



United States
Department of
Agriculture

Forest
Service

Southwestern
Region



Environmental Assessment

Homestead/Davenport Grazing Project

Williams Ranger District, Kaibab National Forest
Coconino County, Arizona



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Chapter 1 – Purpose and Need

Document Structure

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

- **Introduction:** The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency’s proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- **Comparison of Alternatives, including the Proposed Action:** This section provides a more detailed description of both the agency’s Proposed Action and alternative courses of action, as well as the No Action Alternative. This discussion also includes mitigation measures.
- **Environmental Effects:** This section describes the environmental effects of implementing the Proposed Action and other alternatives. This analysis is organized by resource area. For each alternative, the affected environment is described first, followed by the effects analysis.
- **Agencies and Persons Consulted:** This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Williams Ranger District Office in Williams Arizona.

Background

The Homestead and Davenport Allotments are located within the Williams Ranger District, Kaibab National Forest, and contain 6,879 and 7,498 acres, respectively. The Homestead Allotment is approximately 6 miles northeast of Williams, Arizona, and the Davenport Allotment is bisected by I-40, extending eastward from the I-40/ Hwy 64 interchange approximately 8 miles. The project area is situated in T22 N, R3 E, Sections 16-22, and 26-35; T22 N, R3 E, Sections 3, 4, 10, 15, 16, and 19-36; T22 N, R2 E, Sections 23-26 and 35-36; and the northeast portion of T21 N, R3 E, Section 1 (See Figure 1. Vicinity Map of the Davenport and Homestead Allotments).

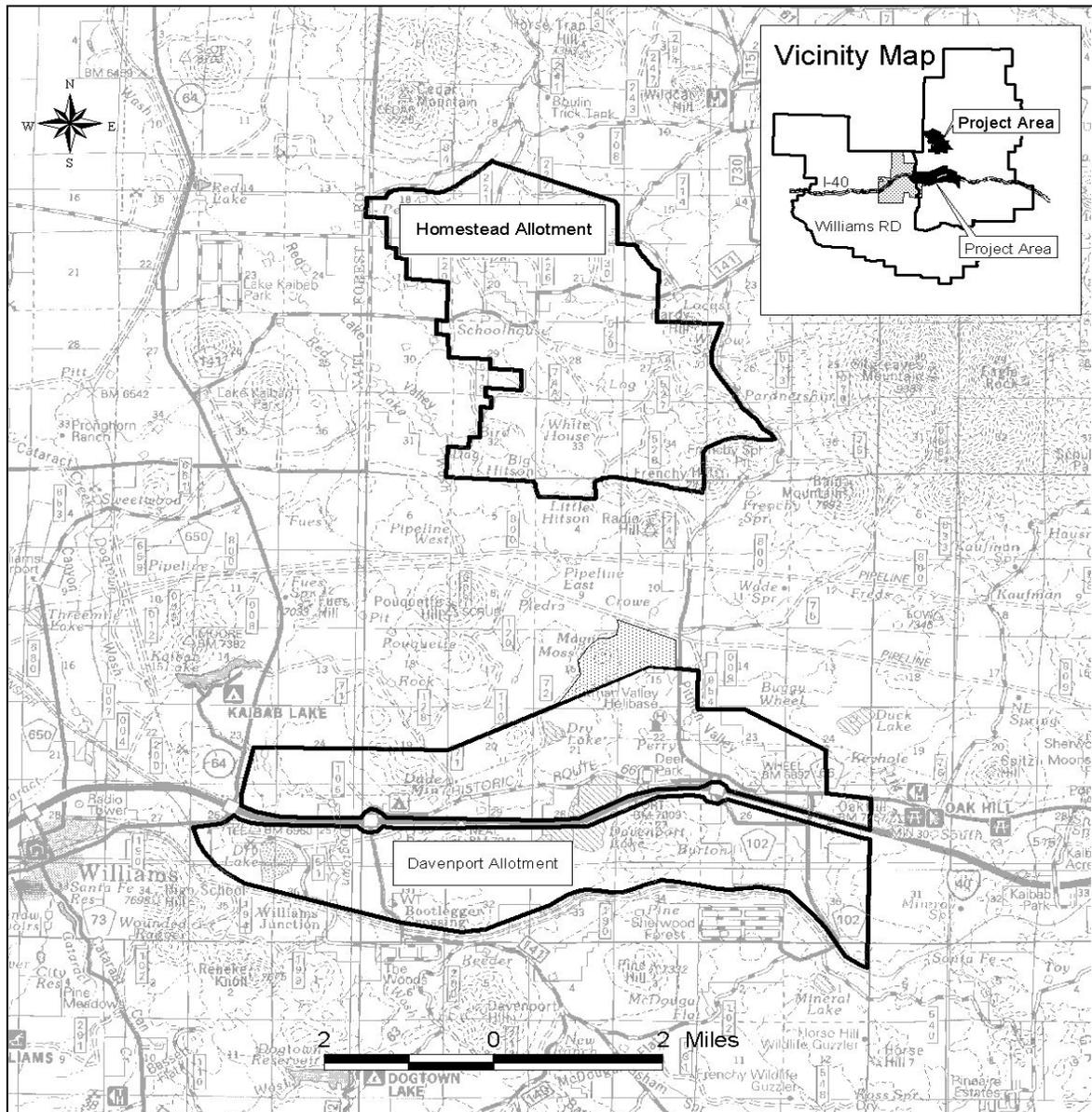


Figure 1. Vicinity Map of the Homestead and Davenport Allotments

The Homestead and Davenport Allotments have had the same grazing permit holder for over forty years. They are only the third grazing permit holder for Davenport Allotment since its establishment in 1936. They have held the Homestead permit since the Allotment was established in 1962. The Homestead Allotment was created by combining the Hardy Allotment and part of the old Williams Allotment.

Coordination with the affected grazing permit holders was initiated in March of 2000, when existing conditions for each allotment and a draft Proposed Action were presented to them. The environmental analysis process for the Homestead and Davenport Allotments was initiated by a project initiation letter dated November 3, 2000. Data collection, analysis, consultation, and public/permit holder participation has been on-going.

Purpose and Need for Action

This proposal was initiated in response to range management regulations at 36 CFR 222 Subpart A, 222.2 (c) that requires the Forest Service to make forage available for livestock under the direction contained in the Kaibab National Forest Land Management Plan. In addition, Section 504 (a) of the 1995 Rescission Act (Public Law 104-19) requires the agency to establish and adhere to a schedule for completion of National Environmental Policy Act analyses and decisions on all range allotments.

There are two aspects to the purpose and need: 1) to provide forage for domestic livestock as directed by the Forest Plan, and 2) to maintain or improve range and soil conditions on the allotments. Range condition and trend monitoring and analysis have shown that there is a need to improve resource conditions in the following areas:

- In the Davenport Allotment, recent range analysis indicates that the allotment is in poor condition with a stable to slightly downward trend; abundance and vigor of cool season plants are decreasing.
- Early season livestock presence in the Davenport Lake area, combined with the current drought situation is causing negative short-term impacts to vegetation and displacement of wetland-dependent species.

Proposed Action

The Forest Service proposes to reauthorize grazing on the Homestead and Davenport Allotments so that grazing permits may be issued. Also included are specific management practices and range structural improvements necessary to meet the purpose and need. The Proposed Action includes the parameters shown in Table 1. Alternatives to the Proposed Action are displayed in Chapter 2.

Table 1. Proposed Action for the Homestead and Davenport Allotments.

		DAVENPORT ALLOMENT	HOMESTEAD ALLOTMENT
GRAZING SYSTEM		Deferred Rotation – 5 pastures	Rest Rotation – 4 pastures
NUMBER OF LIVESTOCK		Cattle – 145 (15% reduction from current numbers)	Cattle - 125
SEASON OF USE		5/16 – 10/31	5/1 – 10/31
ANIMAL MONTHS		798	750
AVERAGE	KEY AREAS	30%	40%
ALLOWABLE UTILIZATION	UPLAND MSO HABITAT	Less than 20%	Less than 20%
RANGE IMPROVEMENTS		Construct about 1/3 mile of fence to create a 5 th pasture. Construct 1.5 mile of fence to create a temporary holding pasture on the adjacent Sitgreaves Allotment.	None

Decision Framework

Given the purpose and need, the deciding official will review the Proposed Action and the other alternatives in order to make the following decisions:

- Whether to authorize continued livestock grazing on the Homestead and Davenport Allotments.
- If livestock grazing is authorized, under what parameters and management practices livestock grazing will be implemented.
- Whether the selected alternative would have significant effects.

Public Involvement

The project was placed on the Kaibab National Forest’s Schedule of Proposed Actions in 2000, and has been listed quarterly ever since. The initial Proposed Action for the allotments was sent out for scoping to individuals, permit holders, organizations, State and Federal agencies, and interested Indian tribes for review and comment on February 28, 2001 (Project Record # 8, 9, 10). Over the scoping period, comments were received by mail, telephone, and the Internet (PR # 11, 13-17, 22, and 34).

Using the comments from the public, other agencies, and interested Indian tribes, the interdisciplinary team developed a revised Proposed Action which was sent out for Notice and Comment on June 11, 2004. Due to an oversight in the project mailing list, not all individuals who typically express interest in grazing projects on the Williams District were notified. In order to provide those individuals an opportunity to comment, the comment period was opened for a second 30-day comment period. During the Notice and Comment Period, comments were received from seven individuals, some of whom were representing an organization (PR # 53, 54, 57, 58, 65, 66, 68). The District considered the comments received during the two Notice and Comment periods to assess and determine if the EA analysis was sufficient or if the Proposed Action needed alteration (see next paragraph).

During the Notice and Comment periods, two individuals made comments (PR # 57 and 65) in relation to the proposed five-day cool season grazing period reduction in the White House pasture of the Homestead Allotment. One comment said that the concern over cool season grasses was unfounded and that the five-day reduction was not needed. The other comment stated that a five-day reduction in grazing was insufficient to maintain the ecological health of the pasture. To resolve this late-breaking public concern, the range analysis data for the White House pasture was examined more closely. The data actually showed that the cool-season grass component in the White House pasture has steadily improved over the past 30 years (PR # 69). Based on this information, the District made the decision to drop this five-day grazing period reduction in the White House pasture from the Proposed Action. For the Homestead Allotment, Alternative 1 (Current Management) is now the same as Alternative 2 (Proposed Action).

Issues

Generally, an “issue” can be defined as a point of conflict, debate, or disagreement about some aspect of the proposal. Not all issues are significant. Issues are not considered significant if they are 1) Outside the scope of the analysis; 2) Already decided by law, regulation, or policy; 3) Irrelevant to the decision to be made; 4) Conjectural and not supported by scientific fact; or 5) Limited in extent, duration, or intensity. Many times public comments simply involve questions or concerns based upon incomplete information, which, if known, would resolve or significantly mitigate the concern. If an issue is truly significant, it will be addressed in at least one of the alternatives analyzed, and may require another alternative to be developed if an existing one does not adequately address it.

