Dark Canyon Allotment Management Plan
Final Environmental Assessment
Clifton Ranger District
Apache-Sitgreaves National Forest

CHAPTER 1 PROJECT SCOPE

I. Introduction

This assessment report summarizes a proposal to implement an Allotment Management Plan and amend the Term Grazing Permit for livestock use on the Dark Canyon Allotment, Clifton Ranger District, Apache-Sitgreaves National Forest. The proposed project is a livestock management operating plan designed and proposed to enable the Forest Service and the Term Grazing Permittee to better address livestock management to achieve vegetation objectives as described in the Apache-Sitgreaves National Forest Land and Resource Management Plan, as amended.

II. Background

The Dark Canyon Allotment lies in the extreme southwestern section of the Clifton Ranger District, Greenlee County, Arizona. It borders the Tule Allotment to the north, the Granville Allotment to the northeast, BLM, State and patented land to the east and south, and the San Carlos Reservation to the West. The Dark Canyon Allotment contains 18,266 acres of National Forest land and 26 acres of private land which consists of the Spur Cross Ranch. The terrain consists of shallow soil ridges, rocky bluffs, narrow steep sided canyons and rocky terrain. Enebro Mountain is included within the allotment boundaries on the northeast and Coronado Mountain to the southeast, both at 7,400 feet. Coronado Ridge ranges east to west from 6,700 to 4,800 feet. Elevation descends 3,400 feet from the east side along Highway 191 to Eagle Creek on the west. Approximately 39 percent of the allotment area exceeds the 41 percent slope class. The major canyons within the area boundary include Dark Canyon, Spur Cross Canyon, Whitewater Canyon, Knight, Woods Canyon and Cottonwood Canyon. Dark and Spur Cross Canyons unite with Whitewater Canyon. Knight and Woods Canyons unite with Cottonwood Canyon. All canyons drain into Eagle Creek which is a tributary of the Gila River.

Primary use of the Dark Canyon Allotment has been for livestock grazing since establishment of the grazing permit in the early 1920's. No roads exist on the allotment. U.S. Highway 191 boarders the allotment on the eastern boundary. Two trails provide the primary access to the Dark Canyon Allotment, Spur Cross Trail No. 8, and the Painted Bluffs Trail No. 13. There are no organized camping facilities within the Dark Canyon boundaries, however the allotment boarders the Granville campground located off Highway 191. This area of the Clifton Ranger District was once logged by pack animals to supply fuel for the Morenci mine, however no future commercial timber or fuelwood harvest is proposed due to the lack of reasonable motorized access to the area. Other past and present activities within the allotment area include hunting, hiking, rock hounding, and dispersed recreation use.

There are currently six livestock pastures on the Dark Canyon Allotment: Spur Cross, 5,100 acres; Knight, 5,403 acres; Eagle Creek, 1,166 acres; Painted Bluff, 3,962 acres; Coronado, 2,073 acres; and Zorilla with 588 acres. Two smaller traps exist within the Spur Cross pasture, the Steer trap and the Headquarters trap. Pasture division to improve livestock distribution patterns is accomplished with a combination of natural barriers and short sections of drift fencing. Livestock management is under a three pasture deferred rotation Allotment Management Plan. The three primary pastures include Spur Cross, Eagle Creek/Knight, and Painted Bluff. Under this management system two of the three pastures receives growing season rest annually, and one of the three pastures receives dormant season rest annually. The Coronado pasture is utilized as a supplemental pasture, primarily for horses. The Zorilla pasture is not grazed by domestic cattle due to the rough terrain. The

two traps within the Spur Cross pasture are used for supplemental grazing, working livestock, replacement heifers, and or bulls. A pasture division fence was constructed in 1992 which created a riparian pasture along the 3.25 miles of Eagle Creek which crosses the west end of the Allotment. This division fence isolated the Eagle pasture from the Knight pasture in the above management system. Since the construction of this division fence the Eagle riparian pasture has been used as a swing or transit pasture. Livestock are worked both spring and fall, which includes branding, shipping, and culling. Livestock rotation between pastures is correlated with the permittee's livestock working schedule. The Eagle Creek riparian area is utilized for short periods during livestock working, and pasture movements. Pasture movements and durations are documented in the Annual Operating Plan. The Eagle Creek riparian area is utilized during spring and fall livestock working seasons to be followed by winter and summer rest.

Water on the Dark Canyon Allotment is supplied by many creeks, springs and wet weather seeps scattered throughout the allotment. Water is perennial in Dark Canyon, Whitewater Canyon, and Eagle Creek. Pot holes and small springs provide water in Spur Cross Canyon, Knight Canyon, Woods Canyon and Cottonwood Canyon. Two other developed water systems exist on the allotment, Hughes Spring pipeline and trough, and Painted Bluffs pipeline and trough. There are no other developed water sources on the allotment. One earthen stock tank is proposed for future construction pending severance and transfer of water rights.

III. Purpose and Need for Action

The purpose of this proposed action is to implement the direction and objectives in the Apache-Sitgreaves National Forest Plan (including compliance with applicable laws, regulations, and policies) in the Term Grazing Permit authorizing livestock use on the Dark Canyon Allotment. Authorization is needed on the allotment because:

The Rescission Act of 1995 (Public Law 104-19) became law on July 27, 1995. Section 504 addresses allotment analysis, grazing permit issuance, and compliance with the NEPA and other environmental laws.

Where consistent with other multiple use goals and objectives there is Congressional intent to allow grazing on suitable lands. (Multiple Use Sustained Yield Act of 1960, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976).

The Dark Canyon Allotment contains lands identified as suitable for domestic livestock grazing in the Apache-Sitgreaves National Forest Plan and continued domestic livestock grazing is consistent with the goals, objectives, standards, and guidelines of the forest plan.

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

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

By regulation, forage producing lands will be managed for livestock grazing where consistent with land management plans (36 CFR 222.2 (c)).

The need for this proposal is to determine how livestock grazing should be authorized and what grazing strategy will be implemented in an Allotment Management Plan to ensure that resource objectives are achievable. The proposed action is a strategy developed to address resource concerns that include:

1. Management of livestock within current capacity estimates.

2. Immediate and long-term improvement in riparian area conditions.

3. Enhancement and protection of threatened, endangered, and sensitive species habitat.

Existing Resource Condition

The Dark Canyon Allotment contains six primary vegetation types; pinyon/ juniper, grassland, browse, chaparral, Arizona cypress, and riparian. Acreage within these vegetation types is summarized below.

Associations	Acres	% of Area	Map Color
Pinyon/Juniper	**5,991 acres**	**33%**	**Brown**
Grassland	**1,729 acres**	**9%**	**Orange**
Browse	**3,531 acres**	**19%**	**Red**
Chaparral	**1,272 acres**	**7%**	**Red**
Arizona Cypress	**5,647 acres**	**31%**	**Purple**
Riparian	**171 acres**	**1%**	**Blue**

The pinyon/juniper and grassland vegetation types have been aggregated for management consideration. The pinyon/juniper and grassland vegetation types dominate the allotment, occurring on the majority of the moderately steep slopes and ridge tops throughout the central and western portions of the allotment. Browse species are also intermixed with the pinyon/juniper and grassland vegetation types. Browse species decrease in abundance from east to west within these types. Pinyon, and Utah juniper are the primary species of the pinyon/juniper type with alligator juniper present on deeper soil areas. Grey oak and turbinella oak are the dominant shrub species throughout, with manzanita, skunkbush sumac, and Wright's silktassel prevalent in disturbed areas. The south slopes along Cottonwood Canyon and Coronado Ridge support whitethorn acacia, and mesquite within the grassland type. The central and northern grassland areas of the allotment support alligator juniper. Grass species within the pinyon/juniper and grassland types on the southern slopes include black grama, hairy grama, purple grama, blue grama, tobosa, curly mesquite, wolftail, and vine mesquite. Sideoats grama is the dominant grass species on all exposures and provides the primary forage resource and watershed protection. The north slopes support little bluestem, silver bluestem, cane beardgrass, lovegrass, and green sprangletop. Canopy cover within these types is 0 to 40%.

The browse type is the third largest vegetation type and located throughout the allotment, in between the Arizona cypress and pinyon/juniper types. Live oak is present both in the shrub form and as a tree along side slopes and canyon bottoms. Turbinella oak is also found along the side slopes in conjunction with mountain mahogany, Wright's silktassel, and skunkbush sumac. Gamble oak is present along the deeper narrow canyon bottoms. The browse stands are mature to over mature, and mostly available. Grass cover within the type is moderate to sparse, dependent upon canopy cover. This type includes the majority of the potential capacity acreage within the allotment. Canopy cover is generally 0 to 40%.

The chaparral type is a limited association located adjacent to Arizona Cypress types, primarily in the eastern portion of the allotment. The majority of the area is on slopes greater than 40%, on highly erosive soils, and dominated by manzanita, mountain mahogany, and Wright's silktassel. Grass cover within the type is sparse, and soil movement is evident. Age class of browse species is mostly mature to over mature and decadent, with moderate availability. This vegetation type has the potential for high intensity fires and can readily type change to pure manzanita under these burning conditions.

Arizona cypress is the second largest vegetation type and dominates the northeastern and southeastern portions of the allotment. These Arizona cypress stands include Mexican pinyon pine, and ponderosa pine on the north slopes and canyon bottoms. Manzanita, live oak, gray oak, Wright's silktassel, Emory oak, buckbrush, sideoats grama, bull grass, and sedges are present within these stands. The overstory is generally dense with 57% of vegetation type having a canopy cover of 40% to 70%, allowing for very little herbaceous cover. The majority of the area is on slopes greater than 40%, on highly erosive soils and adjacent to rock outcrops.

The broad leaf riparian areas are the most limited vegetation type on the allotment and occur along Dark Canyon, Whitewater Canyon and Eagle Creek. Arizona sycamore dominates the overstory in the narrow canyon bottoms along with Arizona walnut, ash, maple and cottonwood. Understory species include green sprangletop, sideoats grama, bermuda, and little bluestem.

Eagle Creek is a wide steep walled canyon with well developed terraces. Substrate consists mostly of a variety of particle sizes but dominated by cobble and gravel sand bottom. Stream flow is perennial and has experienced several high flow flood events in the last ten years. Eagle Creek riparian area is characterized by deciduous riparian species such as alders, cottonwoods, sycamores, maples, willow, and baccharis. Vegetation is predominately seedlings and saplings with a few remnants of old growth trees scattered along the stream course. Regeneration of riparian species is occurring, and canopy densities are moderate between 40-70%. Mesquite bosques dominate the terraces. Mesquite and baccharis are also present along the deep sandy benches of the river. Ground cover by perennial grasses, predominantly bermuda, varies within the vegetation type, but is generally inadequate to prevent soil movement. Deposition of fines is occurring and will continue to improve conditions for establishment of riparian seedlings.

Dark Canyon is a narrow canyon with narrow, but well developed terraces, dense upper canopy, moderately steep grade and a substrate consisting of a variety of particle sizes but dominated by boulder and in places bedrock. Down woody debris from alder and cypress is common. The lower reaches of Dark Canyon are perennial flow with dense even aged and mix age classes of alder, sycamore and ash. Canopy cover is rated at 25-40%, with 3-4 age classes of deciduous trees. Understory tree level is dominated by Arizona cypress, and ash. The terraces are narrow with upper canopy dominated by sycamore, walnut and ash. Scarlet sumac dominates the shrub layer on terraces. The upper reaches of Dark Canyon are ephemeral with a more open canopy. Upper canopy is dominated by Arizona cypress with sycamore as co-dominant. The understory tree level is dominated by ash with cypress saplings in shrub midstory. The upper canopy terraces are dominated by sycamore with alligator juniper co-dominant. Arizona cypress is also present. Netleaf hackberry dominates the understory with brickellia.

Whitewater Creek is perennial on the lower stretches with well developed terraces and dense closed canopy. Substrate consists of a variety of particle sizes but is dominated by large boulders and slickrock. The upper canopy along the stream is dominated by alder, sycamore, and Arizona cypress. Understory tree species are dominated by alder and ash. The age structure consists primarily of older trees with regeneration occurring in down log gaps. Terrace upper canopy is dominated by sycamore with ash as co-dominant. Understory tree level is dominated by walnut and alligator juniper. Scarlet sumac is present in dense thickets. Understory is discontinuous consisting of scattered stretches of grasses and dense stands of sumac.

Desired Condition

Management emphasis to ensure ecological systems remain healthy and productive. A visually desirable mosaic of vegetative conditions exist on the landscape, including a diversity of both overstory and understory components. The understory contains vigorous shrubs, grasses, and forbs, which provide for stable watershed conditions, high water infiltration, and productive soils. Water quality meets or exceeds state standards. The ecosystem provides forage and habitat for many wildlife species. Permitted livestock graze suitable areas. Threatened, endangered, and sensitive plant and animal habitats are recognized and managed for their potential and uniqueness. Archaeological and historical cultural values are managed to ensure protection, restoration, and interpretation. Scenic beauty is high and provides enhanced visitor experiences.

