take into account existing access and location of archeological sites, with minimal disturbance to the access and minimal impacts to resources, per the terms specified by the District Ranger in the authorization. Authorization of OHV use will be identified in the Annual Operating Instructions.

Improvements

Existing range improvements on the allotment would be maintained to Forest Service standards by the permittee under Alternatives B, C and D. Maintenance to keep improvements such as fences, water developments, etc. in good working order would be conducted in all pastures, grazed or ungrazed, and would be the responsibility of the permittee.

The permittee has also identified a number of miles of boundary fence that was burned in the CCC Fire and needs to be rebuilt. Typically, improvements are funded on a cost-share basis with the Forest Service providing materials and the permittee providing the labor to construct or install the improvement. Forest Service funding for all of the improvements is not currently available and funding constraints will likely require the projects to be completed over a period of years. The permittee has been notified of funding constraints and encouraged to pursue alternative sources of funding if they wish to expedite completion of the developments. The permittee has implemented an aggressive program of reconstruction of burned fences. This is being done in cooperation with both the FS and National Resource Conservation Service (NRCS), through the Environmental Quality Incentives Program (EQIP) program and Range Betterment funding. However, the current funding does not cover all of the burned fences.

The permittee has a schedule of new improvements currently in place with the NRCS under EQIP through 2011. Proposed projects include replacing over 21 miles of burned pasture fence. Funding for the new improvements would be cost-shared between the permittee and NRCS. EQIP is an ongoing program that the permittee may apply for funding from each year, so additional projects may be added during the life of this decision. All new projects would be subject to analysis to comply with NEPA regulations.

Several improvements are proposed to promote achievement of desired conditions (see Table 7). These improvements have been proposed in the context of adaptive management, meaning that they have been identified as possible practices to assist in the achievement of desired conditions if management alone is not sufficient. Future monitoring may indicate that the projects are not necessary, in which case they will not be constructed.

New rangeland improvements would be assessed for need on a case by case basis. Any range improvement which would disturb the soil would require an archaeological clearance by the Forest Archeologist or a certified para-archeologist and a biological clearance by the District Wildlife Biologist. New improvements not anticipated by this Decision would also require a separate analysis to comply with NEPA regulation. Salting, watering, or supplemental feeding would not be permitted where cultural sites or resources exist.

Mitigation of impacts to heritage resources is best accomplished by avoidance of these properties by the placement and construction of all range improvements. It can also be achieved by minimizing opportunities for the localized concentration of animals, improving distribution across the allotment and across each pasture, and by reducing the intensity of grazing for the allotment as a whole. Other, more specific mitigation requirements may be identified as each of these improvements is developed and a heritage inventory is made of their areas of potential effect. Archeological clearance must be approved and all necessary consultation with SHPO and the potentially interested Tribes prior to issuing any decision regarding the construction, modification or removal of all improvements. Wherever possible, mitigation of direct impacts from proposed improvements would be resolved by avoidance and relocation; where this is not possible, further consultation with SHPO would be undertaken. This approach, based on long-term consultation with SHPO and on Region 3 policy as embodied in the Heritage Consideration Checklist issued 11 February, 1998, is considered to be the "best management practice" for treating potential grazing impacts to heritage resources on the Tonto National Forest.

Table 7: Description and objective for proposed improvements in this NEPA document

Pasture Name	Proposed Improvement	Objective
Maverick	Rebuild the burned Camp Creek Exclosure and extend Camp Creek Exclosure northward to include spring area, approximately ½ mile total length	Continue exclosure area for studies; improve riparian condition and livestock distribution by reducing use in riparian area and moving cattle into the uplands; provide double fence separating livestock from Camp Creek residences
Bronco	Construct exclosure around ½ mile of 7 Springs riparian area	Improve livestock distribution and improve riparian condition by reducing use in riparian area by moving cattle into the uplands.
Quien Sabe	Fence one mile on south side of Cave Creek and tie into existing fence on north side of creek	Improve livestock distribution and improve riparian condition by reducing use in riparian area by moving cattle into the uplands.