No significant issues were identified during the scoping and Notice and Comment periods. However, a number of comments did raise relevant resource concerns. These resource concerns are addressed in Chapter 3 of this document. A summary of the resource concerns raised and the agency responses is included in Appendix 1. A complete list of comments, concerns, and how they were considered or categorized as may be found in the Project Record # 69).

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Chapter 2 - Alternatives

This chapter describes and compares the alternatives considered for the Homestead/Davenport project. It includes a map of the Proposed Action and a description of each alternative. This section also presents the alternatives side-by-side, defining the differences between each alternative and providing a clear basis for choice by the decision maker.

Alternatives

Alternative 1- Current Management

Under Alternative 1, the current management would continue and no changes or improvements would be made.

The **Davenport Allotment** is currently managed as a cow/calf operation under a four-pasture deferred rotation grazing system, with 170 cattle permitted. The season of use is May 16 through October 31. Average allowable use in “key areas” (see key area definition at top of next page)* is 30%, but typical actual use has been gradually moving higher over the last several years. This gradual increase in overuse has occurred because of two main factors: 1) acres of available forage have gradually been reduced through steady encroachment of trees into grassland areas, and 2) acres of private land “unpermitted” forage has been decreasing over the last 10-15 years as more private landowners build adequate fences to keep permitted livestock out. These factors have put more grazing pressure (and consequently greater use) on the remaining available forage on Forest Service lands. This has the effect of reducing stocking capacity (15% reduction proposed) in order to maintain a given allowable use level (30% for Davenport).

The **Homestead Allotment** is currently managed as a cow/calf operation under a four-pasture rest-rotation grazing system, with each pasture being rested once every four years. Under this management, the first unit grazed in any given year is rested the next year. There are 125 cattle permitted, and the season of use is May 1 to October 31. Both allowable and actual use in key areas is 40%.

Alternative 2 – Proposed Action

Davenport Allotment: The allotment would be managed under a five-pasture deferred rotation grazing system, with 145 cattle permitted. This is a reduction of 25 cattle (15%) from current management. Based on an analysis of the stocking capacity, this reduction in stocking is considered adequate to bring the overuse from tree encroachment and private fencing factors in line with allowable use. Annual utilization monitoring will occur to ensure allowable use levels are not exceeded (see Monitoring section).

Currently, the western portion of the existing Depot Pasture is under-utilized because the cattle tend to quickly migrate to the Davenport Lake portion of the pasture. In order to ensure that cattle appropriately utilize the Davenport Lake area, a new pasture would be created. The fifth pasture would be created out of the western portion of the existing Depot Pasture, and would retain the name “Depot Pasture.” The eastern portion of the existing Depot Pasture would be renamed “South Davenport Pasture.” This pasture would be created by constructing about a 1/3 mile of fence. The fence would have a smooth bottom wire 18 to 20 inches above the ground and would be built to meet the Arizona Game and Fish Department (AGFD) fence standards for pronghorn management.

*** “key areas” are defined in the Forest Plan as... “areas normally ¼ to 1 mile from water, located on productive soils on level to intermediate slopes, and readily accessible for grazing”. Key areas exist throughout both allotments.**

Under the Proposed Action, the season of use would remain the same. In two out of three years, the cattle would be grazed in the new “Depot Pasture” for a short period (15-20 days) before being moved on to other pastures in the rotation. This early short-period grazing would reduce the amount of “re-use” of new plant growth in this pasture, while providing for early deferment of the cool season grasses in other pastures. Average allowable use in key areas would remain at 30%.

In order to facilitate livestock operations, a new holding pasture is proposed. This addition was developed at the request of the permit holder. The establishment of this pasture would involve an exchange in the use of several small grazing areas within the Davenport Allotment (totaling about 315 acres), for the use of 420 acres in the adjacent Sitgreaves Allotment. This reflects an agreement between grazing permit holders and would become a permanent allotment boundary adjustment. The 315 acres of “exchanged” land used by the Sitgreaves Allotment permit holder would be managed with the same average utilization as the other key areas in the Davenport Allotment (30%), unless an improved range trend improvement to forage is documented through range analysis surveys.

This holding pasture would be created by building approximately 1.5 miles of fence along the east side of Forest Service Road 72. The fence would be constructed to meet AGFD pronghorn fence standards. A maximum of 145 head of cattle would be kept in this pasture for approximately two weeks. Typically, this would only occur once a year, at the end of the grazing season. It is estimated that the annual utilization of the holding pasture would be 40%.

It is expected that these changes from current management on the Davenport Allotment would allow for range conditions to develop an upward trend. See Figure 2. Proposed Action Map for the Davenport Allotment.

Homestead Allotment: The Homestead Allotment would be managed as it is currently.

This Proposed Action does not include tree encroachment control activities, however, the District has planned and implemented several separate tree encroachment control projects within and adjacent to the allotments over the past several years. Tree encroachment management is anticipated to continue.

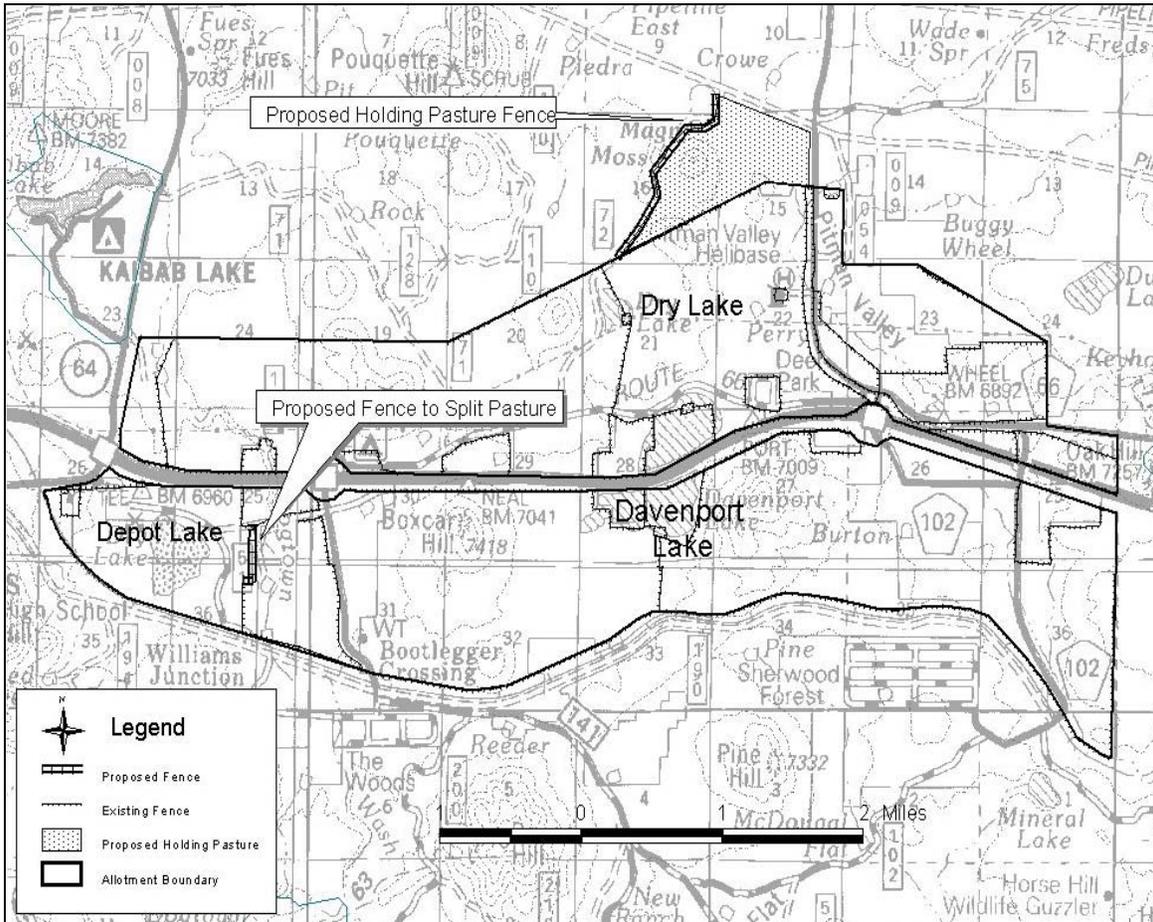


Figure 2. Proposed Action for the Davenport Allotment

Alternative 3 - No Action Alternative

Under the “no action” alternative, livestock grazing would not be authorized in the project area. Grazing permits would not be issued and no range improvements would be constructed.

Alternative Considered but Eliminated from Detailed Analysis

Complete Exclusion of Livestock from Davenport Lake

This alternative was considered, but excluded from detailed analysis. The exclusion of livestock from the wetland area (which encompasses considerably more area than that which is currently fenced) would require the construction of a significant amount of fence, which would be detrimental to pronghorn antelope. Field observations by the District Plant Ecologist and the Range Specialist indicate that the species composition is nearly identical in both the grazed and ungrazed sections of the Allotment. Based on these observations, it was concluded that any benefits of livestock exclusion would not outweigh the negative impacts of the fence construction. Monitoring is planned under the action alternatives to assess the grazing pressure of cattle apart from wild ungulates in the ephemeral wetland areas of Davenport Lake. This study will provide better information for future management.

Mitigation Measures Common to the Action Alternatives

If either action alternative is selected, the following mitigation measures will be implemented:

- Mineral supplements will not be placed in Mexican spotted owl restricted habitat.
- Regardless of the normal scheduled season of use, the Davenport Lake (ephemeral lake) area would not be stocked with cattle during periods when the lake is still wet.* (See definition next page) Cattle would rotate through other pastures during these periods.
- Applicable Soil and Water Best Management Practices (FSH 2509.22) will be incorporated into management practices under this proposal (Appendix 7).
- Noxious weed prevention and control measures identified in the *Coconino, Kaibab, & Prescott National Forests Noxious and Invasive Weed Strategic Plan Working Guidelines Update: Integrated Weed Management Practices* will be followed during implementation of this proposal (Appendix 8).
- In the event that 30% utilization is reached in the Dry Lake ephemeral wetland prior to scheduled rotation out of the pasture, a temporary electric fence will be installed to exclude cattle and prevent overuse.