Diverse habitat needs by a variety of wildlife species are sustainable over time. The complex array of species demand a diverse landscape, incorporating a mixture of tree sizes, with interspersed grassland openings. Stringers of ponderosa pine and riparian areas that bisect the area are maintained, and areas containing old and dense trees are maintained as part of the landscape. Patchy openings are blended into the landscape to provide much needed forage for wildlife.

Resource Objectives - The following objectives are prescribed for this project to provide site specific details to measure movement from existing to desired land conditions.

Pinyon/juniper woodland and grassland:

a. Increase ground cover of perennial grass and forb species and litter to improve soil conditions and productivity.

b. Increase the percentage of cool season grasses within the composition.

c. Increase diversity of species within the herbaceous composition.

Browse:

a. Maintain the majority of browse in immature age classes.

b. Increase ground cover of perennial grass and forb species and litter to improve soil conditions and productivity.

Chaparral:

a. Improve vigor, regeneration, and composition.

b. Maintain the majority of browse in immature age classes.

c. Stabilize soils that lack effective ground cover and increase soil productivity on slopes by increasing litter and cover.

Arizona Cypress:

a. Manage for uneven aged stands, and retention of old growth components.

b. Increase herbaceous vegetation and litter to provide ground cover to stabilize soils.

c. In areas designated for restoration of herbaceous production, manage for large mature or over mature trees.

Riparian:

a. Increase herbaceous understory, providing for bank stabilization, and sediment storage in all riparian areas.

b. Maintain overstory of mixed broadleaf riparian trees and shrubs in all riparian areas.

c. Create a multiple age class of mixed broadleaf riparian species in all riparian areas.

d. Increase down woody material in Eagle Creek.

IV. Proposed Action

The Clifton Ranger District, Apache-Sitgreaves National Forest proposes to implement an Allotment Management Plan and modify the existing Term Grazing Permit for livestock use on the Dark Canyon Allotment. This modification does not change the number or class of animals permitted, or range facilities. Livestock management operations will be amended to include direction for addressing critical resource concerns, establish monitoring needs, and incorporate appropriate forest plan standards and guidelines as terms and conditions within the Term Grazing Permit, Part 3.

The proposed action would authorize:

1. Modification of a 10 year Term Grazing Permit on the Dark Canyon Allotment.

2. Implementation of an Allotment Management Plan for utilization of the forage resource by domestic livestock. Livestock management under this Allotment Management Plan would be implemented within the following parameters:

a. Livestock numbers and duration of use on Forest Service lands as follows: 57 head of cattle (cow/calf) from 3/1 to 2/28 annually or 915 Animal Unit Months.

b. Livestock management under a three pasture rest rotation livestock operating plan. The three primary pastures include Spur Cross, Knight, and Painted Bluff. Each of the three main pastures receives one year of complete rest, six months of winter rest, and six months of summer rest out of every three years. Other pastures included in the management plan are Coronado, utilized as a supplemental pasture primarily for horses; the Steer and Headquarters traps utilized as supplemental and livestock working pastures; Zorilla not utilized by domestic livestock; and Eagle Creek riparian pasture utilized as a swing pasture for livestock working and movement between pastures.

V. Decision to be Made

The Clifton District Ranger is the official responsible for deciding whether or not the proposed Allotment Management Plan is desirable to aid in moving the Dark Canyon Allotment from existing to desired landscape conditions. The District Ranger may decide to select the proposed action, the no action alternative, defer action or select an expansion alternative. If an expansion alternative is selected the District Ranger will decide on the scope of this proposal as it incorporates additional alternatives.

VI. Issues

An issue is defined as a point of discussion, debate or dispute concerning environmental effects. Scoping for this proposal began the spring of 1995. Letters were sent to interested individuals and groups. Internal and external scoping revealed few issues related to livestock grazing on the Dark Canyon Allotment. For the purpose of this analysis these issues were divided into significant and non-significant issues. Significant issues are used to formulate alternatives, analyze environmental effects or prescribe mitigation measures. Issues are considered significant when they are within the scope of the proposed action, have not been decided by law, regulation, or other previous decision, are relevant to the decision being made, are not distinctly limited in extent, duration and intensity, and are amenable to scientific analysis rather that conjecture.

Significant Issues: The following issues have been identified to define the scope of the environmental concerns to be addressed in this process.

Economics - An action alternative may affect the economic stability and social values of local communities. Economic benefits in the form of increased recreation use may also be derived from closure of lands to livestock grazing. Potential positive as well as negative economic benefits may arise from a change in the livestock management program.

Threatened, Endangered or Sensitive Species - Effects on existing or potential TE&S species and corresponding habitat both confined and not confined within the Allotment area. Compliance with federal law is an issue for Allotment Management Planning. Consultation with the U.S. Fish and Wildlife Service and compliance with the terms and conditions for each affected species, which implement the reasonable and prudent measure, will constitute compliance with the Endangered Species Act.

Riparian - There is a concern about achieving satisfactory riparian conditions even with the current riparian pasture system along Eagle Creek. An action alternative without mitigation measures may affect riparian conditions within these areas.

Capacity - The Forest Planning process directed determinations of capacity of land areas for domestic livestock grazing be completed within project level planning. Capacity is therefore within the scope of the decision to be made and will be carried forward as an issue to be addressed in the environmental assessment for Allotment Management Plan implementation. A fully developed process for estimating capacity is included as **Appendix A** of this document.

Clean Water Act - The need for the environmental assessment to address impacts to water bodies and in particular in compliance with the Clean Water Act. Under date of November 15, 1990, the State of Arizona, Department of Environmental Quality, and the Southwestern Region of the Forest Service entered into an Intergovernmental Agreement to respond to the objectives defined by Congress in the Federal Water Pollution Control Act, as amended (1987). Implementation of the requirements in this Agreement, including the use of Best Management Practices, will satisfy compliance with the CWA and NEPA.

Monitoring - A fully developed monitoring program is a part of the decision making process. A Monitoring Plan is included as **Appendix B** of this document.

VII. Measures

The following measures have been selected to evaluate issue resolution, evaluate attainment of meeting objectives, and describe environmental impacts. In most cases the measures are quantified. When measures are not quantified, a narrative discussing specific effects will be presented in the environmental document. The measures for use in this assessment are:

Range Condition
- a. The percent of the allotment within each range condition class.
- b. The trend of range condition within each class.

Riparian

The percent of the riparian area in satisfactory condition.

Utilization
- a. The allowable forage use percentage per management alternative.
- b. The expected livestock use patterns in key areas.

Capacity
- a. Addressed in narrative form within the assessment.
- b. Addressed in terms of estimated stocking rates for each alternative.
- c. Addressed in narrative form within Appendix A of this document.

Threatened, Endangered, and Sensitive Species
- a. Addressed in narrative form within the Biological Assessment and Evaluation.
- b. Addressed in narrative form within the assessment.

Wildlife

Addressed in narrative form within the assessment.

Addressed in narrative form within the Wildlife Report.

Soil Condition

The percent of soils in satisfactory condition.

Watershed

Addressed in narrative form within the assessment.

Water Quality
- a. Addressed in narrative form within the assessment.
- b. Addressed in number of Best Management Practices being implemented.

Air Quality

Addressed in narrative form within the assessment.

Social

Addressed in narrative form within the assessment.

Economic
- a. The number of direct and indirect jobs affected.
- b. Payment to the county.
- c. Indirect monetary contributions to the local economy.
- d. Addressed in narrative form within the assessment.

Heritage Resources/Traditional Cultural Properties
- a. Addressed in narrative form within the Cultural Resource Survey Report.
- b. Addressed in narrative form within the assessment.

Recreation

Addressed in narrative form within the assessment.

Monitoring
- a. Addressed in narrative form within the assessment.
- b. Addressed in narrative form within Appendix B of this document.

National Forest Management Act Findings

Addressed in narrative form within Appendix C of this document.

CHAPTER 2 ALTERNATIVES

Alternative A (No Livestock Grazing)

The National Environmental Policy Act requires a "No Livestock Grazing" alternative. The no livestock grazing alternative eliminates livestock grazing on forest lands covered by this assessment process and provides for cancellation of the Term Grazing Permit.

The no livestock grazing alternative would authorize:

1. Cancellation of the Term Grazing Permit on the Dark Canyon Allotment for livestock use of the forage resource.
2. Removal of livestock from Forest Service lands within the Dark Canyon Allotment.
3. Forest Service maintenance responsibility of approximately 6 miles of National Forest boundary fence and approximately 1 mile of allotment boundary fence. No other range improvements such as water developments, pasture fences, corrals, or livestock related trails would be maintained.

Alternative B (No Action)

The National Environmental Policy Act requires a "No Action" alternative. For this assessment, the no action alternative is the continuation of current livestock management. Alternative B is the continuation of livestock grazing on the Dark Canyon Allotment under the terms and conditions of a Term Grazing Permit, with no change in permitted livestock numbers, no change in class of permitted livestock, no change in livestock management, and no change in range improvements. The Term Grazing Permit would be modified to incorporate appropriate forest plan standards and guidelines within Part 3 of the permit.

The no action alternative would authorize:

1. Continuation of a three pasture deferred rotation livestock management system which was implemented on the Dark Canyon Allotment in 1979. Under this management system two of the three main pastures receives growing season rest annually, and one of the three pastures receives dormant season rest annually. The Eagle Creek riparian area is grazed as one pasture with the Knight pasture.
   a. Livestock numbers and duration of use on Forest Service lands as follows: 57 head of cattle (cow/calf) from 3/1 to 2/28 annually or 915 Animal Unit Months.
   b. The three primary pastures include Spur Cross, Painted Bluff and Eagle Creek/Knight. Other pastures included in the management plan are Coronado, utilized as a supplemental pasture primarily for horses; the Steer and Headquarters traps utilized as supplemental and livestock working pastures; and Zorilla not utilized by domestic livestock.

Alternative C (Proposed Action/Rest Rotation)

Alternative C is the Proposed Action alternative. The proposed action alternative is the implementation of an Allotment Management Plan and modification of the exiting Term Grazing Permit for livestock use of the forage resource on the Dark Canyon Allotment. This modification will not change the number of animals permitted, or range facilities. Livestock management operations will be amended to include direction for addressing critical resource concerns, establish allowable forage use rates, establish monitoring needs, and incorporate appropriate forest plan standards and guidelines as terms and conditions within the Term Grazing Permit, Part 3.

The proposed action would authorize:

1. Modification of a 10 year Term Grazing Permit on the Dark Canyon Allotment.
2. Implementation of an Allotment Management Plan for 35% maximum allowable utilization of the forage resource by domestic livestock. Livestock management under this Allotment Management Plan would be implemented within the following parameters:

a. Livestock numbers and duration of use on Forest Service lands as follows: 57 head of cattle (cow/calf) from 3/1 to 2/28 annually or 915 Animal Unit Months.

b. Livestock management under a three pasture rest rotation livestock operating plan. The three primary pastures include Spur Cross, Knight, and Painted Bluff. Each of the three main pastures receives one year of complete rest, six months of winter rest, and six months of summer rest out of every three years. Other pastures included in the management plan are Coronado, utilized as a supplemental pasture primarily for horses; the Steer and Headquarters traps utilized as supplemental and livestock working pastures; Zorilla not utilized by domestic livestock; and Eagle Creek riparian pasture utilized as a swing pasture for livestock working and movement between pastures.

Table 1 - Alternative Descriptive Parameters

Parameter/Alternative	A	B	C
Permitted Animals (numbers)	-0-	57	57
Total time of use (months)	n/a	12	12
Animal Unit Months (AUM's)	-0-	915	915
Allowable use in Key Areas(%) (maximum allowable)	-0-	35%	35%
Minimum livestock grazing (months per pasture all seasons)	12	6	12
Maximum livestock grazing (months per pasture all seasons)	-0-	12	6
Number of pastures (available for main livestock grazing)	-0-	4	3
Number of pastures (available for livestock transit)	-0-	-0-	1
Number of pastures (available for supplemental grazing)	-0-	3	3
New Fence Construction (miles)	-0-	-0-	-0-
New Water Developments (#)	-0-	-0-	-0-
Kind/Class of Animals	-0-	c/cc	c/cc

note: Kind: c=cattle, h=horses, s=sheep
Class: cc=cow-calf, yr=yearling, na=not applicable

Alternatives considered but dropped from detail study

Two additional alternatives were considered in the assessment process, but dropped from detail study.

No livestock use of Eagle Creek

An alternative was considered for analysis which included exclusion of the Eagle Creek pasture from all livestock use, both grazing and transit. All other existing pastures and traps would be considered for livestock use.

This alternative was dropped from further development and study within this assessment process due to the following limitations:

a. Other than the two existing developed trails that traverse the allotment from Highway 191 to Eagle Creek the only other ingress and egress of the Dark Canyon Allotment for livestock movement is in conjunction with the Eagle Creek corridor.

b. The Painted Bluff Trail rises over 3,000 feet in elevation from Eagle Creek to Highway 191. The trail is steep, narrow in spots, rocky, and could not easily be utilized for livestock movement. Adjacent to Highway 191 the Painted Bluff trail crosses privately owned lands that would preclude the development of corrals or shipping facilities for permitted livestock.

c. The Spur Cross Trail also rises over 3,000 feet in elevation from Eagle Creek to Highway 191. The trail is steep, narrow through more than half its length, and could not easily be utilized for livestock movement.