Drift fence will be required if cattle are found to drift into Lime Creek Pasture from Maverick Pasture.

Adaptive Management

Adaptive management (FSH 2209.13, Ch. 90) is a tool that uses the documented results of management actions to continually modify management in order to achieve specific objectives. The Proposed Action (Alternative B) and Alternatives C and D are designed to provide sufficient flexibility to adapt management to changing circumstances. If monitoring indicates that desired conditions are not being achieved, adaptive management decisions would be used to modify management. Changes may include administrative decisions such as the specific number of livestock authorized annually, specific dates for grazing, or modifications in pasture rotations. The changes would not exceed the limits for timing, intensity, duration and frequency as defined in the Term Grazing Permit. Using adaptive management, specific numbers of livestock will be set each year based on resource conditions and management objectives for the allotments. Pasture rotations will be planned at the beginning of each grazing year and will be continually modified in response to changing resource conditions with the objective to avoid grazing any one pasture during consecutive growing seasons. Use levels may be variable depending on range condition and other factors such as drought. Adaptive management would be implemented through Annual Operating Instructions that would adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and capacity and is meeting management objectives.

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

Administrative Actions Necessary to Implement the Decision

The following administrative actions would be used to implement the NEPA-based decision to authorize grazing under the proposed action of alternatives A, C or D.

Permit Issuance: A new ten-year Term Grazing Permit would be issued for the allotment with the permitted numbers (or HMs).

Allotment Management Plans: A new Allotment Management Plan (AMP) would be developed and will become part of Part 3 of the grazing permit issued under the proposed action. The AMP would incorporate an adaptive management strategy (see below)

Annual Operating Instructions (AOI): On an annual basis, the Forest and permittee would jointly prepare an annual plan, referred to as the AOI, which sets forth numbers, class of livestock, and the timing and direction of use for the current grazing year.

- The numbers, class of livestock, and the timing and duration of use for the current grazing year.
- The planned sequence of grazing in pastures on the allotment and the monitoring criteria that would be used to make changes
- Structural and non-structural improvements to be constructed, reconstructed, or maintained and who is responsible for those activities.
- Allowable use or other standards to be applied and followed by the permittee to properly manage livestock.
- Monitoring for the current year may include documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP, and AOI. The AOI is directly associated with the AMP. As stated above, the AOI is initially discussed with the permittee and/or his representative during annual on-the-ground inspections and agreements are documented during the Annual Authorization meeting with both the permittee and District representatives present.

Appendix A - Dictionary

Head month (HM) - One month's occupancy of the rangeland by one mature animal. For grazing fee purposes, it is a month's occupancy of rangeland by one weaned or adult cow, with or without calf, bull, steer, heifer, horse, burro, mule, bison, ewe with or without lamb, ram, or goat.

Soil Condition Categories:

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

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

-Unsatisfactory - The soil indicators (hydrologic function, soil stability, and nutrient cycling) signify that loss of soil function has occurred. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs, and recover from impacts. Soils rated in the unsatisfactory category are candidates for improved management practices or restoration designed to recover soil functions.

Stream Channel Types:

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

"Bc" type streams are moderately entrenched and have narrow floodplains, like a "B", and a low gradient, like a "C". They are probably a step in the evolutionary sequence, C-G-F-C, between F and C when the channel is just beginning to gain back some floodplain.

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

"F" type streams are highly entrenched (downcut), with little or no floodplain to dissipate flood flows, consequently, high flows are concentrated in the stream channel rather than in overbank flow which results in streambank erosion and loss of riparian vegetation. They usually evolve from a more stable stream type due to some natural or

management caused disturbance. "F" type streams have a high width/depth ratio (wide and shallow) and lack the stream power, or energy, necessary to move the sediment through the system, causing aggrading. These stream types are generally unstable and extremely sensitive to disturbance.

"G" type streams are unstable, moderately steep (2-4%), entrenched gullies with no access to a floodplain. They evolve from a more stable stream type due to some natural or management caused disturbance.