Monitoring Common to the Action Alternatives

If either action alternative is selected, the following monitoring will be conducted:

- General ocular monitoring of utilization cages and fence line contrasts in key areas will be conducted periodically throughout the grazing season. If allowable utilization of a pasture is met prior to the scheduled rotation date, cattle will be immediately rotated into the next pasture of the rotation identified in the grazing schedule. In addition to the “normal” monitoring, on-going drought-related monitoring of the vegetation condition has also been occurring over the last few years (and will continue until the drought is over). As a result of this monitoring, stocking on the Davenport Allotment was reduced from permitted numbers by 40-50% in 2003, and by 12% in 2004; on the Homestead Allotment, stocking was reduced from permitted numbers by 20-40% in 2003, and by 12% in 2004.
- Upland utilization monitoring focused in Mexican spotted owl (MSO) habitat will be conducted adjacent to key grazing areas. General ocular monitoring of utilization cages and fence line contrasts will be used to assess forage utilization in the monitoring areas prior to livestock entry into a pasture, during livestock use, when livestock leave, and when possible at the end of the growing season. If forage utilization levels reach the maximum allowable levels in MSO monitoring areas (average 20%), livestock will be moved into the next pasture of the grazing sequence as outlined in the Annual Operating Instructions. If utilization limits have been met in all pastures of the rotation sequence, livestock will be removed from the allotment.
- To determine grazing pressure from cattle apart from wild ungulates, two ¼ -acre monitoring exclosures will be constructed on the ephemerally moist soils in Davenport Lake, one to exclude all ungulates, and the other to exclude only cattle. The cattle exclosure will be built to meet AGFD fence recommendations to allow pronghorn access. The ungulate exclosure will be a multiple-strand barbed wire fence, about 8 feet high. This construction will prevent entry by wild ungulates, and will minimize negative affects to the scenic qualities of Davenport Lake.

***Davenport Lake will be considered “wet” for 10 days following the disappearance of standing water. At that time, soils will be assessed for saturation and range readiness.**

Table 2. Comparison of Alternatives for the Davenport Allotment.

DAVENPORT ALLOTMENT		ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		CURRENT MANAGEMENT	PROPOSED ACTION	NO ACTION, NO GRAZING
GRAZING SYSTEM		Deferred Rotation – 4 pastures	Deferred Rotation – 5 pastures	NA
NUMBER OF LIVESTOCK		Cattle - 170	Cattle - 145	NA
SEASON OF USE		5/16 – 10/31	5/16 – 10/31	NA
ANIMAL HEAD MONTHS		935	798	0
AVERAGE ALLOWABLE UTILIZATION	KEY AREAS	30%	30%	Wild ungulates only.
	UPLAND MSO HABITAT	Less than 20%	Less than 20%	Wild ungulates only.
RANGE IMPROVEMENTS		None	Construct about 1/3 mile of fence to create a 5 th pasture.	None
			Construct 1.5 mile of fence to create a temporary holding pasture on the adjacent Sitgreaves Allotment.	

Table 3. Description of Alternatives for the Homestead Allotment.

HOMESTEAD ALLOTMENT		ALTERNATIVE 1 CURRENT MANAGEMENT	ALTERNATIVE 2 PROPOSED ACTION	ALTERNATIVE 3 NO ACTION, NO GRAZING
GRAZING SYSTEM		Rest Rotation – 4 pastures	Rest Rotation – 4 pastures	NA
NUMBER OF LIVESTOCK		Cattle - 125	Cattle - 125	NA
SEASON OF USE		5/1 – 10/31	5/1 – 10/31	None
ANIMAL MONTHS		750	750	0
AVERAGE ALLOWABLE UTILIZATION	KEY AREAS	40%	40%	Wild ungulates only.
	UPLAND MSO HABITAT	Less than 20%	Less than 20%	Wild ungulates only.
IMPROVEMENTS		None	None	None

Chapter 3 - Environmental Effects

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

Table 4. Summary of Effects for the Davenport Allotment by Resource Area

Davenport Allotment			
Environmental Effect	Current Management	Proposed Action	No Action
Range Vegetation Condition/Trend			
Plant species diversity	No change or slight decrease	Stable or slight increase	Some increase
Forb and grass cover	Slight decrease	Slight increase	Increase
Forage production	Slight decrease	Slight increase	Increase
Cool season plant density	Slight decrease	Slight increase	Increase
Noxious weeds	Stable or slight increase	Stable or slight increase	Stable
Rare plants	Stable to slight decrease	Stable	Stable or slight increase
Wildlife			
Habitat trend (for 11 species preferring more ground cover)	Slight decrease in habitat trend.	Slight increase in habitat trend.	Slight increase in habitat trend.
Habitat trend (for 3 species preferring less ground cover)	Slight increase in habitat trend.	Slight decrease in habitat trend.	Slight decrease in habitat trend.
Wetland habitat (for species preferring vegetation around waters)	Slight decrease or remain stable	Slight increase or remain stable	Slight increasing trend
Population trend (for 11 species preferring more ground cover)	No change (7 species) slight decrease (4 species)	No change (7 species) slight increase (4 species)	No change (7 species) slight increase (4 species)
Population trend (for 3 species preferring less ground cover)	No change (1 species) slight increase (2 species)	No change (1 species) slight decrease (2 species)	No change (1 species) slight decrease (2 species)
Pronghorn movement	No new fence, no effect	Minor negative effects	No new fence, no effect
Pronghorn forage	Slight decrease	Slight increase	Increase
Pronghorn fawning habitat	Slight decrease	Slight increase	Increase
Soil and Watershed			
Soil condition	Remain stable, good to excellent	Remain stable, good to excellent	Limited improved conditions
Heritage			
Heritage resources	No adverse effect	No adverse effect	No adverse effect
Economic and Social			
Maintenance of ranching lifestyle	Yes	Yes, but slightly reduced	No
Dispersed recreation	Minor positive and negative effects	Minor positive and negative effects	Minor positive and negative effects
Annual receipts to the Government (grazing fees)	\$1,262	\$1,077	None
Average annual cost to the Government	\$5,356	\$5,356	\$3,120

Table 5. Summary of Effects for the Homestead Allotment by Resource Area

Homestead Allotment			
Environmental Effect	Current Management	Proposed Action	No Action
Range Vegetation Condition / Trend			
Plant species diversity	Continue to increase	Continue to increase	Continue to increase
Forb and grass cover	Remain stable or increase	Remain stable or increase	Increase
Forage production	Increase	Increase	Increase
Cool season plants	Remain stable or increase	Remain stable or increase.	Increase
Rare plants	Remain stable	Remain stable	Remain stable
Noxious weeds	Remain stable	Remain stable	Remain stable
Wildlife			
Habitat trend (for 11 species preferring more ground cover)	Stable or slight increase in habitat trend.	Stable or slight increase in habitat trend.	Slight increase in habitat trend.
Habitat trend (for 3 species preferring less ground cover)	No change (1 species) slight increase (2 species)	No change (1 species) slight increase (2 species)	No change (1 species) slight decrease (2 species)
Wetland habitat (for species preferring vegetation around waters)	Slight decrease or remain stable	Slight decrease or remain stable	Slight increasing trend
Population trend (for 11 species preferring more ground cover)	No change (7 species) slight decrease (4 species)	No change (7 species) slight decrease (4 species)	No change (7 species) slight increase (4 species)
Population trend (for 3 species preferring less ground cover)	No change (1 species) slight increase (2 species)	No change (1 species) slight increase (2 species)	No change (1 species) slight decrease (2 species)
Pronghorn movement	No new fences, no effect	No new fences, no effect	No new fences, no effect
Pronghorn forage	Remain stable or increase	Remain stable or increase	Increase
Pronghorn fawning survival	No effect	No effect	No effect
Soil and Watershed			
Soil condition	Remain fair and stable	Remain fair and stable	Limited improvement
Heritage			
Heritage resources	No adverse effect	No adverse effect	No adverse effect
Economic and Social			
Maintenance of ranching lifestyle	Yes	Yes	No
Dispersed recreation	Minor positive and negative effects	Minor positive and negative effects	Minor positive and negative effects
Average annual receipts to the Government (grazing fees)	\$1,012	\$1,012	None
Average annual cost to the Government	\$4,944	\$4,944	\$2,880

Range Vegetation

Affected Environment

The Davenport Allotment is dominated by a ponderosa pine bunchgrass community. Blue grama, mountain muhly, Arizona fescue, and squirreltail make up the majority of grass species, with western wheatgrass and pine dropseed in less abundance. Unpalatable species such as snakeweed and rabbitbrush occur, but are not common in high densities. Some browse species including Gambel oak and cliffrose are present and are found primarily on the slopes of Boxcar Hill, Beacon Hill, and Dude Mountain.

The Davenport Allotment also contains three ephemeral wetland/meadows: Davenport Lake, Dry Lake, and Depot Lake. These ephemeral wetlands retain surface water for longer periods than the surrounding areas due to concentrations of clay in the upper surface layer. Davenport Lake is the only wetland that has retained any substantial water in the past nine years. Depot and Dry Lake have been dry since 1995. During normal and wet years, the more mesic environment supports a community of spikerush and needle spikerush, bordered by a transition zone of western wheatgrass. Due to the lack of standing water in recent years, foxtail barley has become established in the southern portion Davenport Lake

The southern portion of the Homestead Allotment is vegetatively similar to Davenport, but the northern portion of the Homestead Allotment is slightly drier resulting in a community dominated by blue grama with mixed bunchgrasses. Western wheatgrass, mountain muhly, squirreltail and Junegrass are found in the higher elevation north facing slopes and along drainage bottoms where overstories of juniper, pinion pine, ponderosa pine occur. The allotment contains a good diversity of browse species including Mexican cliffrose, wild current, mountain mahogany, and skunkbush. Cliffrose is the most common and occurs on both the northern and southern sections of the allotment. Rabbitbrush, snakeweed, and pingue rubberweed are found in small quantities throughout the allotment.

Differences exist between the potential natural community and existing vegetation as the result of tree encroachment. Juniper, pinyon, and ponderosa pines have encroached into once productive grasslands, competing for available nutrients, moisture, and sunlight. This trend has been attributed to a combination of climatic shifts, control of fire, and grazing (Jameson 1987; Tausch and West 1994). Current ratios of grassland to tree cover are approximately 40:60 for Davenport Lake and 75:25 in the Homestead Allotment. As tree encroachment continues, overstory cover will increase, resulting in a corresponding decrease in grass and forb production (Moore and Deiter 1992).

Range Management History

Livestock grazing has occurred within the project area since the late 1880's. Permitting began around 1905 with the establishment of National Forests. No specific documentation is available about the number of livestock grazed in the early years, but management notes indicate that trespass was a problem and numbers were high. The current Davenport Allotment was established in 1939, and the current permit holder for Davenport Allotment is only the third since its establishment.