At Highway 191 the terrain is steep, and narrow and precludes development of corral and shipping facilities for livestock.

d. It was determined that exclusion for livestock transit of the Eagle Creek corridor would effectively equate to the no grazing alternative due to the rugged topography and limited access points within the allotment. Trailing of livestock along the canyon bottoms is the only practical method available to the operator.

Fire

Fire, either natural or man made ignition, can be utilized as an effective tool to invigorate decadent browse communities, to reduce canopy cover of both shrub and tree species, and create natural mosaics within stands. Short term effects of fire are to increase the diversity of herbaceous and woody vegetation and to change the species composition within a vegetation community. The use of fire to obtain desired objectives would be prescribed under a burning plan. Fire can be used in conjunction with other actions such as impact from animal disturbance, rest, or grazing to achieve desired effects.

The use of fire to achieve resource objectives is not proposed for use at this time and was dropped from further development and study within this assessment process. The use of fire should be given future consideration, but is not considered to be "ripe for decision" under this proposed action for reasons of timing, as no immediate proposal for the use of prescribed fire is projected for this land based area at this time.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter shows the present condition of the affected environment with in the project area and the changes that can be expected from implementing the action alternatives or taking no action at this time. Existing land conditions and the no action alternative set the environmental base line for comparing effects of the action alternatives.

STANDARD EFFECTS TABLES

A. Range Condition

Range Condition is the status of a unit of range in terms of specific values of potentials for grazing or browsing animals. Range Condition in terms of this assessment is not interpreted as the state of vegetation in relation to the potential natural plant community for a soil type, based on soil potential.

Range Condition is displayed in terms of vegetation composition, density and frequency of perennial forage plants, and vigor of the grazed plants. Grazing by domestic livestock may impact vegetation by changing the mix of species in the plant communities being grazed (vegetation composition); by changing the density and frequency of perennial forage plants (forage frequency); and by changing the vigor of the grazed plants. These three vegetation effects are combined into 5 range condition classes which reflect the relative effects of grazing on vegetation.

In addition to range condition classes, the trend is also displayed to show whether range conditions are improving or declining. Table 2 below displays the range condition and trend for the proposed action and alternatives at the end of the project period.

Table 2 - Range Condition

Condition Class/ Alternative	Current	A	B	C
Excellent				
% of allotment	5%	10%	5%	5%
% upward trend	-0-%	40%	40%	50%
% stable Trend	100%	40%	50%	40%
% down trend	-0-%	20%	10%	10%
Good				
% of allotment	27%	35%	25%	30%
% upward trend	18%	20%	40%	30%
% stable trend	62%	65%	50%	60%
% down trend	20%	15%	10%	10%
Fair				
% of allotment	40%	35%	35%	35%
% upward trend	60%	60%	30%	50%
% stable trend	20%	30%	50%	30%
% down trend	20%	10%	20%	20%
Poor				
% of allotment	19%	20%	25%	25%
% upward trend	81%	100%	50%	80%
% stable trend	19%	-0-%	50%	20%
% down trend	-0-%	-0-%	-0-%	-0-%
Very Poor				
% of allotment	9%	-0-%	10%	5%
% upward trend	-0-%	-0-%	-0-%	-0-%
% stable trend	100%	-0-%	100%	-0-%
% down trend	-0-%	-0-%	-0-%	-0-%

Alternative A (No Livestock Grazing): Rest is defined as the amount of time which allows for plant recovery from utilization or disturbance by domestic livestock and/or wildlife. A potential exists for over rest of perennial plants when a plant has been rested to the point where accumulation of old standing plant material begins to hamper the growth and degrade the viability of the plant. Increased rest of perennial plants will result in increased litter and plant vigor, but may lead to over rest over time. Initial vegetation responses to increased rest will result in improved vegetation condition, but may eventually lead to a declining trend through accumulation of old standing plant material. The density of perennial grass plants will increase, but not on a significant scale. Encroachment of forbs, shrubs, junipers and pinyon in areas of reduced grass plant vigor and density is a likelihood and may result in declining range condition over time.

Alternative B (No Action/Deferred Rotation): The Dark Canyon Allotment exhibits significant changes in range condition over the last 38 years, 20 of which have been under deferred rotation livestock management, with the exception of the Eagle Creek riparian area. These changes include improvement in upland vegetation condition class, species composition, plant vigor, and soil condition. However, cool season and browse components may show decline in grazed pastures under this alternative, considering cool season rest is achieved only 1 year in every 3 grazing seasons. Continuation of the current grazing program should continue to improve or at least maintain range conditions, with the exception of riparian conditions and cool season components.

Alternative C (Proposed Action/Rest Rotation): Implementation of a rest rotation grazing schedule on the Dark Canyon Allotment should continue to improve or at least maintain range conditions, while improving both riparian area conditions and cool season components. The recently created Eagle Creek riparian pasture under the transit pasture proposal of livestock use should continue to show improvement in riparian condition. Cool season components and browse conditions should continue to improve or at least maintain conditions considering cool season rest is achieved 2 years in every 3 grazing seasons.

B. Riparian

Riparian areas are vegetation communities found on the Dark Canyon Allotment that are of special consideration. A riparian condition rating is used to show the relative effects on riparian from the proposed action and the alternatives. The rating system considers plant composition, sedimentation, ground cover, shade, plant structure, vegetation crown cover, and channel geometry. The riparian rating system stratifies riparian areas into satisfactory and unsatisfactory condition based on the above factors. Table 3 displays the riparian conditions at the end of the project period from implementation of the proposed action and the alternatives.

Table 3 - Riparian Condition

Condition Class/ Alternative	Current	A	B	C
Satisfactory % of riparian area	40%	70%	40%	65%
`Unsatisfactory % of riparian area	60%	30%	60%	35%

Dark Canyon and Whitewater Canyon are considered to be in satisfactory condition under current condition. The potential development of these riparian systems may be ecologically limited by steep upland and talus slopes that feed Dark and Whitewater Canyons. Steep upland and talus slopes result indirect, undissipated flows through the canyon, limiting terrace development and routinely removing riparian vegetation. Eagle Creek, which comprises the majority of the riparian area within the allotment is considered to be in unsatisfactory condition under current condition. Contributing conditions to this section of Eagle Creek include the cumulative effects of the Eagle Creek watershed (approximately half of the watershed and stream system are not within Forest Service administrative boundaries) and upstream activities directly affecting the stream system and flood plain.

Alternative A (No Livestock Grazing): Multiple factors contribute to riparian condition and recovery such as watershed condition, flood events, weather patterns, etc. Under the no grazing alternative, riparian area functions projected to require longer than 10 years for recovery include those associated with stream bank form. The percent of both banks which are stable, undercut, or have vegetation overhang has a direct influence on stream system stability and diversity. To be of value, the stream banks must be stable and the vegetation close enough to provide both shade and litter to the stream system. Most stream reaches in the Eagle Creek system exhibit modified stream banks. These modifications are directly resultant from large flood events within the last five years. Plant community composition will continue to improve over time, with annual fluctuations in plant density and composition expected with high flow events. As plant community composition improves stream bank form and stability will continue to improve, but are expected to require 10 to 15 years to reach satisfactory condition.

Alternative B (No Action/Deferred Rotation): Riparian condition percentages projected with this alternative are based on current livestock utilization levels, patterns, and growing season long livestock access to all riparian areas 1 year in every 3 grazing seasons. Season long grazing access to a stream system can directly effect water temperature, turbidity, channel geometry, and bacteria through bank shearing, trampling, reduction of streamside vegetation, fecal matter, urine discharge, and stirring of stream bottom materials. Under season long livestock access to the stream system of Eagle Creek, riparian conditions are not projected to show improvement. Current conditions within Dark Canyon and Whitewater are satisfactory. No change is projected within these condition ratings as both canyons are narrow with steep rock walls and bluffs that preclude livestock access and use.

Alternative C (Proposed Action/Rest Rotation): Riparian condition percentages projected within this alternative are based on projected livestock utilization levels, patterns, growing season long livestock access to Whitewater Creek and Dark Canyon 1 year in every 3 grazing seasons, and livestock access to Eagle Creek limited to livestock transit between pastures. Livestock access to Eagle Creek, limited to transit between pastures, biannually, is projected to have minimal or short term effects to water temperature, turbidity, channel geometry, and bacteria. However, due to the multiple factors that contribute to riparian conditions it is projected to require longer than 10 years to reach satisfactory condition for Eagle Creek. No change is projected within the current condition ratings of Dark Canyon and Whitewater Creek.

C. Utilization

Utilization of forage is the amount of forage removed by grazing. Residual vegetation is the standing and down plant material remaining within an area following grazing. Allowable utilization standards are based on the standards and guidelines in the Apache-Sitgreaves National Forest Land Management Plan, as amended. These utilization standards reflect the residual vegetation desired to remain on the land following domestic livestock grazing. Residual vegetation is needed to provide for wildlife, dormant season ground cover, litter cover, decomposition for soil productivity, and forage reserves.

Over grazing is defined as severe and frequent grazing during active growth periods that impact the recovery capability of a plant species or plant community. Over grazing can occur when plants are regrazed before they have recovered from a first grazing. Over grazing of vegetation by grazing animals affects vegetation composition and productivity. Over grazing can cause some plants to decline in frequency and distribution and to lose vigor and sustainability, eventually affecting composition and productivity of the plant community.

Key areas related to livestock grazing are areas of special emphasis or concern such as riparian areas or threatened, endangered, or sensitive species habitat. Key areas may also be areas where livestock tend to concentrate under a particular livestock management program.

Table 4 shows the maximum percent allowable use in upland areas by alternative and range condition. Table 4 also shows the projected utilization of available forage by livestock use patterns in critical riparian areas from

implementing the proposed action and alternatives. Utilization levels and patterns are for domestic livestock only.

Table 4 - Utilization

	Current	Maximum Allowable Use / Alternative		
Key Area	% Use	A	B	C
Uplands .5 miles from water	34%			
Poor Condition		-0-%	-0-%	-0-%
Fair Condition		-0-%	30%	25%
Good Condition		-0-%	35%	35%
Excellent Condition		-0-%	35%	35%
Browse	24%	-0-%	35%	35%
		Projected Use Pattern / Alternative		
Key Area	Current	A	B	C
Riparian (Eagle Creek)	70%	-0-%	70%	05%

Alternative A (No Livestock Grazing): Projected utilization by native wildlife species is between 5 and 10% of available forage.

Alternative B (No Action/Deferred Rotation): Projected utilization levels within the Eagle Creek riparian area is based on previous production/utilization surveys, and projected livestock concentration based on the duration of livestock use per pasture. Overall livestock utilization under deferred rotation management is within allowable use levels but does not include consideration for livestock concentration within key areas. Due to the duration of livestock use within each pasture, over grazing as a factor of time will occur under this alternative within areas of preferred livestock use.

Alternative C (Proposed Action/Rest Rotation): Projected utilization levels within the Eagle Creek riparian area is based on management under a riparian transit pasture system. Overall livestock utilization under rest rotation management is within allowable use levels but does not include consideration for livestock concentration within key areas, except for the Eagle Creek riparian corridor. Due to the duration of livestock use within each pasture, over grazing as a factor of time will occur under this alternative within areas of preferred livestock use.

D. Capacity

Multiple factors and considerations were used to reach an estimated livestock capacity for the Dark Canyon Allotment. Estimated livestock capacity changes with each change in livestock management alternative. Capacity is the average number of livestock and/or wildlife which may be sustained on a management unit compatible with management objectives for the unit. In addition to site characteristics, it is a function of management goals and management intensity. **Appendix A** presents the various factors and considerations used to reach the estimated domestic livestock capacity figures listed below.

The Terrestrial Ecosystem Survey (TES) Data for the Forest provided a base layer for mapping soils and effective ground cover. The Digital Elevation Model (DEM) provided information on slope and aspect of lands within the Dark Canyon Allotment. The slope of the land and effective ground cover by soil types are used to display the capacity of land for livestock grazing. Lands classified as having "no allowable capacity" for livestock grazing, are areas under natural conditions which are not stable with respect to soils, where natural soil loss and tolerance soil loss are equivalent. Management activities which may accelerate erosion rates have the potential to reduce the inherent productivity of the site. Areas of slopes greater than 40% are also considered as "no allowable capacity" areas for livestock grazing.