The Homestead Allotment is used by the same grazing permit holder as Davenport. The family-run operation has held the permit to most of the Homestead Allotment since 1956. The existing Homestead Allotment was created in 1962 by combining the Hardy Allotment and part of the old Williams Allotment. For the past 50 years, stocking levels on both allotments have remained relatively stable, with reduced stocking during drier years. On the Davenport Allotment actual use has ranged from 112 head (1945) to 184 (1971). Actual use on the Homestead Allotment has ranged from 102 head (1960) to 125 (permitted). Figure 3 shows actual use over the past eleven

years. For eight of the past eleven years, actual stocking has been at permitted levels. Reductions have occurred during three years in response to drought.

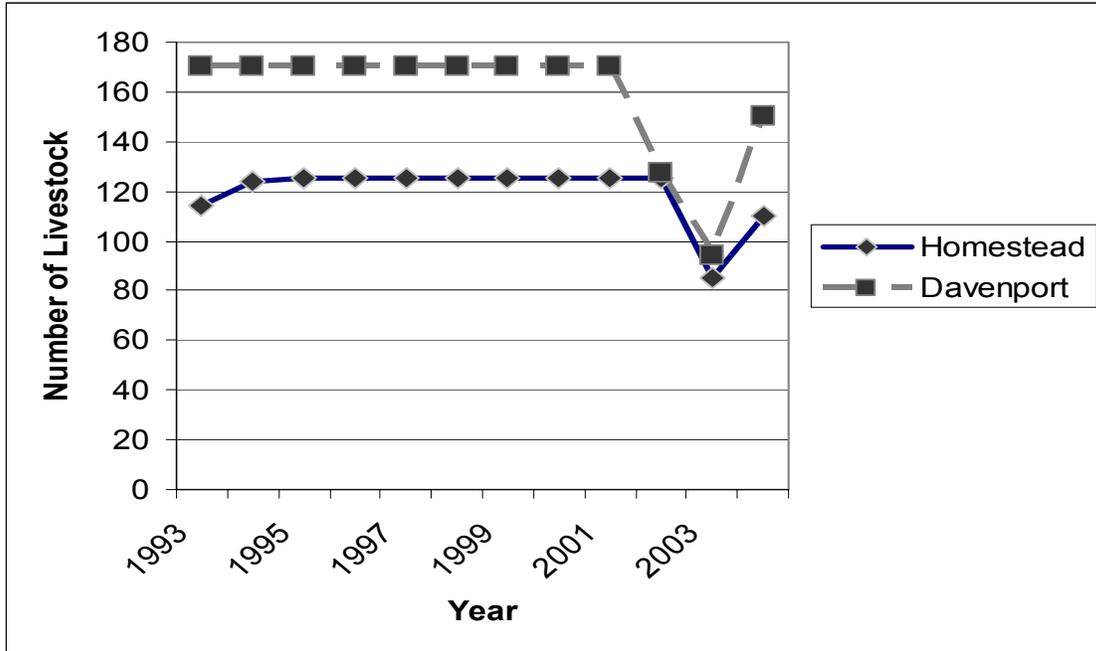


Figure 3. Actual Use of the Homestead and Davenport Allotments 1993-2004

Range Condition and Trend

The process for determining range condition uses a rating system based on three factors: forage cover index, species composition, and vigor of perennial plants. A comparison of periodic readings identifies range condition and trend.

Permanent “Parker” range monitoring plots were established on the Davenport and Homestead Allotments to determine range condition and trend. The Forest Service has been using the “Parker” methods to evaluate condition and trend of rangelands since 1954. On the Homestead Allotment, the Parker “clusters” were established in 1954 and on the Davenport Allotment they were established in 1964. Both allotments were monitored on about a ten year cycle. Because these methods have been used for over 40 years, they provide long-term trend data for evaluating vegetation and soil cover at selected locations. These permanent “clusters” are supplemented by paced transects. The paced transects help to delineate vegetation condition classes and provide additional data on composition, vigor, cover, and soil conditions over the larger area.

Between 1964 and 1997 on the Davenport Allotment, there were decreases in all three factors. Forage cover index decreased from eight down to three. This represents a slight decrease in grass and forb cover. The species composition dropped from 27 to 21. This indicates a decrease in desirable grass species, particularly “cool season” grasses, which have the major portion of their growth and reproduction during the spring. The vigor rating declined from five to four. The overall range condition for the allotment was a “high-poor,” with a slightly downward trend.

The Homestead Allotment analysis showed improved conditions in all three factors. The forage cover index improved only slightly over the past 50 years, but both species composition and plant vigor improved steadily in all clusters throughout the allotment. The average overall range condition shows a “low-fair” condition with a stable to slightly upward trend.

Utilization

An assessment of forage production was conducted on both allotments in 1998 and 1999 to determine grazing capacity. The study collected forage production data using a combination of clipping, weighing, and ocular estimates. These data were projected across the allotments using Terrestrial Ecosystem Survey (TES) soil units. Dry weight forage per acre was calculated to determine total available capacity for each allotment. Depending on precipitation, an average estimated 6,900 animal unit months of forage can be produced within the allotments each year.

Grazing capacity is generally considered to be the average number of animals that a particular range will sustain over time (Holechek et al. 2000). Production-utilization is the ratio of forage produced to the amount removed by grazing. Trend and production-utilization data are used in combination to determine sustainable stocking levels. The Homestead and Davenport Allotments have been permitted at 1,685 animal unit months (AUMs), or approximately 25% of the annual production.

Utilization monitoring is conducted regularly throughout the grazing season. Monitoring is needed because forage production is closely tied to precipitation levels which can vary year to year. Ocular estimates are used to compare grazed areas to ungrazed areas. Utilization is expressed as a percentage of available forage that has been consumed or trampled. Monitoring is conducted at regular intervals in each pasture to prevent exceeding allowable utilization and also to comply with the outcome of threatened and endangered species consultation with USFWS.

Direct and Indirect Effects of Alternatives on Vegetation

Alternative 1 – Current Management

Within the Davenport Allotment, current management has resulted in a downward trend of ground cover and decreased densities of cool season plants. If current management is continued, the total amount of forage production is anticipated to decrease. Over time, the downward trend would likely result in the loss of some of the cool season species, with a corresponding reduction in species diversity.

For the past 15 years, allowable utilization of key areas in the Homestead Allotment has been 40 percent. Forage cover, vigor, and species composition has improved under this management and this upward trend is projected to continue.

Alternative 2 - Proposed Action

The proposed decrease in livestock numbers on Davenport would reduce the grazing pressure in the Allotment and help to offset the reduced forage effects of tree encroachment. The additional pasture would reduce the mean grazing period from 5.5 to 4.5 weeks and allow for increased deferment of the key meadow areas associated with Davenport Lake. With the increased deferment on the Davenport Allotment, rest ratios will promote increased densities of cool season grasses and provide for an increase in effective ground cover. Increased herbaceous cover and litter cover will enhance soil moisture retention and enhance nutrient cycling.

The frequency of cool season plants is projected to increase over the next ten years. The increased deferment will also benefit warm season plant species. Higher ground cover densities will increase organic matter and provide for improved soil surface structure and reduced soil compaction in the alluvial bottomlands.

The Homestead Allotment would be managed as it is currently. The allowable utilization in the Homestead Allotment is 40 percent and has been authorized at this level for the past 15 years.

Range condition trend has improved under this management and the upward trend of forage cover, vigor, and species diversity is projected to continue.

Alternative 3 - No Action

No permitted livestock grazing would occur in the analysis area, so no effects from livestock grazing would occur. Although wild ungulate grazing would continue, there would be reduced grazing pressure compared to Alternative 2, resulting in greater improvements in cool season grass density, effective ground cover, and plant vigor. The increased cover would enhance soil moisture retention and also increase the fine fuels, which could result in more frequent, low intensity fires. Low intensity fires promote nutrient cycling and the maintenance of healthy grassland communities.

Cumulative Effects

The geographical extent of this analysis is confined to the Allotments. Past and ongoing uses and actions within the analysis area that could affect range condition and trend and the overall grass and forb component within the allotments include prescribed burning, tree thinning, dispersed recreation, and off-road vehicle travel. Except for the off-road vehicle travel, all of these uses are expected to continue indefinitely into the future.

Thinning small and medium-diameter trees increase available light, nutrients, and moisture for grass and forb species, improving forage and rangeland condition. Past, present, and foreseeable future projects on the allotments include the East, Central, and West Beacon (2,200 acres) vegetative treatment projects and the Johnson, Hardy, Homestead, and Pedigo Tank grassland improvement projects (~3,000 acres).

Grasslands in the project area developed with low intensity fire. Fire provides several benefits important to the maintenance and function of grassland communities. Prescribed fires temporarily remove forage and expose soil, but promote nutrient cycling, growth, and vigor. Fires also kill young trees which prevent tree encroachment into grasslands. Past and current prescribed fires in the analysis area include East and West Beacon. The only planned prescribed burn in the Allotment areas is Beacon Central. The East, West and Central Beacon vegetative projects have a total of 1,870 acres planned for broadcast burning.

Dispersed recreation and off-road travel can trample vegetation and compact soils. Compacted soils absorb and retain less water than aerated soils. Compacted soils inhibit growth regeneration of grass and forb species. Although dispersed recreation occurs throughout the project area, trampling and soil compaction is generally confined to the immediate area around roads. These limited impacts result in only minor negative effects to rangeland condition on a small portion of the allotments.

The net effects of these past, present, and ongoing activities have an overall positive effect on range condition and trend. The direct and indirect effects of the Alternative 2- Proposed Action combined with these actions would result in a cumulative effect of an increased rate of range condition improvement.

On the Homestead Allotment, Alternative 1- Current Management is the same as the Proposed Action; therefore the net cumulative effect on the Homestead Allotment would have the same increased rate of range improvement. On the Davenport Allotment, the overall positive effects of these past, present, and future activities would be partially offset by the slightly downward trend of range condition under Alternative 1- Current Management.

Noxious Weeds

Affected Environment

Weeds of concern include non-native plant species list by the state of Arizona as “noxious” and non-native plant species determined by the Forest to be unacceptably aggressive in our native ecosystems. Species that are known or suspected to occur on the Williams Ranger District are shown in Table 6.

Table 6. Noxious Weed Species Known or Suspected to Occur on the Williams RD

Common Name	Scientific Name	Objective	Relative Priority
Russian knapweed	<i>Acroptilon repens</i>	Contain / Control	1
Diffuse knapweed	<i>Centaurea diffusa</i>	Contain / Control	2
Spotted knapweed	<i>Centaurea maculosa</i>	Eradicate	3
Scotch thistle	<i>Onopordum acanthium</i>	Eradicate / Control	4
Russian olive	<i>Elaeagnus angustifolia</i>	Contain / Control	5
Tamarisk	<i>Tamarix sp.</i>	Contain / Control	6
Dalmatian toadflax	<i>Linaria dalmatica</i>	Contain / Control	7
Bull thistle	<i>Cirsium vulgare</i>	Contain / Control	8
Cheatgrass	<i>Bromus tectorum</i>	Contain / Control	9

Weeds are most likely to be introduced first along roads, carried in on the bodies of vehicles or in their cargo. Roadsides are also among the most frequently disturbed areas in any landscape. Weeds that become established along roads are often able to move into less disturbed and undisturbed areas. Livestock and wildlife can spread weed seeds that attach to their hair, hooves, or feet. Land management projects that remove litter or vegetative cover or rearrange rock cover expose bare soil that is vulnerable to colonization by weeds. Equipment or hay brought in from other areas may also transport weed seed directly to the project area. If weeds already occur in the project area, they can expand their population size there or be spread outside of the project.

Roadsides in the project area are inspected annually for weeds. These surveys have revealed the presence of localized small populations of Russian knapweed, Dalmatian toadflax, Scotch thistle, tamarisk, and bull thistle either adjacent to or within the project area. Except for a small population of Dalmatian toadflax observed in the Depot pasture, known weed populations are confined to roadsides. Most of these weed populations are controlled (digging up plants) annually. Cheatgrass is sparsely scattered throughout grasslands and disturbed areas.

Direct and Indirect Effects of Alternatives on Noxious Weeds

Alternative 1- Current Management

Maintaining the current grazing management is unlikely to introduce weeds and will not cause roadside weeds to expand into pastures. Livestock grazing may create areas of exposed soil.

Existing areas of bare ground, such as around stock tanks, will continue to be vulnerable to invasion by noxious species. Vehicles or equipment may be brought in from weed-infested areas and introduce weed seed to the project area.

Alternative 2 - Proposed Action

The Proposed Action would have no different effect on noxious weeds than the current management. Exposed soils would remain favorable sites for weed colonization. Vehicles or equipment may be brought in from weed-infested areas and introduce weed seed to the project area. Mitigation measures connected to both Alternatives 1 and 2 would ensure that noxious weeds are monitored and controlled.

In the long-term, the Proposed Action will change vegetation composition and structure. An increase in herbaceous ground cover will maintain or increase the land's resistance to further invasion by noxious weeds.

Alternative 3 - No Grazing

In the No Action Alternative, there would be no soil disturbance associated with implementation activities. Therefore, there would be no additional risk of either introducing new weed populations from outside the project area or spreading existing populations. Introductions or expansions of populations may occur as the result of other activities in the project area.

Cumulative Effects

Past and ongoing uses and actions within or adjacent to the project area include dispersed camping, livestock grazing, logging and thinning, well digging and water line installation, road maintenance, off-road vehicle travel, and residential development. Except for the off-road vehicle travel, all of these uses are expected to continue indefinitely into the future. All of these activities have increased noxious weed habitat in the past by exposing bare soil. Any of them may also have introduced noxious weed seed into the project and most may do so in the future. However, despite the many opportunities, there are only small, widely scattered weed populations. Mitigation measures identified for the action alternatives require continued monitoring and control along all roads and within the project areas. These measures prevent project activities from contributing to the spread of noxious weeds within and adjacent to the project area.

Current actions that could facilitate the management of noxious weeds in and around the allotments include the recently signed Decision Notice for the "Management of Noxious Weeds and Hazardous Vegetation on Public Roads on National Forest Systems Lands in Arizona." This project authorizes the Arizona Department of Transportation (ADOT) to use herbicides to control noxious weed infestations within road easements and extending up to 200 feet outside of road easements onto NFS lands. This action will facilitate the treatment of noxious weeds along the I-40 corridor through the Davenport Allotment.

Future actions that could facilitate the management of noxious weeds in and around the allotments include the "Draft Environmental Impact Statement for Integrated Treatment of Noxious and Invasive Weeds on the Coconino, Kaibab, and Prescott National Forests," which is expected to be signed before the end of the year.

Threatened, Endangered, and Sensitive Plant Species

Existing Condition

There are no federally threatened, endangered, or candidate plant species on the south zone of the Kaibab National Forest. There is also no habitat for any listed species.

Arizona bugbane is a Forest Service sensitive species. As the result of a conservation agreement, with the U.S. Fish and Wildlife Service, consultation is required for projects likely to affect the Bugbane or its habitat. Arizona bugbane does occur on the Williams Ranger District, in a humid north-facing drainage on Bill Williams Mountain. The population is located at approximately 8000 feet, in an area dominated by mixed conifer vegetation. It is highly unlikely that it would occur in the lower elevation pine-oak or pinyon-juniper of the Homestead/ Davenport project area.

The Southwestern Region of the Forest Service (Region 3) maintains a list of sensitive plant species. These are not listed by USFWS, but are considered rare or vulnerable on federal forests in Arizona and New Mexico. The list identifies both those forests that are known to support a species and those where the species is unknown but potential suitable habitat appears to exist. Appendix 3 is a species list of sensitive plants that may occur on the south zone of the Kaibab National Forest.

No sensitive species are known to occur in the project area. However, Rusby's milkvetch, Mt. Dellenbaugh sandwort, Tusayan rabbitbrush, and Flagstaff beardtongue have been documented on or near the Williams Ranger District. Potential habitat for all four species may occur in the project area.

Direct and Indirect Effects of Alternatives on TES Plant Species

Alternative 1 - Current Management

If any of the sensitive species are present, they may experience direct grazing and trampling impacts. In addition to injury or death, such impacts may lead to decreased vigor and reproduction.

Alternative 2 - Proposed Action

Same as Alternative 1.

Alternative 3 - No Action

Grazing and trampling impacts would be reduced. If any populations are currently being impacted, their size and vigor would likely increase.

Cumulative Effects

Past and ongoing uses and actions within or adjacent to the project area that may affect sensitive plant species include dispersed camping, livestock grazing, logging and thinning, well digging and water line installation, road maintenance, off-road vehicle travel, and residential development. Except for the off-road vehicle travel, all of these uses are expected to continue indefinitely into the future. Tree thinning and broadcast burning are also proposed for lands adjacent to the project on the west and south. Any of these activities may degrade habitat or directly damage or kill any existing plants.

The "Draft Environmental Impact Statement for Integrated Treatment of Noxious and Invasive Weeds on the Coconino, Kaibab, and Prescott National Forests EIS (draft in publication, 2004) does NOT propose to treat exotic annual grasses. Exotic annual grasses (cheatgrass, jointed goatgrass) are currently sparse throughout the project area. Should they increase in the future and remain

untreated, they are likely to cause increased fire frequency, extent, and intensity, which could negatively impact sensitive plant habitat and cause increased unsustainable mortality rates.

The likely improvement of habitat as a result of the Proposed Action, assures that the project will not add significantly to ongoing impacts. The project may cause short-term impacts to already stressed habitat or populations, but will have no long-term cumulative effects.

Soil and Watershed

Existing Condition

The Homestead and Davenport Allotments are located within the San Francisco Volcanic Field, a plateau punctuated by recent volcanoes along the southern edge of the Colorado Plateau. Most of the project area is level-to-moderately sloping plains. Approximately 10% of the area contains steep cinder cones and escarpments.

The Homestead and Davenport analysis area overlaps the junction of two 5th code watersheds: Sycamore Creek and Cataract Creek. Sycamore Creek ultimately drains to the Verde River, while Cataract Creek drains to Havasu Creek. Smaller watersheds within the 5th codes have been delineated for this project, in order to more specifically identify the affects of the management alternatives. These are Red Lake Wash, a contributor to the Cataract Creek watershed, and Williams Basin, Kaibab Lake, and Scholz Lake, contributors to the Sycamore Creek watershed. See Appendix 4. Maps of the 4th, 5th, and sub-5 code watersheds.

There are no perennial streams or water bodies within the allotment boundaries. There are a number of constructed water tanks for livestock and wildlife use, fed by ephemeral drainages and overland flow. None of these provide year-round water. Due to the lack of perennial water sources, there are no riparian areas, which require free, unbound water and year-round moisture (Kaibab Forest Plan). Davenport, Depot, and Dry Lakes in Davenport Allotment are temporary or seasonal wetlands (Fredrickson and Dugger 1993). These wetlands conform to the definition of wetlands issued in Executive Order 11990 (EO). According to the EO, “‘wetlands’ are those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.” The Davenport Allotment wetlands are in nearly closed basins, but water can flow out of them during extreme flood events. They are saturated often enough that their soils are hydric and, when wet, they support a community of rushes and sedges. After the upper horizon of the soil dries, mesic, mostly annual, vegetation develops.

EO 11990 requires that federal agencies take action to “avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands.” The following paragraph explains why the Forest Service believes that the continued existence and maintenance of the stock tanks in Davenport and Dry Lakes does not have significant adverse impacts on the wetlands. Additionally, EO 11990 does not apply to projects completed prior to Oct. 1, 1977. The Dry Lake and north Davenport Lake tanks were built in approximately 1930 and the south Davenport Lake tanks were built in about 1900. Therefore, the tanks may have minimal negative effects, but they are exempt from the requirements of EO 11990.

These seasonal wetlands are highly variable, due to their lack of connection with the water table. They are fully reliant on annual precipitation, which controls the frequency and depth of flooding (Fredrickson and Dugger 1993). In years with heavy snowfall, the lakes may flood sufficiently to

support duck nesting. Concerns about the possible impact of stock tanks in the wetlands on nesting habitat focus on the amount of water stored in the tanks that would otherwise be available to the wetland as a whole and on the potential for tanks to accelerate loss of sub-surface moisture through evaporative wicking. Calculations based on the estimated capacity of the tanks in Davenport and Dry Lake and average monthly and annual evaporation rates show that the withheld water could increase the depth of the wetland by up to half an inch and prolong the period of standing water by a few days (Watershed Specialist Report PR # 74). Depot Lake does not contain a stock tank.

The soils of the wetlands are deep, heavy clays (USDA 1991). Water moves exceedingly slowly through these soils, due to clay's very fine pores (Brady 1974). It moves even more slowly, if at all, through stock tank liners. Tank construction intentionally alters soil structure by compacting the clay and decreasing the numbers of pores available for water movement, increasing the impermeability of the liner. This is essential for the tank to hold water. The same soil characteristics that prevent tank water from escaping into the wetland also control the movement of sub-surface water into the tank. While evaporative wicking may be a concern in coarser soils, it is negligible in constructed stock tanks in northern Arizona's clay-lens wetlands.