Lands classified as having "allowable capacity" for livestock grazing are areas capable of being grazed by domestic livestock on a sustained-yield basis under reasonable management goals without exceeding tolerance

soil loss rates and reducing the inherent productivity of the site. Capacity lands are also areas of slopes less than 40%. Within allowable capacity lands exist two capacity designations, potential capacity areas and full capacity areas. Potential capacity lands are primarily soil mapping units where soil stability is impaired and/or there is insufficient vegetative ground cover to protect the soil and prevent accelerated soil erosion but do not exceed tolerance soil loss levels. Potential capacity lands may also be lands within certain soil types which present special management considerations such as areas of sufficient cover and litter to protect the soil but are producing 50 pounds or less per acre of herbaceous forage. Full capacity lands are areas which are presently stable with effective ground cover providing for soil protection, where natural soil loss levels are not exceeded. Full capacity and potential capacity lands contribute as to numbers of livestock permitted.

The most recent production information collected on the Dark Canyon Allotment was utilized to assess average production of available forage by soil type for potential and full capacity acres only. This forage production figure multiplied by the acres within each soil type provides the total pounds of forage available for capacity acres. The total pounds of forage available multiplied by the percent of allowable forage use by alternative provides estimated production of forage available for domestic livestock on the allotment.

There is also a need to account for winter browse use on the Dark Canyon Allotment. The most recent production information on the Dark Canyon Allotment for browse was utilized to assess average browse production of available forage by soil type for potential and full capacity acres only. This browse production figure multiplied by the acres within each soil type where browse stands dominate the vegetation provides the total pounds of woody forage available for capacity acres.

Allowable forage use is the degree of utilization considered desirable and attainable on various specific parts of an allotment considering the present resource condition, management objectives, management level, soil characteristics, and grazing conflicts. Amendment #6 of the Forest Plan provides allowable forage use guidance. The percentages used in the assessment process are purposefully conservative and considered desirable under present resource conditions.

Stocking rates describe the number of animals proposed under each alternative that will be supported by the allotment land based area and approved for use under the terms and conditions of the Grazing Permit. Stocking rates for domestic livestock are based on estimated capacity in animal unit months, adjusted dependant on monitored residual forage availability, on key areas, the previous season, and effectiveness of the management program. Other factors used for consideration in estimating stocking rates under a planned management program include the desired levels of residual vegetation, proposed duration of rest, proposed season of use, proposed duration of use per pasture, and proposed class of livestock.

Alternative A (No Livestock Grazing): Stocking rates for domestic livestock proposed for the Dark Canyon Allotment under Alternative A are -0- head of domestic livestock.

Alternative B (No Action/Deferred Rotation): Proposed stocking rates under the livestock management program as described under Alternative B are 57 head of cattle (cow/calf) on the Dark Canyon Allotment for 365 days a year, or 915 Animal Unit Months.

Table 5 - Capacity Alternative B

Range Condition	Acres	Total Pounds Forage Production		Percent Allowable		Pounds of Available Forage
Excellent:	**182 acres**	**109,200 lbs**	**X**	**35%**	**=**	**38,220 lbs**
Good:	**2,598 acres**	**1,385,200 lbs**	**X**	**35%**	**=**	**484,820 lbs**
Fair:	**826 acres**	**242,300 lbs**	**X**	**30%**	**=**	**72,690 lbs**
Browse:	**2,121 acres**	**354,200 lbs**	**X**	**35%**	**=**	**123,970 lbs**
				Total	**=**	**719,700 lbs**

719,700 lbs/8,790 lbs = 82 head Cow/calf; yearlong

Allowable use rates for livestock management under Alternative B were based on seasonal deferment of pastures 2 years in every 3 grazing seasons, growing season and dormant season use. Estimated capacity for domestic livestock under this alternative is 82 head of cattle (cow/calf) yearlong. Proposed stocking rates under this alternative are within estimated livestock capacity calculations.

Alternative C (Proposed Action/Rest Rotation): Proposed stocking rates under the livestock management program as described under Alternative C are 57 head of cattle (cow/calf) on the Dark Canyon Allotment for 365 days a year, or 915 Animal Unit Months.

Table 6 - Capacity Alternative C

Range Condition	Acres	Total Pounds Forage Production		Percent Allowable		Pounds of Available Forage
Excellent:	**182 acres**	**109,200 lbs**	**X**	**35%**	**=**	**38,220 lbs**
Good:	**2,598 acres**	**1,385,200 lbs**	**X**	**35%**	**=**	**484,820 lbs**
Fair:	**826 acres**	**242,300 lbs**	**X**	**25%**	**=**	**60,575 lbs**
Browse:	**2,121 acres**	**354,200 lbs**	**X**	**35%**	**=**	**123,970 lbs**
				Total	**=**	**707,585 lbs**

707,585 lbs/8,790 lbs = 80 head Cow/calf; yearlong

Allowable use rates for livestock management under Alternative C were based on resting pastures 1 year in every 3 years, growing season and dormant season use. Estimated capacity for domestic livestock under this alternative is 80 head of cattle (cow/calf) yearlong. Proposed stocking rates under this alternative are within estimated livestock capacity calculations.

E. Threatened, Endangered, and Sensitive Species

A Biological Assessment and Evaluation (BAE) was completed regarding the effects of implementing the proposed action alternative. The BAE for the Dark Canyon Allotment analyzed anticipated effects and impacts to 50 species; 6 of which are endangered, 4 threatened, and 40 sensitive species.

Informal and formal consultation with the U.S. Fish and Wildlife Service, in compliance with Section 7 of the Endangered Species Act, was conducted based on Guidance Criteria (dated August 25, 1998) and through a consultation team comprised of various federal agency biologists. Results of consultation related to the proposed action is present below.

Alternative A (No Livestock Grazing): The No Action alternative would eliminate livestock grazing within the Dark Canyon Allotment, will have no effect, or likely beneficial effects to all or most of the listed and sensitive species addressed in the BAE. It is assumed that no livestock grazing would eliminate effects/impacts to wildlife species that have been sustained since livestock became a factor in the area. Although livestock have, or potentially can, create many unnatural and often adverse conditions, it is assumed that after many years natural conditions could return, at least to some degree, throughout the allotment.

These natural conditions include adequate forage and hiding cover, no competition with livestock, a balanced predator/prey relationship, healthy and sustainable riparian systems, reduced erosion (from current levels), re-establishment of a historical fire regime, increased vegetation and wildlife diversity, historical water table levels, historical disturbance factors, etc. Conditions on the land, with anticipated recovery of ecosystem processes, may resemble those prior to the introduction of livestock on the allotment. Man would still have some influence on ecosystem functions, but the influence from livestock would be removed. Many functions that have had cumulative impacts originating from livestock (loss of herbaceous cover, loss of soils, possible

type changes, etc.), would tend to stabilize for at least a period of years. This successional trend would likely have beneficial effects for many indigenous species. Recovery time to achieve more pristine conditions will vary in time from a few years to beyond our lifetime.

Alternative B (No Action/Deferred Rotation): Under the No Action Alternative, Eagle Creek would continue to receive livestock use for up to 12 months every third year, and at a minimum 6 months every year. This would likely result in adverse effects for the riparian dependant community, including plant, animal, and aquatic species. Affected species may include riparian vegetation, fish (including the Spikedace and Loach minnow), and possibly the Bald eagle, Peregrine falcon, Mexican Spotted owl, and the Jaguar. The minimum rest in grazing pastures is 6 months versus 12 months for the proposed action. Additionally, in the Alternative B grazing plan, maximum continued use in one pasture is one full year versus 6 months for the proposed action. Continued use for these long periods would likely have adverse effects for herbaceous species, especially the most palatable species and those in wetted areas. Range and watershed conditions would be expected to degrade in some key areas. Herbaceous cover may lessen in density and diversity. Erosion and sedimentation in streams would likely continue, possibly at relatively high levels. Over grazing of key areas could occur on a yearly basis. Not only would there likely be adverse effects for many of the listed species, but also to a range of sensitive species, which in some circumstances may lead to adverse population trends. This alternative would likely promote a general static to downward trend in ecological conditions.

Alternative C (Proposed Action/Rest Rotation): Determinations within the Biological Assessment and Evaluation found that implementation of the proposed action may affect 7 of the listed species. The affected species are the Lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*), the Jaguar (*Panthera onca*), the American Peregrine falcon (*Falco peregrinus anatum*), the Bald eagle (*Haliaeetus leucocephalus*), the Mexican Spotted owl (*Strix occidentalis lucida*), the Razorback sucker (*Xyrauchen texanus*), and the Arizona hedgehog cactus (*Echinocereus triglochidiatus var. arizonicus*). Adherence to guidelines as outlined in the proposed action addressing allowable forage use, changes in livestock management to include consideration for the riparian area of Eagle Creek, increased rest for each pasture, reduced livestock use duration for each pasture, a relatively low stocking rate on the allotment, low impacts to critical areas such as narrow riparian canyons, and implementation of a monitoring plan were the primary factors used in the determination of not likely to adversely affect for these species.

Implementation of the proposed action will have no effect to the Mexican gray wolf (*Cannis Lupus Baileyi*), or the Southwestern willow flycatcher (*Epidonax trailii extimus*).

Subsequent informal consultation with the U.S. Fish and Wildlife Service supported initial findings that the proposed action would have insignificant or immeasurable effects to most federally protected species or habitats that were considered in the assessment. Because the Arizona hedgehog cactus was not originally included in the Guidance Criteria, it was included under formal consultation and concurrence with the determination was provided.

Formal consultation with the U.S. Fish and Wildlife Service, and the resultant Biological Opinion (BO), issued June 30, 1999, concluded that the proposed action may have adverse effects to the Loach minnow (*Tiaroga cobitis*), and the Spikedace (*Meda fulgida*). Application of the Guidance Criteria in the BAE determined that implementation of the proposed action may have an adverse affect on Loach minnow and Spikedace habitat within Eagle Creek. This determination was based on the potential for direct and indirect effects from livestock trailing along, through, and across Eagle Creek while moving cattle among pastures and for shipping. Direct access to Eagle Creek may affect Loach minnows by crushing eggs, larvae or adult fish, and by causing eggs to be covered by sediments generated by livestock wading in the creek or trampling the stream bank. Livestock crossing may alter aspects of stream morphology that influence suitability for both species. The accumulation of sediments in the interstitial spaces of cobbles and gravels in riffle habitats is especially detrimental to successful reproduction of loach minnow, and may reduce the aquatic invertebrate food base.

The Service anticipates that incidental take of fish species associated with the proposed action cannot be directly quantified and will be difficult to detect. Finding dead or impaired individuals is unlikely, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. The Service, therefore, defines incidental take in terms of fish (Loach minnow and Spikedace) habitat characteristics. The anticipated level of incidental take is expressed as maintenance of the current level of habitat quality. Any decline in habitat quality would exceed this level of incidental take and would require reinitiation of formal consultation.

The reasonable and prudent measures described for the affected species, for which incidental take is anticipated, are necessary and appropriate to minimize the take. The Forest Service will comply with the terms and conditions for the affected species, which implement the reasonable and prudent measures as described in the Biological Opinion and will constitute compliance with the Endangered Species Act.

The Biological Assessment and Evaluation determined that the proposed action may impact numerous sensitive species. Implementation of the proposed action and expected impacts to sensitive species is not anticipated to result in a trend toward listing or loss of viability of any of the sensitive species analyzed.

F. Wildlife

The following information on wildlife was synthesized from the wildlife report, available in the process record. The Apache-Sitgreaves National Forests Land Management Plan provides standards and guidelines within portions of several Management Areas (MA) that are represented within the Dark Canyon Allotment. A small portion of the area is within MA 3, which are riparian corridors and wetlands, and MA 4 which includes grasslands. The majority of the allotment falls within guidelines for MA 2, woodland characterized by pinyon, juniper, cypress, and several shrub associations. Because the allotment includes portions of these Management Areas, several species designed as indicators of ecosystem health within each area of emphasis have been summarized below.

Woodland:

a. Plains titmouse - inhabits pinyon/juniper or oak woodland; feeds on spiders and acorns; cavity nester; fairly common.

b. Antelope - requires open plains or sagebrush plains; mainly a browser, but also requires many forbs and some grass. The Arizona Game and Fish Department's Research Branch recently completed a statewide antelope habitat evaluation. The entire Dark Canyon allotment was mapped as poor or unsuitable.

Grassland:

a. Elk - usually occurs in semi-open forests, mountains in summer, lower elevations in winter; grazer of grass/forbs and a browser. Not known to occupy the allotment.

b. Mule deer - occurs in several vegetation types including forests, chaparral, desert scrub, grassland; primarily a browser but also requires forbs in spring and summer. Common on the allotment.

Riparian:

a. Lincoln's sparrow - riparian dependant; feeds on insects and grass/forb seeds; nests on or near ground in grass tussocks; a rare host to the brown-headed cowbird; considered uncommon. May be found along Eagle Creek.

b. Yellow-breasted chat - usually riparian dependant, sometimes dense brush; feeds on insects and berries; nests above ground in brush; a frequent host of brown-headed cowbirds; considered rare. Not known to exist within the allotment.

c. Lucy's warbler - sometimes riparian dependant, inhabits woodland or mesquite in arid areas; insectivorous; cavity nester; occasional cowbird host; considered uncommon. Likely inhabits the elevations near or adjacent to Eagle Creek.

d. Aquatic macroinvertebrates - aquatic insects such as stoneflies, mayflies, caddisflies which are the larvae form of flying insects, and the food source for insectivorous fish. Generally, they require clean, unpolluted waters to thrive and are an indicator of stream health.