There are perennial waters in the four sub-5 watersheds affected by grazing management on the allotments. Scholz Lake, Kaibab Lake, Cataract Lake, Gonzales Lake, and the City of Williams' reservoirs are the main water bodies. Because of the allotments' positions in their watersheds relative to the lakes, Scholz and Kaibab Lakes are the only perennial waters that could potentially be affected by allotment management. Water quality and quantity in both lakes are essential components of their recreation and wildlife value. Kaibab Lake is also a component of the City of Williams water supply system. The hydrologic connection between the lakes and Davenport allotment is extremely weak. The drainages are nearly flat and extremely ephemeral; water flow from the allotment to either of the lakes is unlikely. Both drainages are well-vegetated, which facilitates water infiltration into the soil, decreasing runoff. It also decreases the amount of sediment produced and decreases the distance sediment moves.

Soils throughout the project area are derived from volcanic minerals. The areas with less than five percent slope have alluvial soils that formed from materials eroded from other parts of the watershed and transported by water or wind. The bulk of the project area has soils that formed in place as the result of weathering and decomposition. Mollisols frequently develop under grasslands and are characterized by high accumulations of organic matter composed largely of grass roots. Mollisols make up approximately 45% of Davenport and 73% of Homestead Allotment. Where woodland or forest species occur on these soils, it is frequently the result of woody invasion. Alfisols tend to develop under forest vegetation. Approximately 55% of Davenport and 15% of Homestead Allotments have these soils. Alfisols typically have deep bands of clay concentrations that result from erratic precipitation patterns. Inceptisols make up approximately 11% of Homestead's soils. Inceptisols are comparatively young and less developed, due to ongoing surface erosion or mass wasting. These soils occur on the steepest slopes in the project area and can support either forest or grassland vegetation.

Approximately 7% of Homestead and 4% of Davenport have soils that are prone to sheet, rill, and gully erosion, particularly if vegetative ground cover is removed. Soils on slopes greater than 15% with high cinder contents are inherently unstable. When the potential rate of erosion exceeds the tolerance rate, soils are at risk of experiencing long-term loss in productivity. More than 90% of the area has little risk of unsustainable erosion (see Appendix 5). The Homestead Allotment currently has a predicted average soil loss rate of 0.4 tons/acre/year. Davenport Allotment currently has a predicted average soil erosion rate of 0.7 tons/acre/year. The predicted average potential soil loss rate, which could occur if all vegetation and litter were removed, is 1.4 tons/acre/year on Homestead and 1.9 tons/acre/year on Davenport. The erosion tolerance level, which is the highest

rate at which soil can be lost without long-term loss of productivity, on both allotments is 2.7 tons/acre/year.

Soil condition on range allotments is monitored and evaluated as part of the range condition and trend monitoring protocol (PR # 75). The score is heavily influenced by the amount of litter cover and bare soil present and by signs of sheet or rill erosion. Homestead soil condition is generally rated as fair and stable. Trend is slightly upward in some areas. There has been very little change during the last 40 years. On Davenport, soil condition is good to excellent. The trend has been steadily upward since monitoring began in 1964, when conditions at each of the monitoring sites were rated as poor.

Direct and Indirect Effects of Alternatives on Soil and Watershed Values

Alternative 1: Current Management

Soil condition will remain fair and stable on the Homestead allotment and good to excellent on the Davenport allotment. The condition scores on Davenport are so high that there is little room for further improvement. Soils that are currently in satisfactory condition will remain that way, and soils in unsatisfactory condition are unlikely to improve. Water quality in Scholz and Kaibab Lakes will continue to support recreational, wildlife, and municipal values.

Alternative 2: Proposed Action

The proposed decrease in livestock numbers on Davenport will reduce the level of utilization that is currently occurring. This will favor increased herbaceous cover (plant size) and litter cover, which will enhance soil moisture retention. That will, in turn, enhance nutrient cycling. Dividing the Depot Pasture will facilitate development of cool season species, with a small increase in plant cover. With the new pasture it will be easier to avoid hoof impacts to moist soils and protect wetland plant species during their active growing season in the immediate Davenport Lake area. The benefits are more likely to be expressed as improved vigor and resistance to climatic stress than as a meaningful increase in vegetative ground cover (number of plants). This will ensure better protection of the soil surface, preventing degradation, but is unlikely to provide any improvement in condition. Water quality in Scholz and Kaibab Lakes will continue to support recreational, wildlife, and municipal values.

Alternative 3: No Action

Vegetative basal area, herbaceous canopy cover, and litter cover would slowly increase. This would lead to a decrease in surface water runoff, thereby reducing soil erosion. Increased water infiltration would lead to increased plant vigor and cover, and likely improve nutrient cycling. There would be some decrease in soil compaction around heavily used areas such as stock tanks. Wildlife would continue to utilize forage and watering sites, so current impacts would not immediately or completely vanish. While soil condition would improve, the area's semi-arid climate would limit both its rate and extent. Water quality in Scholz and Kaibab Lakes will continue to support recreational, wildlife, and municipal values.

Cumulative Effects

The boundary for the cumulative impact analysis is the watershed that drains to Scholz Lake (including Davenport Lake), Kaibab Lake, into the City of Williams basin, and out to Cataract Creek through Red Lake Wash. This comprises approximately 146,000 acres.

Only 41,230 acres of the 81,000 acre Red Lake Wash basin has Terrestrial Ecosystem Units mapped, and all soil loss calculations are based on the mapped acres. The unmapped areas are state or private property. Land use (primarily livestock grazing and recreation) and topography are quite similar between the different ownerships. The Williams Basin watershed is strongly influenced by urban and residential development. Flooding and seasonally high water table are municipal concerns. Kaibab and Scholz Lake watersheds are primarily federal lands, affected most by recreation, timber and fuels management, and livestock grazing activities.

Some of the major topographic features found in the analysis area are Sitgreaves Mountain, Cedar Mountain, Government Prairie, Government Hill, Spitz Hill, and Davenport Lake. The City of Williams, communities around Red Lake, Pineaire, Parks, Pittman Valley, Sherwood Forest, Woods, and Echo Canyon housing developments are also in the analysis area. Grazing allotments in addition to Homestead and Davenport Lake that are wholly or partially within the analysis area are Chalender, Government Prairie, Sitgreaves, Spitz Hill, Smoot Lake, Cowboy Tank, Squaw Mountain, Twin Tanks, Hat, Pine Creek, Government Mountain, Bellemont, Chalendar, and Juan Tank.

The time period for the cumulative effects analysis begins with two years before implementation of the Homestead and Davenport Allotment Management Plans (AMPs) and ends upon their expiration ten years later. Direct effects of projects and management activities are considered to persist for approximately three years after their completion. Three years is chosen because the Best Management Practices (BMPs) and mitigation measures that are part of each project are intended to prevent or heal negative watershed impacts within three years. Allotment Management Plans are implemented over a ten-year period. If implementation begins in 2005 and continues through 2015, the analysis period would include any other projects in the area that are active or in the 3-year recovery phase between 2003 and 2015. Not all projects that are likely to occur in the latter portion of the analysis period are known at this time. The cumulative soil erosion rates for approximately the last five years are likely lower than what will actually occur. Timber management and fuels management projects wholly or partially within the analysis area that are likely to overlap the Homestead - Davenport AMP analysis period are portions of Spring Valley, Frenchy, Pineaire, Government Prairie burns, Beacon, City, Marteen, Dogtown, South Williams burns, Wright Hill, and Government Hill. There will likely be other projects added during the latter part of the analysis period; these can't be evaluated at this time. Burning and mechanical disturbance associated with each of these projects will cause some increased soil erosion. The average soil loss rate on the Spring Valley Resource Area for example, is 0.9 tons/acre/year when there are no impacts from projects. The rate rises to 1.3 tons/acre/year within active project areas, and then gradually returns to the non-impacted rate over the three year recovery period.

The average background erosion rate within the 106,000-acre analysis watershed is 0.67 tons/acre/year. During implementation of the projects listed above the rate is predicted to be 0.80 tons/acre/year. The cumulative impact of adding the Homestead/Davenport management to other activities in the watershed is an increase to 0.803 tons/acre/year. The average tolerance erosion rate for the analysis watershed is 2.6 tons/acre/year.

Livestock grazing will likely continue on all the allotments within the analysis watershed throughout the analysis period. The effect of current grazing on soil erosion is already reflected in the current rate of soil loss. Management changes in the future can be expected to increase control over the location and extent of use. Under the Proposed Action (Alternative 2) and the No Action Alternative (Alternative 3), these changes are expected to improve vegetative cover and watershed condition, causing a gradual decrease in the soil erosion rate.

Conclusion

Soil condition trend on the two allotments is stable to upward. Portions of each allotment may be experiencing excessive erosion, but the overall flatness of each sub-watershed prevents long distance soil movement. The average soil loss is well below the long-term tolerance rate. Ephemeral wetland vegetation is in an early seral stage, but the hydrological function is intact. Each of the management alternatives maintains or improves soil condition.

Heritage Resources

Because the Davenport and Homestead Allotments fall in spatially separated areas, and the heritage resources of each area are distinct, Archaeologists discuss each of these areas individually.

Davenport Affected Environment

Approximately 28% (2,887 out of 10,197 acres) of the Davenport Allotment has been previously surveyed for heritage resources, primarily for timber sale, range and roads projects. Archaeologists have located 46 heritage resource sites which include 25 sites with at least one masonry outline, 2 sites with both pithouses and above ground structures, 2 multiple pithouse sites, 6 historic sites (only one with cabin foundations), 2 rock art sites, 3 lithic scatters, and 6 sherd and lithic scatters.

The earliest occupants of the project area were Archaic Indians who hunted and gathered between 7000 BC and AD 1. Very little evidence remains of these nomadic people. Two lithic scatters without ceramics may be Archaic assemblages, but without further testing little more can be said about these sites. The transitional period between Archaic populations and Cohoninas is poorly understood in this area. Few sites from the time period have been identified on the south Kaibab.

By far, the majority of sites (36) are affiliated with the Cohonina who occupied the project area between AD 700-1100. Most sites date from AD 900-1050, and this indicates that the area was most heavily used during the early Medicine Valley Phase.

Two petroglyph sites contain about 50 elements, mostly depicting lizards. Other figures include a bow hunter, snakes and other unidentifiable zoomorphs. Archaeologists assume these sites are affiliated with the Cohonina because of their proximity to other Cohonina sites, but little more can be said of this enigmatic artwork.

There is no evidence of cultures occupying the project area after the Cohonina abandoned their territory around AD 1100, although it is likely that ancestors of Hualapais, Havasupais and Yavapais hunted and gathered in the project area much like the Archaic Indians mentioned above. These people also led a nomadic existence and left few items behind that would preserve in the archaeological record.