Fauna

The Dark Canyon allotment lies within Arizona Game Management Unit 27. Primary big game species include mule deer, white-tailed deer, javelina, Bighorn sheep, black bear, mountain lion, and javelina. Predator species include the black bear, mountain lion, coyote, fox, and bobcat. The allotment historically may have provided northern fringe habitat for Jaguar, an endangered species, and may occur here as a very rare transient. Mearn's quail, Gambel's quail, dove, and turkey are the huntable avian species within the area. Known raptor species include the Golden eagle, Bald eagle, Mexican blackhawk, zone-tail hawk, red-tail hawk, Coopers hawk, and possibly the Goshawk. A variety of waterfowl species are also known to utilize Eagle Creek.

a. Deer - Both whitetail and mule deer inhabit the allotment, both at relatively low densities (3-6 per section). Predators, particularly mountain lion, are considered abundant throughout their range here, and may contribute substantially to current declining populations in this game management unit (Unit 27). Region-wide reasons for this decline have been attributed to poor fawn survival (20-25% vs. 40-50% a decade ago) and cyclic adverse (dry) climate conditions over a number of years. Because deer are generalists of lower successional conditions in all vegetation associations, low deer numbers may also be due to continued shifts in vegetation toward closed canopy shrublands and forests. This is especially true in pinyon/juniper woodland associations, where decadence in browse stands is evident, along with closing of overstory canopy. Successional trends of closing canopy, unavailable browse stands, and reduced herbaceous understories are apparent on the Dark Canyon Allotment, and my contribute to potential conflicts for available forages. Historic concentration areas of ungulate use are observable on the allotment, but rest from livestock and reduced deer numbers have resulted in improved browse vigor. However, this has not halted successional progression. There may be a conflict between livestock and deer during spring and summer use of annual forbs and perennial grasses. Relatively recent (1994) surveys by the Arizona Department of Game and Fish showed a healthy population of whitetail, especially in the southern portion of the allotment. Mule deer populations appeared low.

b. Quail - Habitat conditions appear to be marginal for quail. Gambel's quail, is likely the dominant quail species within the allotment. Mearn's quail are also present. Recent observations during range inspections of allotments on the District indicate widespread populations of Mearn's quail where a combination of grazing and adequate rest for recovery has provided optimum habitats.

Given adequate summer rains to provide nesting and food (forb) production, the Mearn's quail may increase in range and numbers. In the usual Mearn's quail habitat of Madrean evergreen woodlands of oaks and pines, an adequate herbaceous cover is essential for this species to survive, most importantly for concealment. A 30% canopy cover is optimal. Nesting begins in late June or July, sometimes August, closely coinciding with the summer rains. Water sources are not required as subsistence moisture is provided by their food. Species density typically increases in conservatively managed allotments or in areas too remote from water to be grazed by livestock. Heavy grazing may increase production of important foods (forbs), but the reduction in cover, especially in late spring, may destroy its value as Mearn's quail habitat, despite the abundance of food. Therefore the cover eliminated by livestock is more critical for this species than the increased food supply which results from livestock use.

For Gambel's quail, cover is not as critical. While the summer rains are critical for the survival of the Mearn's quail, the Gambel's quail are dependant on the winter/spring precipitation patterns and the forage it produces.

c. Turkey - Merriam's turkey are present in low numbers on or near the allotment. Turkeys are typically confined to the major riparian areas of Eagle Creek and other riparian areas within and outside of allotment boundaries. Oaks are present for turkey foraging but the area lacks significant ponderosa pine roost sites necessary for prime turkey habitat, except in the upper reaches of the major riparian areas. The distribution of waters and lack of widespread roost sites may be the limiting factors for turkeys on the allotment.

d. Fish - A survey to detect presence and relative abundance of fish occurring along the Dark Canyon Allotment border was conducted in July, 1996, and again in the summer of 1999. Eight species of fish were

collected during the 1996 survey, but poor water conditions were not conducive to accurate sampling in 1999. In 1996, native fish captured were Roundtail chub, Longfin dace, Speckled dace, Sonora sucker, and Desert sucker. Non-native fish captured were carp, yellow bullhead, and smallmouth bass. No federally protected fish were collected during the 1996 survey.

Other native fish have been captured and collected in Eagle Creek in surveys during the last decade, both upstream or downstream of this allotment. Loach minnow were recently discovered about 20 miles upstream in 1994, and suitable habitat exists along the northern allotment border in Eagle Creek. Spikedace were documented upstream and downstream of this allotment several years ago, but have not been found during recent surveys. The endangered Razorback sucker, although occupying this stream historically, are very unlikely and remnant adults may still persist. The Gila chub has been documented with the Eagle Creek portion within the allotment. Limiting factors for native fish species may be the currently impaired hydrological and biological systems of Eagle Creek as well as an established exotic crayfish population. Eagle Creek is moving towards improvement in both ecosystem functional areas, as documented in recent surveys by fisheries biologists. No formal habitat or riverine system suitability assessment has been completed. Eagle Creek also contains a number of other introduced fish species, including fathead minnow, red shiner, channel catfish, flathead catfish, and rainbow trout.

Longfin dace and Speckled dace occur in the lower reaches of Whitewater Canyon. These two species in addition to the Roundtail chub also occur in the lower reaches of Knight Canyon.

e. Herps - Several sensitive amphibians and reptiles also occur in Eagle Creek, Whitewater Canyon and Dark Canyon. The Lowland Leopard frog and the Chiricahua leopard frog, both sensitive species, have been documented in Whitewater Canyon and Knight Canyon.

Effects by Alternative

The following table provides a general overview of anticipated effects of livestock, including grazing and land disturbance, to wildlife and fish species on or associated with the Dark Canyon Allotment, as prescribed for each action alternative. Different "categories" of wildlife species have been provided. Since actual population densities within he allotment are unknown for most of these species, this table is created based on available literature, professional opinion, and personal observations in similar areas. Most effects pertain to potential or anticipated habitat alteration, and are so indicated. (*I=improve, In=increase, U=unknown, D=decline, S=Static + is degree of change)

Table 7 - Wildlife Effects

Wildlife Category/Parameter	Existing	Alt. A/No Livestock	Alt. B/No Action	Alt. C/Proposed Action
Ground Nesting Birds				
Habitat Improvement	Good	*I ++	D++	I++
Population	Unknown	U++	D	In++
Passerine Birds				
Habitat Improvement	Good	I++	D	I++
Population	Unknown	In++	D	In+
Raptors				
Habitat Improvement	Good	I++	I	I+++
Population	Low/Mod	In	U	In+
Wild Ungulates				
Habitat Improvement	Fair	I+	I+	I+++
Population	Low	U	In	In++
T&E Species - Terrestrial				
Habitat Improvement	Good	I++	D+	I
Population	Unknown/Low	U/In	U/D+	U/I
T&E Species - Aquatic				
Habitat Improvement	Unknown/Fair	I+++	D++	I+
Population	Unknown/low	U/In+	U/S	S/In

Indicator Species Habitat Improvement Population	 Good Unknown/Low	 I++ In+	 D+ S/D	 I++ In+
Promotes Re-establishment of Disturbance Agent	Good	I++	D++	I+

While these descriptions have some quantitative inference, they show only a general predicted result due to a low-level analysis that cannot project substantiated changes. Additionally, predictions are based on implementation of alternatives exactly as stated in the EA and compliance with all Terms and Conditions of the Term Grazing Permit, including Reasonable and Prudent Measures and associated Terms and Conditions.

Alternative A (No Livestock Grazing): Eliminating livestock grazing from the Dark Canyon Allotment may address a particular concern that surfaces from any livestock program, but particularly with year-long permits. Most programs do not allow for long term, continued, undisturbed use of habitats by livestock for wildlife, particularly ground nesting birds. Because of behavioral characteristics relating to nest site fidelity and preference of nesting home ranges by some birds, there is a concern that direct disturbance may occur to birds even if a pasture is occasionally rested for an entire year, yet is exposed to various grazing effects during intervening years. For example, a Neotropical migratory bird nesting in a rested area may return the following year to find its previously suitable nesting area severely impacted by livestock grazing activities. The bird may forgo nesting, or more likely, will attempt to locate other suitable areas, increasing the chance of nest failure. There is currently little literature on birds in the Southwest related to actual nest fidelity related to various levels use. There is good evidence that increases in ground nesting and insectivorous birds in the absence of unmanaged livestock use, but whether this is a response to increased habitat parameters (herbaceous hiding/nesting cover and food sources like insects, seeds) or livestock interactions is unknown.

Grazing can affect nesting birds indirectly by altering vegetation structure and habitat quality, and directly through trampling or other disturbance of nests. Although grazing by livestock may not inherently preclude the presence of potential nest sites, it has the potential to degrade the quality of those sites in some higher use areas, resulting in increased nest failure or poor fledgling success. The excessive removal of vegetation by livestock may increase the susceptibility of nests to depredation, reduce the abundance of insects or other invertebrates important for the growth and survival of nestlings, and in the long term result in the conversion of grasslands to woody shrublands and in this context have overall adverse impacts of grassland types.

Bird species that nest occasionally, to exclusively on the ground, that may be present within the Dark Canyon Allotment include Mearn's quail, Gambel's quail, mourning dove, poor-will, killdeer, common night hawk, ferruginous hawk, western flycatcher, horned lark, common yellow throat, Wilson's warbler, bobolink, western meadowlark, rufous-sided towhee, gray-headed junco, Lincoln's sparrow, song sparrow, lark bunting, green-tailed towhee, and lark sparrow. All of these avian species may be present on this allotment due to the presence of suitable habitats; are within the range of the species; are documented as occurring on the Apache-Sitgreaves, specific to vegetation types found on the Dark Canyon Allotment; and/or have been observed within the allotment. None of these species have had formal systematic surveys completed to detect their presence, absence, or relative abundance. For these reasons, it is assumed that they all have the potential to, and therefore may be currently existing here. All of these species have the potential to be impacted in various ways by livestock grazing in some areas, as described above.

Direct Effects: Eliminating livestock grazing from the allotment would remove direct disturbances to wildlife and eliminate any potential competition for forage or hiding/nesting/thermal cover. Habitats most extensively altered by direct effects of unregulated grazing and trampling by livestock, such as riparian or wetlands, will continue upward trends.

Grass hiding and nesting cover and food resources would increase for some species, as grass vigor, density, diversity changes. This would be most important in the grassland, open pinyon/juniper, and open shrub area vegetation types with gentle slopes. These areas are important for hiding and nesting cover and production of food resources for a variety of passerine and game bird species.

No livestock grazing may increase the prey base for some raptors, by improving the abundance and diversity of the prey base (smaller birds, rodents, insects). However, grazing may also improve the ability of raptors to detect and capture prey by removing cover. Bock et al.'s (1993) study showed probable negative responses to grazing for several raptor species, in arid shrub communities, including Ferruginous hawk, Northern harrier, Swainson's hawk, and the red-tailed hawk. Much more research is needed to gauge responses in these habitats.

Indirect and Cumulative Effects: Increased hatch survival and the resulting increased populations of several native fish species and amphibians may occur under the no livestock grazing alternative, especially in Eagle Creek. Water quality would improve, especially in riparian areas that have low volumes of flow or low volume containment pools which currently are used by livestock.

Hiding cover and food for grassland species will increase with a reduction in utilization of herbaceous forage. Ground nesting birds would likely return to some areas not currently suitable for such species. Susceptibility to predation, especially in potential fawning areas, would decrease concurrent with the increase in hiding cover. Predator control programs (mountain lion and bear) would not be required and a natural predator-prey relationship would eventually be re-established. Continuing rest from disturbances caused by livestock will contribute to the upward trend in stabilization of soils in some areas of the allotment as litter accumulates and key ecosystem functions improve. While reduction in over land flow and total erosion from the area is expected, the level of significance or change is unknown. The increase in perennial grass cover and litter would make the area more susceptible to wildfire and re-establishment of a natural fire regime, a natural disturbance factor.

Extended rest from livestock will result in substantial improvement in development of all riparian and wetland areas on the allotment, including seeps and springs. Water quality would be maintained or improve as no direct or indirect effects on water quality occur from livestock. Spring developments are currently maintained by the permittee. Although some or all of the "improvements" associated with these springs may deteriorate, the upkeep of these springs does not rely on livestock grazing. Some of these springs may become seeps, but they would continue to provide long-term waters for wildlife and provide quality wildlife habitat in the form of improved vegetation communities.

Indicator Species: Species dependent on riparian and wetland habitats may re-appear or increase substantially in occurrence on the allotment. Recolonization of riparian obligate, mobile species like birds will likely occur at measurable levels within the project life. The riparian indicator species (Lincoln's sparrow, Yellow-breasted chat, Lucy's warbler, and aquatic macroinvertebrates) habitats would continue to improve. All other wildlife indicator species populations, except antelope, would likely increase, then stabilize at these increased levels. A fire regime may eventually return and restore some grassland habitats and increase the summer range that the wild ungulates (deer, elk) require. With an improved functioning ecosystem, some species would return and expand in areas suitable for these individual species. Many natural relationships would return, uninfluenced by livestock. Overall, the no livestock grazing alternative will be beneficial to a diverse group of indicator species for the duration of the project period.