The history of the project area is basically defined by its southern boundary, namely the Burlington Northern Santa Fe Railroad. Site -1596 is a railroad construction camp that dates to the original construction of the mainline in 1882. Another site, -1597, dates to 1900 and probably is the remnants of a railroad maintenance camp. High stumps throughout the project area parallel to the railroad probably indicate areas that were cut in 1882 as ties were needed for the laying of track through the area. Tree ring dating could verify this assumption.

Also related to the railroad is an earthen berm segment of the Saginaw logging railroad that weaved its way from the old Chalender townsite north to Sitgreaves Mountain. It was in operation from 1902 to 1904. Portions of the 1921-1922 alignment of Historic Route 66 Pass through the allotment

area. Isolated scattered trash in this area may be associated with cross-country auto travelers from this time period.

Davenport Environmental Effects

With respect to grazing, two site types deserve special attention. Cave/rock shelters are important sources of stratified and well-preserved cultural deposits that are vulnerable to livestock traffic disturbance. Rock art sites may be vulnerable to livestock rubbing against their surfaces. There two petroglyph sites in the allotment area. AR-03-07-02-1574 and –1575 should be periodically monitored for possible impacts. The remaining site types constitute what are generally referred to as “open sites.” Livestock grazing effects on these sites generally has no adverse effects when grazing use and animal traffic is dispersed.

The three alternatives are: Alternative 1- Current Management (no change from current management); Alternative 2- Proposed Action (15% reduction); and Alternative 3- No Action, No Grazing. None of these alternatives would have adverse effects on Heritage Resources.

Improvements associated with the Proposed Action have included new construction of fence. The locations of these projects have all been identified and archaeologists have cleared all such projects. Kaibab National Forest Heritage Clearance Report # 2003-15a meets the requirements for the National Historic Preservation Act of 1966 Section 106 consultation process. All future project developments proposed for management of the allotment will be subject to Section 106 consultation prior to implementation.

Homestead Allotment Affected Environment

Approximately 29% (2035 out of 7035 acres) of the Homestead Allotment has been previously surveyed for heritage resources, primarily for timber sale, range and roads projects. Archaeologists have located 46 heritage resource sites that include 15 sites with at least one masonry outline, 3 sites with multiple pithouses, 4 historic sites, 6 rock art sites, one rock shelter, 3 lithic scatters, and 14 sherd and lithic scatters.

The earliest occupants of the project area were Archaic Indians who hunted and gathered between 7000 BC and AD 1. Very little evidence remains of these nomadic people. Three lithic scatters without ceramics may be Archaic assemblages, but without further testing little more can be said about these sites. The transitional period between Archaic populations and Cohoninas is poorly understood in this area. Few sites from the time period have been identified on the south Kaibab.

The majority of sites (38) are affiliated with the Cohonina who occupied the project area between AD 700-1100. As is often seen in Cohonina populations during this time period, a patterned habitation site distribution occurs around major topographic features. The rest of the sites are either artifact scatters or rock art sites. The site types tend to be rather ephemeral and not surprisingly these occur in the grassland communities.

With the plentitude of water sources, it is not surprising that there are numerous petroglyph sites within the Allotment area. Hundreds of elements are present, mostly depicting snakes, footprints, lizards and spirals are located at the different sites. Archaeologists assume this site is affiliated with the Cohonina because of its proximity to Cohonina sites, but little more can be said of this enigmatic artwork.

There is scant evidence of cultures occupying the project area after the Cohonina abandoned their territory around AD 1100. The Cerbat culture, likely ancestors of Hualapais, Havasupais and Yavapais, hunted and gathered in the project area much like the Archaic Indians mentioned above.

These people also led a nomadic existence and left few items behind that would preserve in the archaeological record. One site was recorded affiliated with the Cerbat culture.

The most impressive historic feature is site AR-03-07-02-1284, an enigmatic railroad trestle that crosses a basalt escarpment and then dead ends. This feature is a spur of the Chalender North logging railroad grade operated by the Saginaw Lumber Company between 1902 and 1904. The eastern boundary of the Allotment was the old mainline of the logging railroad grade. The grade is now Forest Road 74.

Once the railroad logging era ended, homesteaders attempted to farm small plantations of corn, beans, wheat and potatoes (Joe Clarke, personal communication). However, during the 1940s many homesteaders abandoned their home sites as the area began to dry up. This may have been a direct result of the overstocked ponderosa forests.

Homestead Environmental Effects

With respect to grazing, two site types deserve special attention. Cave/rock shelters are important sources of stratified and well-preserved cultural deposits that are vulnerable to by livestock traffic disturbance. Rock art sites may be vulnerable to livestock rubbing against its surface. In the allotment area, there are 6 petroglyph sites and one rock shelter that require monitoring. Sites AR-03-07-02-507, -1284, -1473, -1474, -1622, -1636 and -1756 should be periodically monitored for possible impacts.

The remaining site types constitute what are generally referred to as “open sites”. Livestock grazing effects on these sites generally has no adverse effects when grazing use and animal traffic is dispersed.

The three alternatives are: Alternative 1- Current Management; Alternative 2- Proposed Action; and Alternative 3- No Action, No Grazing. None of these alternatives will have adverse effects on Heritage Resources.

Improvements associated with the Proposed Action have included new construction of fence. The locations of these projects have all been identified and archaeologists have cleared all such projects. Kaibab National Forest Heritage Clearance Report # 2003-16 meets the requirements for the National Historic Preservation Act of 1966 Section 106 consultation process. All future project developments proposed for management of the allotment will be subject to Section 106 consultation prior to implementation.

Wildlife

Affected Environment

The rangeland environment within the Homestead and Davenport Allotments includes habitat for many wildlife species found in the ponderosa pine, ponderosa pine-Gambel oak, ponderosa pine-savannah, pinyon pine-juniper, and juniper-savannah forest types. In addition, ephemeral Davenport Lake on the Davenport Allotment provides occasional wetland habitat for a myriad of migratory birds. During dryer periods, this ephemeral wetland, along with Pitman Valley, provide important grassland habitat for wide-ranging large mammals and grassland-dependent avifauna. Two stock tanks within the Davenport Allotment, Reed and Old Ranger Station, and three stock tanks within the Homestead Allotment, Parnership, Schoolhouse, and Pedigo tanks, may also be used by migratory birds and other wildlife species.

For some wildlife species addressed, habitat does not exist within the allotments and/or their range does not overlap with the allotments (see Appendix 6 for species and rationale). Other species that predominantly use trees, snags, bushes, dense forests, rocks, and/or cliffs for nesting and feeding may incur very minor effects through potential indirect effects to food items (e.g., insects). These minor effects would not result in impacts to habitat or population trends and therefore, no significant impacts would occur to these species (see Appendix 6 for species and rationale). These species will not be discussed further in this document.

The following analysis focuses on species that use either grassland-savannah habitats or aquatic-wetland habitats.

A. Grassland or Savannah Species

Federally Listed Species

No federally listed species would be negatively affected by any of the alternatives (see Appendix 6 for rationale).

Sensitive Species - Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk

Chihuahua savannah sparrows may occur in large grassland areas during the winter on the allotments. This species forages for insects, spiders, and seeds, particularly grass seeds, on the ground in grasslands (Ehrlich et al. 1988). Based on the range condition and trend data, winter forage availability for this species on the Davenport Allotment has been declining, while trends in winter forage availability on the Homestead Allotment have been stable to upward.

Navajo Mountain Mexican voles prefer ponderosa-pine or pinyon-juniper savannah with dense carpets of herbaceous or woody shrub cover. Grass cover on the Davenport Allotment has been declining, while grass cover on the Homestead Allotment has remained stable or increased. One small area of dense grass cover may support this species on the Davenport Allotment, as evidenced by the presence of vole-sized runways and clippings. One such area may support this species on the Homestead Allotment, based on the presence of dense herbaceous vegetation. Woody shrubs are not believed to occur on the allotments in patches dense enough to support this vole species.

Northern goshawks have three delineated nest areas and 195 acres of post-fledging family area (PFA) within the Davenport Allotment. No known goshawk nest areas or PFAs occur on the Homestead Allotment. Both allotments provide foraging habitat for this species. Though goshawks in forest situations spend much of their time in areas with large, tall trees, they also use grassy openings, especially during the winter. Use of grassy openings is often related to the availability of prey in these locations. The most important goshawk prey item that occurs within grassy areas on the allotments is the eastern cottontail. The eastern cottontail prefers well-developed grass and shrub cover for food, nesting, and shelter. Grass cover on the Davenport Allotment has been declining, while grass cover on the Homestead Allotment has remained stable or improved. Trends in shrub cover on the allotments are not known, though shrubs are currently present within approximately 30% and 18% (238 acres and 89 acres) of the grassland-shrubland areas on the Davenport and Homestead allotments, respectively. Shrub coverage of areas with shrubs range between 5–50% on the Davenport Allotment and 15-40% on the Homestead Allotment.

Management Indicator Species (MIS) – northern goshawk, pronghorn antelope, Rocky Mountain elk, turkey

The MIS concept was developed for use in land-management planning and was based on the idea that monitoring population trends of selected species could allow assessment of the effects of

habitat management on communities that include those species. The assumptions inherent in this approach include the following: a) the status of MIS will be reflected in the impacts of management activities at the Forest and the project level; b) changes in MIS populations can be assessed and tracked through time; and c) the changes are representative of overall ecosystem conditions. The selection of MIS, as described in the Federal Code of Regulations (36 CFR 219.19), may include the following: threatened or endangered plant and animal species identified on State and Federal lists; species with special habitat needs that may be significantly influenced by planned management programs; species commonly hunted, fished, or trapped; non-game species of special interest; or other plant or animal species that may reflect management activities. For information on the status of MIS and their associated habitat at the Forest-level, see the *Management Indicator Species for the Kaibab National Forest*, December 2002.

Northern goshawks were selected as MIS to represent the late-seral ponderosa pine habitat within the Forest. Population trends on the Forest appear to be stable, with possible increases on the North Kaibab Ranger District (*Management Indicator Species for the Kaibab National Forest*; December 2002). The northern goshawk is discussed in the Sensitive Species section above and will not be addressed further in this section.

Pronghorn antelope were selected as an MIS to represent grassland habitat within the Forest. Davenport Lake and Pitman Valley provide important pronghorn habitat within the Davenport Allotment for foraging, and also likely for fawning and nursing. Pronghorn fawns have been previously recorded in these two areas. Pronghorn also use other grassy areas and savannahs on both allotments during seasonal and daily movements between grasslands and waters.