Alternative B (No Action/Deferred Rotation):

Direct Effects: Livestock remaining in the same areas of the allotment for too long a time can result in over grazing problems causing loss of perennial grass cover. Competition for perennial grasses and direct disturbances of grassland nesting species may occur in some areas. Some grassland wildlife species may have reduced or inadequate hiding or nesting habitat. Springs and riparian areas would continue to be impacted.

Potential direct disturbance of some wildlife habitats, such as bird nesting, feeding, and hiding cover areas, competition for available forage, and trampling of fish and amphibians, particularly their larvae and eggs, would occur. Growing season impacts to riparian species along Eagle Creek would also occur. Many other

components of various habitats will not change significantly. Current adverse direct effects would likely continue at levels previous to destocking the allotment.

Indirect Effects: With no changes in livestock numbers, operations, or range facilities, the overall condition or level of perennial grass species diversity, vigor, density, range, and litter layer may remain virtually static and not change the current condition of the allotment significantly. Low densities and short height of perennial grasses, and lack of litter, all attributable to livestock grazing, reduce the value of some grassland habitats within the allotment to wildlife. Litter will continue to be unavailable in sufficient amounts to slow rainfall or increase infiltration of rain so erosion will likely remain at relatively high levels, contributing to a loss of wildlife habitat. Hiding cover and food for grassland species will remain at about the same level.

Susceptibility to fawn predation will remain about the same. Predator control (lion) programs would remain in effect, thus eliminating chances for a natural predator-prey relationship to become re-established. Watershed conditions, including current erosion rates, will likely remain relatively constant. Riparian conditions will continue to degrade in Eagle Creek, especially since Eagle Creek would have some use (several months) 2 of 3 years and 12 months use 1 of 3 years. This may have potentially severe adverse effects for many riparian dependant species, both vegetation and wildlife/fish species. Quality and quantity of current wildlife habitat conditions will remain about the same or decline. Current adverse indirect effects will likely continue at levels prior to destocking.

Cumulative Effects: The current poor to fair range and watershed conditions of the allotment are at least partially a result of the cumulative effect of past over grazing and over utilization. These past land management practices have not yet allowed the allotment to recover to its full potential. Wildlife species that require perennial grass for nesting and hiding cover likely have been extirpated or reduced in some portions of this allotment. Areas with low water availability for livestock would continue to receive lighter livestock use. These areas will continue to provide habitat to species that currently use these areas. Some key concentration areas are expected to see a decline in grassland habitat. Overall, watershed conditions and associated grassland wildlife species, may remain static or decline slightly within the next 5 years.

Indicator Species: The response by indicator species will be variable. Some grassland species may decline, while many shrub and woodland species will remain unaffected. A grazing system that has contributed to a decline in ecological conditions and has no mechanism for biological concerns will do little to promote healthy indicator species habitats or populations. Lincoln's sparrow, Yellow-breasted chat, and Lucy's warbler, all moderate to exclusively riparian dependant indicator species, would all likely decline under this alternative. The impaired condition of Eagle Creek would not improve, thus adversely affect aquatic macroinvertebrates. There would likely be little effect to the Plain titmouse. Habitat conditions would not change significantly for wild ungulates. Summer range, with an abundance of grasses and forbs, appears to be a limiting factor for deer and elk.

Under Alternative B some wildlife habitat would remain stable, some may improve slowly, and some would continue to decline. Areas that would decline would be the Eagle Creek riparian corridor and other wetted areas and areas adjacent to them. Areas that may decline or remain stable include relatively flat areas, open canopy areas, areas with a comparatively higher percentage of cool season grasses that have spring livestock use, areas with an abundance of palatable or preferred species. Areas that may improve include low impacted areas and areas inaccessible to livestock.

Alternative C (Proposed Action/Rest Rotation):

Direct Effects: The Proposed Action alternative contains some changes in livestock management operations, stocking below estimated capacity, and no change in range facilities. Competition for perennial grasses and direct disturbances of grassland nesting species may continue in some key areas every other year. In these isolated locations, grassland wildlife species may have inadequate hiding or nesting habitat available to them, but is not anticipated to be substantial nor cause documentable decline in species richness or diversity

since applied rest will occur each year. Springs and riparian areas would continue to be impacted, possibly retarding woody riparian species development, during growing season use. Planned rest periods will help to mitigate this effect.

Direct disturbance of wildlife habitats (grazing, trampling, loafing) will occur, but to a much lesser degree than Alternative B. This may include disturbance of some bird nesting, feeding, and hiding cover areas. Potential direct effects to fish and amphibians, particularly their larvae and eggs, in Eagle Creek, Whitewater, and Knight Canyons, will be reduced substantially, as will impacts to riparian species. Many other components of various habitats will be maintained in current condition, or continue to improve slowly, or not change significantly. This will include hiding cover for ground nesting birds and mammals. Current adverse direct effects will be reduced in upland habitats and significantly reduced in riparian habitats, particularly in Eagle Creek, when compared with Alternative B.

Indirect Effects: The proposed action could contribute to significant changes in the overall condition of the allotment, or maintenance of improved condition, as compared to Alternative B. With proposed changes in livestock operations, perennial grass species diversity, vigor, and density will improve or stabilize, and effective litter will increase. Hiding cover and food for some grassland species may increase in some areas. Susceptibility to fawn predation may be reduced in some areas. Predator (lion, bear) control programs will be available, thus eliminating chances for a natural predator-prey relationship to become re-established. Watershed conditions, including current erosion rates may be reduced. Riparian conditions would improve substantially, especially in Eagle Creek, since direct livestock use is much reduced. This will have much reduced adverse effects for many riparian dependant species, both vegetative and wildlife/fish species. Quality and quantity of current wildlife habitat conditions may improve for some species, especially improved diversity of habitats for rodents that are prey for many raptors. Current adverse indirect effects will likely be substantially reduced when compared to Alternative B.

Cumulative Effects: Current poor and fair range and watershed conditions of the allotment are at least partially a result of the cumulative effect of past over grazing and/or over utilization. Recovery of the watershed, and associated wildlife species, will continue at the current upward trend, in some cases (aquatic and wetland species) improve slowly under the proposed action.

Indicator Species: Riparian dependant indicator species will likely benefit from anticipated improvement in riparian and aquatic conditions in Eagle Creek and are expected to increase in abundance under this alternative. Aquatic macroinvertebrates would increase because stream health would improve. There would likely be little effect to those bird species, like the Plain titmouse, which capitalize on forested habitats. Those needing grassland or riparian dependant obligate species will likely improve. Summer range for both deer species will improve with creation of areas producing new growth of forbs and grasses on an annual basis.

Under Alternative C, most wildlife habitats, especially that for passerine birds, raptors, and riparian dependent species, will continue to improve or at least remain stable. Few habitats are expected to decline, those perhaps being near wetland areas not completely isolated from all livestock use. Planned, rotated rest will assist with ensuing these areas are minimized. Areas that would continue to show significant improvement would be the Eagle Creek riparian corridor, and areas of low and moderate effective livestock impact combined with adequate rest. Areas that would likely remain stable include relatively flat areas and open canopy areas, or portions of the allotment where livestock concentrate, but are allowed to regrow with adequate rest. Other areas that would remain stable or may decline may be wetted areas (other than the Eagle Creek corridor) and areas containing a cool season grass/forb component that have spring livestock use. Applied, effective rest each year should mitigate the extent of impact to these sensitive areas.

G. Soil Condition

The soil mapping units within the Dark Canyon Allotment include Lithic Ustrothents, Lithic Haplustalfs (extremely gravelly sandy loams and rock outcrops); Argiustolls (stony, cobbly, and gravelly loams); Haplstalfs

(cobbly and gravelly silty clay loams); and riverwash. The majority of the soils on the allotment are loams to clay loams, with weathered ryolite material. These soils have good water holding capacity and fair infiltration and percolation. These soils are also shallow, and overlaid with rock.

Lithic Ustrothents occur on steep slopes and are characterized by poor access, shallow soils with rock outcrops. Haplustalfs occur on all slope categories, and are characterized by large volume changes in response to wetting and drying, fair revegetation potential, and surface rock. Argiustolls occur on moderate slopes and are characterized by clayey subsurface horizons, and experience large volume changes in response to wetting and drying, and poor access. Riverwash is characterized by high water tables and floodplains.

Domestic livestock grazing affects soil functions that are important to maintenance of long term productivity. Specifically, the soil's ability to accept, hold and release water is affected by physical compaction and trampling. The nutrient recycling function of the soil is affected by removal of vegetation that impacts above-ground nutrient inputs into the system. Finally, the soil's resistance to erosion is affected by changes in plant density and protective litter. Changes in livestock management has the potential to either improve or impair soil functions.

A soil condition rating system is used to measure the relative effects of livestock grazing by alternative on the above critical soil functions. Table 8 displays the soil condition ratings at the end of the project period as a result of implementing the proposed action and alternatives.

Table 8 - Soil Condition

Condition Class/ Alternative	Current	A	B	C
Satisfactory % of allotment	**30%**	**40%**	**30%**	**35%**
Impaired % of allotment	**50%**	**45%**	**50%**	**45%**
Unsatisfactory % of allotment	**20%**	**15%**	**20%**	**20%**

Satisfactory soil condition is classified as percent of the allotment soils in good to excellent condition with respect to soil stability. Soil stability is rated on a combination of soil disturbance and erosion hazard. Soil stability is defined as the relative resistance of the soil to change. Soil disturbance is defined as site characteristics in relation to plant and liter cover, bare spaces, erosion pavement, soil movement, soil deposition, plant pedestaling, and trampling. Erosion hazard is the percent of the soil surface exposed to erosion.

Impaired soil condition is classified as percent of the allotment soils in fair condition with respect to soil stability.

Unsatisfactory soil condition is classified as percent of the allotment soils in poor or very poor condition with respect to soil stability.

Alternative A (No Livestock Grazing): Soil Condition projections are based on overall soil condition and trends over the last 30 years from the 1956 Range Analysis Data and the 1970 Range Analysis Data as compared to current conditions. Extrapolations were made for watershed conditions based on data collected from other areas of the district. These areas indicated that long term rest from livestock grazing (ten + years) does not necessarily result in significant watershed improvement. Soil conditions are generally improved through increased standing litter, show increases in forb and woody plant establishment, but generally do not exhibit large increases in new perennial grass plant establishment.

Alternative B (No Action/Deferred Rotation): Soil Condition projects are based on current conditions. Continuation of existing livestock management practices are projected to have no significant variation in soil stability. No large improvement nor decline in soil conditions are projected over the term of the project.

Alternative C (Proposed Action/Rest Rotation): Soil Condition projections for this alternative are based on current conditions and changes and trends over the last 30 years from Range Analysis Data. Implementation of the proposed action is projected to have no significant variation is soil stability, with the exception of riparian area conditions along Eagle Creek. As plant community density and composition continues to improve throughout this section of the Eagle Creek riparian area, stream bank form and stability will also continue to improve, providing for improved soil stability through plant and litter cover on benches and terraces.

H. Watershed

A Forest wide watershed condition assessment was made for the Forest Land Management Plan in 1985. Watershed condition is a broad scale assessment rating derived from two parts, soil function and hydrologic function. The most restrictive of the two functions determined the watershed condition rating. Classification of 5th code watershed condition rating was determined by whether more acres are in satisfactory or unsatisfactory condition. Unsuited or untreatable acres are areas that cannot be treated under normal forest management or are considered geologically untreatable. These acres are considered satisfactory.

The Dark Canyon Allotment lies 97% within the Eagle Creek 5th code watershed which encompasses 188,987 acres from Bear Canyon to the Gila River, and 3% within the Lower San Francisco River 5th code watershed which encompasses 100,392 acres from Pleasant Valley to Clifton, Arizona. Of this acreage the Dark Canyon Allotment contributes 17,791 acres or 9% of the total Eagle Creek watershed and 502 acres or .5% of the total Lower San Francisco River watershed. Cumulative effects contributions from the Dark Canyon Allotment is not significant to the watershed condition of the Lower San Francisco River watershed. Cumulative effects contribution from the Dark Canyon Allotment is moderate to the watershed condition of the Eagle Creek watershed.

Watershed condition for the allotment is generally considered satisfactory/untreatable and unsatisfactory. Identified areas under heavy forest/woodland tree canopy are of watershed concern, but will not improve significantly with the implementation of any grazing management alternative. Forest openings in unsatisfactory condition will benefit the most from implementation of a grazing management plan that balances use by livestock with available forage, and offers direct control of livestock within major riparian areas on the allotment. Alternatives which provide for increased herbaceous ground cover and direct protection of riparian areas classified as nonfunctional or functioning-at-risk will be rated highest.

Alternative A (No Livestock Grazing): There are no allocated acres to livestock grazing on the Dark Canyon Allotment under this alternative. Cumulative watershed effects are measured by changes in riparian condition.

Alternative B (No Action/Deferred Rotation): Acres within the Dark Canyon Allotment (3,606 acres) used in calculations for estimated capacity of proposed livestock numbers under this alternative are 20% of the total allotment acres, and 2% of the Eagle Creek watershed acres. Stock density on the Dark Canyon Allotment under these proposed livestock numbers is 319 acres per animal unit, yearlong. The stock density on the capacity acres within the Dark Canyon Allotment under these proposed livestock numbers is 63 acres per animal unit, yearlong. Cumulative watershed effects are measured by changes in riparian condition.

Alternative C (No Action/Rest Rotation): Acres within the Dark Canyon Allotment (3,606 acres) used in calculations for estimated capacity of proposed livestock numbers under this alternative are 20% of the total allotment acres, and 2% of the Eagle Creek watershed acres. Stock density on the Dark Canyon Allotment under these proposed livestock numbers is 319 acres per animal unit, yearlong. The stock density on the capacity acres within the Dark Canyon Allotment under these proposed livestock numbers is 63 acres per animal unit, yearlong. Cumulative watershed effects are measured by changes in riparian condition.

I. Water Quality

Under date of November 15, 1990, the State of Arizona, Department of Environmental Quality, and the Southwestern Region of the Forest Service entered into an Intergovernmental Agreement to respond to the objectives defined by Congress in the Federal Water Pollution Control Act, as amended (1987). Implementation of the requirements in this Agreement, including the use of Best Management Practices, will satisfy compliance with the CWA and NEPA.

The head of Dark Canyon, Cottonwood Canyon, Knight Canyon, and a portion of Whitewater Canyon are within the Allotment boundaries, and provide drainage into Eagle Creek and the Gila River System. A surface water hydrologic connection exists between the Gila River and the Dark Canyon Allotment via Eagle Creek, Whitewater Creek, and unnamed washes by the tributary rule.

Within the Arizona Department of Environmental Quality waterbody system summary and Upper Gila River Basin Assessment, the Dark Canyon Allotment is primarily within Reach Number AZ15040005-025 designated by 33 miles of Eagle Creek, from Sheep Wash to the Gila River. The assessment was made to assess each waterbody to determine the level of support for the designated uses and attainment of the Clean Water Act goals for aquatic ecosystems. This waterbody reach was monitored with samples taken and assessed over a 5 year period by comparing Surface Water Standards.

Information on this reach indicates that four designated uses were partially supported and the remaining uses were fully supported. Designated uses within the report included drinking water supply, full body contact, fish consumption, aquatic and wildlife coldwater fisheries, agriculture irrigation, and agriculture livestock watering. The use support status of these designated uses with specific water quality standards listed drinking water supply as partially supported, full body contact as partially supported, aquatic and wildlife as partially supported, agriculture irrigation as partially supported, and agriculture livestock watering as fully supported. The fully supported status for designated uses indicates that number and narrative criteria were not exceeded and any sources of contaminants were adequately managed, so that criteria attainment was predicted. Individual waterbody assessment of designated uses shows that this stream reach is not water quality limited. The partially supported status for drinking water supply, full body contact, aquatic and wildlife, and agriculture irrigation indicates that these uses are impaired, but no uses are in non-support, violations occur seasonally, and discharge occurred with nominal or short term effects. Assessment information indicates the water body is impacted by PH levels. A discharge station to surface waters of Eagle Creek is under permit within this reach at Gold Gulch below the Dark Canyon Allotment and the National Forest Boundary. PH level concerns contributed to the system from livestock grazing operations on the Dark Canyon Allotment is not projected to be of management consideration since the Dark Canyon Allotment has been under livestock non-use since 1993.

Within the Arizona Department of Environmental Quality waterbody system summary and Upper Gila River Basin Assessment, upstream assessments were also made for two additional stream reaches of Eagle Creek. The upper stream reaches are assessed within Reach Number AZ1504005-028 designated by 13 miles of Eagle Creek from the headwaters to Willow Creek and Reach Number AZ15040005-027 designated by 4.6 miles of Eagle Creek from Willow Creek to Sheep Wash. Waterbody assessments indicate that all designated uses were fully supported within these stream reaches. The fully supported status for designated uses indicate that no uses are impaired, there are no numeric or narrative standards violations, and no conditions exist which suggest that the waterbody is impaired.

Alternative A (No Livestock Grazing): There are no projected direct or indirect livestock effects to water quality under the no grazing alternative.

Alternative B (No Action/Deferred Rotation): Potential direct and indirect effects on water quality from season long livestock access to Eagle Creek include increased water temperature, turbidity, bacteria, nutrients,

dissolved oxygen and PH through stream bank shearing, trampling, reduction in streamside vegetation, stirring of stream bottom materials, fecal matter and urine discharge into water.

Alternative C (Proposed Action/Rest Rotation): Potential direct and indirect effects on water quality from livestock transit along Eagle Creek include minimized point in time, or limited, short term influences of the effects as listed under Alternative B. In order to address resource concerns and obtain objectives under Alternative C the following Best Management Practices (BMP's) have been implemented between 1975 and 1992 are included within the proposed action.

1. Preparation of a livestock operating plan to manage for current and projected pasture conditions in order to graze pastures within their capability.
2. Implementation of controlled livestock management program that addresses resource concerns and provides improved livestock distribution patterns. Livestock management takes into consideration frequency of rest, allowable use, and season of use per pasture.
3. Existing range improvements such as pasture fences (utilizing natural barriers where possible), riparian pasture fences, and spring developments that address resource concerns.
4. Implementation of a monitoring plan to insure consistency of application and the effectiveness of program.

J. Air Quality

The Dark Canyon Allotment is within an Arizona designated Air Management Non-Attainment Zone. This area is designated as previously not attaining ambient air quality standards under the Clean Air Act because of previous sulphur dioxide emissions.

A conformity determination is required for each pollutant where the total of direct and indirect air emissions would equal or exceed the published Clean Air Act standards. The following activities and actions are exempt from conformity determinations (Sec. 93.153(c)):

a. When the emissions from an activity are below the minimum standards.
   - permit renewals
   - routine maintenance and repair of improvements
   - routine and recurring transportation of material and personnel
   - planning studies and provision of technical assistance

b. When the emissions are not reasonably foreseeable.

Implementation of an Allotment Management Plan and modification of the Term Grazing Permit for livestock use on the Dark Canyon Allotment falls within all of the above exempt activities.

K. Social

"Greenlee County is located in the southeastern region of Arizona. The county has only two incorporated towns, Clifton and Duncan. Land uses within the unincorporated county are agriculture, mining, ranching, and forestry. Greenlee County consists of 1,838 square miles with only 9% being privately owned. The majority of the land, 64%, is located in the Apache-Sitgreaves National Forest and the remaining 27% is public land which is controlled by the state and the Bureau of Land Management. Most of the county consists of moderate to steep mountain terrain where development would be restricted due to slopes." (Greenlee County Action Plan)

"According to the 1990 Census, a total of 8,008 persons reside in Greenlee County. The County has experienced an almost 30% loss in population since 1980. This drop reflects the flooding experienced in the 1980's and poor economic conditions." (Greenlee County Action Plan) The US Census Bureau listed the employment structure within Greenlee County as 31% in Agriculture and Mining in 1980 and 61% in Agriculture and Mining in 1990.

Livestock grazing occurred in the area of the Apache-Sitgreaves National Forest long before it was designated a Federal Forest Reserve. The region is rich in cultural diversity which goes back to the late 1800's settlement. Public lands have contributed to the support of rural livelihoods in ranching, timber, and mining since these settlement days. Today most livestock operations within Greenlee County are dependent upon public lands. Livestock agriculture in eastern Arizona is by far the largest small business enterprise, consisting mostly of small family owned and operated ranches. The rural beliefs and values within the county are based on the evolution of a community with is existence and heritage based in mining, ranching and farming.

Alternative A (No Livestock Grazing): Perceptions and comments received from within the local community reflects a negative response to the no livestock grazing alternative. Cancellation of the Term Grazing Permit would impact the local community who value their agricultural heritage and rural ranching life-style.

Alternative B (No Action/Deferred Rotation): This alternative will support the local rural beliefs and values based in ranching and farming. This alternative also supports multiple use of public lands.

Alternative C (Proposed Action/Rest Rotation): This alternative also will support the local rural beliefs and values based in ranching and farming. This alternatives also supports multiple use of public lands.

L. Economic

"Greenlee County receives money from the Apache-Sitgreaves National Forest's revenue. These monies are used for education and road maintenance/ construction."(Greenlee County Action Plan) Forest receipts in 1994 for Greenlee County totaled $432,000. "This money represents a substantial portion of the combined general fund and road department budget." (Greenlee County Action Plan) Forest receipts in 1995 for Greenlee County totaled $142,000, a reduction of 67% from 1994 receipts. Forest receipts in 1996 for Greenlee County totaled $67,066, a further reduction of 53% from 1995 receipts. As Forest receipt payments to the county decrease, the importance of revenues generated from livestock grazing fees increase. Changes in several allotments will have cumulative impacts on the local economy as almost all of the ranches in Greenlee County are either federal or state grazing land dependent. Without the availability of public land for livestock grazing, there would be little viable ranching in Greenlee County.

"Farming, ranching and directly related agribusiness make significant contributions to the Arizona economy and are important for maintaining economic diversity. They also provide important income and employment in rural areas of the State where fewer employment and income earning opportunities are available than in the metropolitan areas of Phoenix and Tuscon. Total cash receipts for crops, livestock, and livestock products for Greenlee County in 1991 was $8,405,000." (Agriculture in the Az Economy) "The value to local businesses is approximately $279.00 per cow." (Characteristics of Western Livestock Industry) This value is comparable to the value of 1.5 times the value of calf sales figure utilized in the above table to project dollar contributions to the local economy.

"Tourism certainly has been an economic boost to many communities in Arizona, New Mexico and Utah. A recent analysis of the Gila National Forest recreation demand was completed for 1990. According to the study, tourism/outdoor recreation economic impacts were $3 million in Catron County. For the year 2000 outdoor recreation impacts are projected to increase to $4.8 million on the local economy. If Catron county's cattle and timber revenues stay at the 1992 levels of production, their net projected impact will be well over $20 million by the year 2000. For Catron county, tourism is vital to the economy, but it cannot replace the commodity industries." (Social and Economic Consequences of Public Land Withdrawals on Rural community Stability in the Southwest)

Domestic livestock grazing contributes to the livelihood of permittees as well as to the economy of local communities and counties. Land use by economic activity within Greenlee County indicated that in 1988, 851,000 acres or 70.7% of the county was dedicated to livestock raising agriculture and 3,000 acres or .2% of the county was dedicated to farming agriculture. (Western Economic Analysis Center, USDA/USDI & Dept. of

Commerce). At present the raising of livestock, outdoor recreation and mining are the most extensive uses of the land in Greenlee County. "Economic impacts of policies directed toward agriculture cannot be measured by examining the farm and ranch sector in isolation. Changes in the agriculture community ripple through the entire economy. The impact of changes in economic activity in agriculture begins with effect on businesses that supply farm and ranch products or buy farm and ranch products." (Agriculture in AZ Economy)

Therefore, individual allotments provide incremental contributions to the economy and changes in one or several allotments on the Apache-Sitgreaves will have cumulative impacts on the local economy. The number of direct and indirect jobs supported, and payments to counties from federal receipts provide a relative comparison of economic effects from changes in livestock grazing. Table 9 shows the effects on these indicators from this proposed action and the cumulative impacts considering other reasonable foreseeable actions.

Table 9 - Economic Effects

Economic Effect / Alternative	A	B	C
Number of Head of Livestock	-0-	57	57
Direct and Indirect Jobs (1.14 jobs per 100 head)	-0-	.65	.65
Total Grazing Fee (1997 U.S. Treasury)	$-0-	$936.22	$936.22
Payment to County (PILT) (25% of grazing fees)	$-0-	$234.06	$234.06
Number of Calves Sold (65% calf production assumed)	-0-	37	37
Total Value of Calf Sales ($250-400 per calf sold - $325 assumed average value)	$-0-	$12,025	$12,025
Contribution to Local Economy (1.5 times value of calf sales)	$-0-	$18,038	$18,038

Alternative A (No Livestock Grazing): This alternative would reduce direct and indirect jobs within the county, reduce Payment in Lieu of Taxes (PILT) to the county, and reduce agribusiness revenues within the local community. There is however the possibility that elimination of livestock grazing would replace the loss to the local economy by encouraging increased tourism and recreation activity. Maintenance of existing structural improvements such as springs and fences would revert to Forest Service responsibility.

Alternative B (No Action/Deferred Rotation): The economic variance between this alternative and Alternative C are not significant, in the short-term. However, decline of resource conditions, especially riparian conditions, may reduce water quality for downstream uses and reduce viable recreation values associated with aquatic activities. The permittee will be responsible for maintenance of existing improvements associated with the livestock management program.

Alternative C (Proposed Action/Rest Rotation): This alternative will not significantly change the economic situation of the permittee, payments to the county, or affect work force numbers. Aquatic, riparian, and water quality values will be maintained and improved. The permittee will be responsible for maintenance of existing improvement associated with the livestock management program.

M. Heritage Resources/Traditional Cultural Properties

The alternatives do not include Federal undertakings, or earth disturbing projects, as defined under 36 CFR §800.2(o). The alternatives do include non-undertakings, such as maintenance, reconstruction, or replacement of existing facilities. The effects of grazing on heritage resources are of concern as noted in the Programmatic Agreement and by letter of March 16, 1995, and February 11, 1998, in which Region 3 and the Arizona State Historic Preservation Officer clarified the process for addressing these concerns. Implementation of the Section 106 consultation process where necessary, would satisfy compliance with both the National Historic Preservation Act and NEPA implementing regulations.

No heritage resource surveys have been conducted in this analysis area. Historic sites related to logging may be present in the Dark Canyon Allotment. Prehistoric habitation and rock art sites are reported to be associated with caves in the allotment. Prehistoric sites are also likely to be associated with springs in the area and the riparian zones in Dark Canyon. The significance of heritage resources in the analysis area is unevaluated.

Heritage resources may be directly affected by trampling, and indirectly affected by the same processes affecting soil and riparian conditions, flooding, head cutting, sheet erosion, depending on their location.

Alternative A (No Livestock Grazing): No livestock grazing is permitted under this alternative. Therefore, the potential for heritage resources to be directly affected by livestock trampling is eliminated. Ground cover should increase, minimizing the impacts of flooding and erosion.

Alternative B (No Action/Deferred Rotation): Grazing under this alternative would continue at historic levels. Although none of the known or predicted heritage resources have been documented, no significant impacts due to livestock are expected. With the continuation of livestock grazing, ground cover is expected to decrease. The effects of runoff related processes are expected to increase.

Alternative C (Proposed Action/Rest Rotation): Under this alternative livestock numbers and season of use would be implemented to meet objectives. Ground cover should increase, minimizing the effects of runoff related processes to heritage resources. No new or reconstructed range developments are proposed for the Dark Canyon Allotment. Because no surveys for heritage resources have been conducted, it is recommended that when routine maintenance or reconstruction of existing facilities is proposed, a survey covering an area of at least 10 acres be completed. It is suggested that if personnel conducting routine monitoring are qualified, they also include heritage resource inventory in their work.

N. Recreation/Visual Resources

The area of the Dark Canyon Allotment has much to offer in natural beauty and dispersed recreation values. The different colors of the rock formations and vegetation adds to the natural beauty of the area. From the Arizona cypress stands along Highway 191 to the steep rough bluffy mountain ridges and canyon bottoms to the flood plain and steep canyon sides of Eagle Creek. The area is a very diverse, rugged, remote, roadless area, accessible only by horseback or foot travel. Lands within the Dark Canyon Allotment are within a RARE II roadless area.

Alternative A (No Livestock Grazing): Elimination of livestock grazing is projected to improve recreation activity values for public land users who are disturbed by domestic livestock use on Forest Service Lands.

Alternative B (No Action/Deferred Rotation): The most accessible portions of the allotment are by the Spur Cross Trail and the Painted Bluff Trail. These trails eventually lead to Eagle Creek and Dark Canyon. Continuation of the current livestock management program will not provide for improved resource conditions, especially riparian, and thereby will continue to decline in recreation values. No impact is projected for RARE II designation that precludes future consideration of special status for lands within the Dark Canyon Allotment.

Alternative C (Proposed Action/Rest Rotation): Implementation of a livestock management program that specifically addresses concerns related to riparian area conditions, especially within Eagle Creek, should continue to improve recreation values. No impact is projected for RARE II designation that precludes future consideration of special status for lands within the Dark Canyon Allotment.

O. Monitoring

A complete list of monitoring methodologies that will used on the Dark Canyon Allotment are provided in **Appendix B** of this document.

The following monitoring measures are selected to evaluate changes over time in overall landscape conditions as they relate to established objectives. The execution of monitoring measures should result in data for two levels of monitoring. The two levels are implementation monitoring and effectiveness monitoring. Implementation monitoring indicates whether management activities require adjustment. It should also be recognized that monitoring is not an in depth analysis but a measure of indicators that may trigger further detailed analysis of a particular resource. Either additional monitoring or detailed analysis may trigger immediate corrective action on the allotment on a seasonal basis or a change in the AMP and/or grazing permit. Actions taken are monitored to determine the effectiveness of the implemented action to move the landscape toward resource objectives and established goals.

Alternative A (No Livestock Grazing):

Implementation Monitoring: Maintain a record of allotment inspections verifying the presence or absence of trespass or unauthorized livestock.

Effectiveness Monitoring: No effectiveness monitoring measures have been established for this alternative.

Alternative B, & C (No Action and Proposed Action/Deferred Rotation & Rest Rotation):

Implementation Monitoring: To improve future management a record will be maintained of changes in the planned annual livestock operation, numbers of livestock stocked annually, duration of use per grazing pasture, general observations of utilization levels of available forage, forage use patterns for livestock, overall riparian condition, regeneration of riparian species, livestock use levels and patterns within riparian areas, any observations on wildlife, soil movement, or changes in the land area. Point photographs will be used to document changes or observations. Inspections to document observations will be conducted during and following livestock use. Production/utilization surveys will be conducted where necessary after livestock use patterns have been identified within the allotment. These surveys will be conducted annually during the first three years following implementation of the livestock management operation and on a periodic basis thereafter to verify estimated capacity, allowable forage use levels, and use patterns.

Effectiveness Monitoring: Vegetation responses to management, as implemented, constitutes effectiveness monitoring. Indications of movements from existing resource conditions toward desired resource conditions as identified through resource objectives will validate the effectiveness of the management program. Increases in ground cover through perennial herbaceous species establishment, improved vigor, increases in litter, increases in cool season components, and improved herbaceous species composition, will be used as monitoring indicators of movement toward desired upland conditions. Increases in herbaceous understory, and regeneration of woody riparian dependent vegetation will be used as monitoring indicators of movement toward proper functioning riparian conditions.

P. <u>National Forest Management Act Findings</u>

The Dark Canyon Allotment is included within the Apache-Sitgreaves National Forest Land Management Plan under Management Area (MA) #2, woodland, MA #3, riparian, and MA #4 grasslands. Management emphasis within woodlands is on fuelwood production, wildlife habitat, watershed, and livestock grazing. Riparian emphasis is directed at areas with riparian dependent resources such as threatened and endangered species, cold water fisheries, and warm water fisheries. Management emphasis within grasslands is wildlife habitat and visual quality, especially big game winter range. **Appendix C** lists standards and guidelines that apply to vegetation associations and management activities which occur within the Dark Canyon Allotment.

Alternative A (No Livestock Grazing): Alternative A is consistent with Forest Plan standards and guidelines.

Alternative B (No Action/Deferred Rotation): Alternative B is not consistent with Forest Plan standards and guidelines as they relate to priority 1 streams. The Forest Plan directs implementation of grazing strategies directed toward recovery of both biological systems and physical systems.

Alternative C (Proposed Action/Rest Rotation): Alternative C is consistent with both capacity criteria as expressed in the Forest Plan standards and guidelines and recovery of riparian systems.

CHAPTER 4 LIST OF PREPARERS

I. Planning Efforts

The planning process was initiated on the Dark Canyon Allotment in 1995. Initial scoping of internal and external participants occurred under letter of April 17, 1995. Scoping meetings and discussions with interested and affected persons were conducted between 1995 and the end of 1997. The process utilized to generate this summary is within Region 3's Integrated Resource Management approach to insure compliance with NFMA and NEPA legislation. Existing land conditions have been identified. The Forest Service Geographical Information System (GIS) was utilized to map, display and analyze information. This information is presented in the form of vegetation maps, maps displaying canopy cover, land capacity based on soils, land elevation or slope models, and maps of areas for wildlife habitat emphasis.

Range inspections, previous range analysis information, previous production/ utilization information, the Terrestrial Ecosystem Survey for the Apache-Sitgreaves National Forest, field sampling, aerial photographs, and GIS data layers were the primary techniques used to asses and map land conditions.

II. List of Preparers: District and local agency personnel conducted the majority of the analysis, involvement of forest level team input was also an invaluable part of the process.

Frank A. Hayes, District Ranger, Clifton RD
Nancy L. Walls, Rangeland Management Specialist, Clifton RD
Bob Csargo, Biologist, Clifton RD
Laurette Cosper, Resource Clerk, Clifton RD
Randall Chavez, Range Conservationist, Clifton RD
Robert Whitten, Range Technician, Clifton RD
Jeffery Stone, Fuels Technician and GIS Coordinator, Clifton RD
Chris Nelson, Soil Scientist, Apache-Sitgreaves NF
Sandra Leschin, Zone Archeologist, Apache-Sitgreaves NF
Linda Martin, Forest Archeologist, Apache-Sitgreaves NF
Terry Myers, Wildlife Biologist (TES), Apache-Sitgreaves NF

CHAPTER 5 CONSULTATION WITH OTHERS

I. Names of agencies, groups, and corporations contacted at various times during the process, including scoping, are as follows:

ADOT, Safford District
American Rivers
Anglers United
Arizona Cattlegrowers
Arizona Department of Environmental Quality
Arizona Game and Fish Department
Arizona Mountaineering Club
Arizona Native Plant Society
Arizona Nature Conservancy
Arizona Republic
Arizona State Riparian Council
Arizona State University
Arizona Wildlife Federation
Audobon Society

Biodiversity Legal Foundation
Bureau of Land Management
City of Clifton
City of Duncan
Clifton Chamber of Commerce
Copper Era
Coronado Scenic Trail Association
Defenders of Wildlife
Eastern Arizona Courier
Forest Conservation Council
Gila Fish and Gun Club, Inc.
Gila Valley Natural Resources Conservation District
Graham County Board of Supervisors
Greater Gila Biodiversity Project
Greenlee Chamber of Commerce
Greenlee County Assessor
Greenlee County Board of Supervisor
Greenlee County Cattlegrowers
Greenlee County Court
Honorable J.D. Hayworth
Honorable Jack Brow
Honorable John McCain
Honorable Jon Kyl
Honorable Paul Newman
Honorable Rueben Ortega
Maricopa Audobon Society
Mothers for Clean Water
Mountain States Multiple Use Alliance
Navajo County Board of Supervisors
Phelps Dodge, Morenci Inc.
Sierra Club
Sierra Club, Plateau Group
Sonoran Rio Diversity Project
Southwest Center for Biodiversity
Southwest Center for Biological Diversity
U.S. Fish and Wildlife Service, Ecological Services
United Four Wheel Drive Association
University of Arizona
Utah State University, National Research Library
White Mountain Conservation League
Wilderness Society
Wildlife Society, Arizona Chapter

In addition to the above referenced organizations 31 individuals were contacted.

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III. Glossary of Terms

Allotment: A designated area of land available for livestock grazing. It is the basic land unit used in the management of livestock on National Forest System lands, and associated lands administered by the Forest Service.

Allowable Use: The degree of utilization considered desirable and attainable on various specific parts of an allotment considering the present resource condition, management objectives, and management level.

Animal Unit Month (AUM): The amount of feed or forage required by an animal unit for one month.

Browse: The part(s) of shrubs, woody vines, and trees available for animal consumption.

Carrying Capacity: The average number of livestock and/or wildlife which may be sustained on a management unit compatible with management objectives for the unit. In addition to site characteristics, it is a function of management goals and Management intensity.

Class of livestock: Age and/or sex group of a kind of livestock.

Forage: browse and herbage which is available and may provide for grazing animals or be harvest for feeding.

Key Area: A portion of rangeland selected because of its location, grazing or browsing value, or use. It serves as a monitoring and evaluation point for range condition, trend, or degree of grazing use. Properly selected key area reflect the overall acceptability of current grazing management over the rangeland. A key area guides the general management of the entire area of which it is a part.

Litter: Uppermost layer of organic debris on the soil surface; essentially freshly fallen or slightly decomposed vegetation material.

Natural Soil Loss (NSL): The rate of soil loss under conditions associated with a climax category (minimum rate). The boundary between potential capacity and no capacity is the line of constant slope as determined at the point where "TSL" is equivalent to "NSL".

Over grazing: Severe and frequent grazing during active growth periods that impact the recovery capability of a plant species or plant community.

Pedestalled Plants: Plants which are growing on a hummock of soil as a result of water or wind erosion removing soil from the interspaces between plants.

Percent use: The percentage of the current year's forage production that is consumed or impacted by grazing animals.

Range Condition: A term relating to present status of a unit of range in terms of grazing and browsing animals.

Residual vegetation: The amount of vegetation that is desired to remain on the land area to provide for wildlife, ground cover, litter cover, and emergency forage reserves.

Riparian Area: Geographically delineable area with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems.

Tolerance Soil Loss (TSL): The maximum rate of soil loss that can occur while sustaining inherent site productivity.

Utilization: The available forage by weight consumed or trampled through livestock grazing.