Grass and shrub vegetation height is an important attribute of pronghorn habitat, especially during fawning and nursing. Vegetation should be high enough to provide fawns hiding cover from predators, but low enough to allow for good sighting distances, so that pronghorn can scan for, and detect, predators. Based on work by Schuetze and Miller (1992) in central Arizona, pronghorn exhibit the following habitat preferences for fawning and nursing: 1) they prefer herbaceous vegetation (grasses and forbs) that is approximately 10-15 inches high on average, 2) they avoid areas with herbaceous vegetation that is approximately ≤ 5 inches in average height, and 3) they prefer areas without woody vegetation (shrubs and cacti).

These three characteristics of pronghorn fawning and nursing habitat were evaluated within 793 acres in Davenport Lake and Pitman Valley on the Davenport Allotment (July 8, 2004; C. Nelson & B. Nielsen) and within 501 acres of scattered grassland-shrubland areas on the Homestead Allotment (July 15, 2004; C. Nelson & B. Nielsen). Preferred mean herbaceous heights of 10-15 inches occurred within 33% (262 acres) of the grassland-shrublands on the Davenport Allotment and none of the Homestead Allotment. Approximately 58% (460 acres) of the grassland-shrubland areas on the Davenport Allotment and none of the Homestead Allotment had mean herbaceous vegetation heights > 5 inches. Woody vegetation was absent on about 70% (555 acres) and 82% (411 acres) of the grassland-shrubland areas on the Davenport and Homestead allotments, respectively, including all of the area on the Davenport Allotment that had preferred mean herbaceous vegetation heights of 10-15 inches.

Therefore, based on vegetation height characteristics, the Davenport Allotment has approximately 460 acres of suitable pronghorn fawning and nursing habitat, with 262 of these acres meeting preferred herbaceous vegetation heights. The remaining grassland-shrubland areas assessed on the Davenport Allotment, or 333 acres, are unsuitable for pronghorn fawning and nursing, owing to an average herbaceous height of 1 inch across this area. It is not clear whether this area has the capability of supporting herbaceous vegetation at heights that are suitable (> 5 inches) and/or preferred (10-15 inches) for pronghorn fawning and nursing, though it is likely that this habitat attribute on this Allotment is correlated to some degree with grass cover and general range

conditions, which have been decreasing slightly. The mitigation proposal to erect and monitor vegetation heights within an elk and livestock enclosure at Davenport Lake should help elucidate these relationships. None of the Homestead Allotment is currently suitable for pronghorn fawning and nursing, and it is likely that herbaceous vegetation height within most, if not all, of this area is limited by rocky, arid conditions on this Allotment.

Proper nutrition of wild ungulates can have important influences on reproduction, and offspring survival and growth (Cook et al. 1996, Keech et al. 2000, Cook et al. 2001). In addition, susceptibility to predation and disease can be increased by malnutrition (Spalinger 2000). Pronghorn antelope maintain their necessary nutrition levels by eating primarily high-nutrition forbs, as well as shrubs, especially during the winter (Yoakum and O’Gara 2000). Total grass consumption by pronghorn increases during spring and fall ‘green-ups’, but remains a small proportion (around 10%) of annual diets (Yoakum and O’Gara 2000).

A recent study comparing diet composition and quality between Garland Prairie (South Davenport area) and Anderson Mesa pronghorn herds showed the Garland Prairie herd had a more diverse forage selection and with a higher nutrient quality. Fecal analysis showed the Garland Prairie herd had as much as 25% more protein in their diet than the Anderson Mesa herd (Miller and Drake 2004).

During 1996/1997, perennial forbs contributed to approximately 4% of the perennial vegetation basal cover on both of the allotments. Though annual forbs were not measured in the 1996/1997 analysis, many key annual forb species are known to occur on the allotments (PR #56 and 77). Annual forbs are also important to pronghorn. Typically annual and perennial forbs encompass approximately 10-30% of the vegetation composition of pronghorn habitat (Yoakum 1980).

Key perennial forbs within the allotments during 1996/1997 that are eaten by pronghorn (Neff and Woolsey 1979, Gay 1984, Stephenson et al. 1985, Davis and Schmidly 1997, Miller and Drake 2004) include fleabane (*Erigeron*), buckwheat (*Eriogonum*), rubberweed (*Hymenoxys*), lupines (*Lupinus*), and salsify or goatsbeard (*Tragopogon*). Key shrubs within the allotments during 1996/1997 that have been documented in pronghorn diets (Neff and Woolsey 1979, Yoakum 1986, Miller and Drake 2004) include sagebrush (*Artemisia*), snakeweed (*Gutierrezia*), and rabbitbrush (*Chrysothamnus*) on both allotments, with the addition of juniper (*Juniperus*) on the Homestead Allotment.

Pronghorn fawn to doe ratio of the Garland Prairie herd was 37 per 100 for the last decade. This is more than three times the ratio for the Anderson Mesa herd. The higher nutritional condition during critical periods of reproduction is speculated to account for the higher fawn recruitment for the Garland Prairie herd (Miller and Drake 2004).

Net-wire fences and railroad rights-of-way fences are effective barriers to pronghorn movement (Ockenfels et al. 1994). In addition, barbed-wire livestock fences can impede movement, or injure or kill pronghorn if they are not constructed properly. Pronghorn typically pass under fences, and therefore a minimum lower strand height of 16-18 inches is necessary (Ockenfels et al. 1994), as well as a smooth bottom wire to reduce the potential for snagging and injury.

In total, there are approximately 90 miles of fences within the Davenport and Homestead Allotments. There is some non-Forest Service net-wire fence within the Davenport Allotment, along the railroad tracks, some private lands, and Interstate 40, which are effective barriers to pronghorn movement in the area. Some interior Forest Service fences on both allotments have four strands with the bottom wire barbed, while others have smooth bottom wires. During 2002, perimeter fences on both allotments (approximately 20 miles each) were inventoried and modified to facilitate pronghorn movement. Modifications included inserting sleeves of PVC piping on the

bottom and top barbed wires and raising the height of the bottom wire to 18-20 inches at locations where pronghorn passage was evident. In addition, some interior fences were modified on the Homestead Allotment and approximately 6 miles of fence were removed within this Allotment. Informal monitoring has shown that pronghorn are using the modified crossings (PR # 40). In summary, pronghorn seasonal and daily movement abilities were decreased through the past century with the construction of fences, but recent trends have been to minimize the impacts of fence impediments by using design features or modifications that promote passage. Pronghorn movement is not possible between the north and south portions of the Davenport Allotment, owing to the barrier caused by Interstate 40. Otherwise within and around the allotments, pronghorn movement capabilities are fair, with fences impeding some movement, but design and modifications are minimizing such impediments.

The Arizona Game and Fish Department (AGFD) have been monitoring population trends of this species on the District. Game Management Unit 7 (GMU) includes the northern portion of the Davenport Allotment and the entire Homestead Allotment, while Unit 8 includes the southern portion of the Davenport Allotment. Population trends in Unit 7 have been decreasing since the early 1990s. In Unit 8, population trends have been stable. Annual variation in both units is high. In Davenport Lake, antelope observations have been regularly documented for the past 2 years. During this time, antelope have been observed regularly from about March through October (PR #78).

Rocky Mountain Elk- Though this species was selected to represent the early-seral stage of the ponderosa pine and mixed conifer habitats within the Forest, these animals often prefer savannah and grassland conditions. Ponderosa pine is common on hillsides on the Davenport Allotment, where the trees are dense with small and medium-diameter trees, leading to low levels of elk forage and browse, but good elk-calving cover. Ponderosa pine also exists along drainages in the Homestead Allotment. This habitat is more open and provides good elk forage and browse, with less elk-calving cover. There is no mixed conifer within the allotments. Owing to high levels of dietary overlap between elk and cattle (53% and 97% between summer cattle, and spring and fall elk, respectively on the Coconino National Forest; Miller and Brock 1992), the current range condition and trends for cattle may reflect those for elk, although elk can use areas inaccessible to cattle. On the Davenport Allotment, the range is in poor condition with a stable to slightly downward trend and apparent declines in abundance and vigor of cool season plants. On the Homestead Allotment, the range is in fair condition with a stable to improving trend.

The AGFD has been monitoring population trends of this species on the District. In Unit 7, population trends increased into the mid-1990s and have decreased slightly in more recent years. In Unit 8, elk populations also increased into the mid-1990s with comparable decreases in more recent years. Hunt management by AGFD influences elk population trends by increasing or decreasing hunt permits for a particular GMU. This large ungulate has spread across the entire district since its introduction in 1913 to northern Arizona, after the extirpation of Merriam's elk in the late 1890s (Lee 1986).

Turkeys were selected to represent species using the late-seral ponderosa pine habitat within the Forest. This includes older-aged sites with large, yellow pine that are preferred for turkey nesting and roosting. They will also utilize edge habitat between openings and forest stands for foraging. Insects, oak mast, and seed heads from grasses and forbs are important food items. Grass and other vegetative cover around waters are important for turkey poults.

Late-seral ponderosa pine habitat is less abundant on both allotments than it was during pre-Euroamerican settlement. During the early 1900s, many of the larger ponderosa pine trees were logged for railroad development. Railroad logging, fire exclusion, and grazing contributed to a current forest condition that has a paucity of large trees and is dominated by small and medium-

diameter trees. The abundance of insects and seed heads from grasses have likely decreased within the Davenport Allotment and have remained stable or increased within the Homestead Allotment, owing to grass cover changes. Grass cover around stock tanks has likely decreased on both allotments, owing to drought conditions and associated increases in wildlife and livestock use of waters.

The AGFD has been tracking population trends of this species on the District. Turkey population trends within Units 7 and 8 have remained stable with some oscillations.

Migratory Bird Species of Concern – burrowing owl, chestnut-collard longspur, ferruginous hawk, golden eagle, northern harrier, prairie falcon, Swainson’s hawk

Chestnut-collared longspurs and northern harriers may occur on the allotments only during winter or migration, while the ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson’s hawk may occur on the allotments year-round, including during breeding.

Burrowing owls and chestnut-collared longspurs prefer grasslands with less vegetative cover and vegetative heights < 2 and < 8-12 inches, respectively (NatureServe 2004). Grass cover on the Davenport Allotment has been declining, while cover on the Homestead Allotment has remained stable or increased. Vegetative heights average 7 and 3 inches within grassland and shrubland areas on the Davenport and Homestead allotments, respectively (assessed July 2004, C. Nelson and B. Nielsen). Habitat quality has likely been increasing slightly for these species on the Davenport Allotment and has remained stable or decreased slightly on the Homestead Allotment.

Ferruginous hawks have mixed grass-cover preferences. This species hunts in open, short-stature grasslands, but nests on the ground in areas with substantial grass cover (Saab et al. 1995). Owing to grass cover changes, hunting habitat quality for this species has likely been increasing slightly on the Davenport Allotment and has remained stable or decreased on the Homestead Allotment, while nesting habitat quality has likely been decreasing slightly on the Davenport Allotment and has remained stable or increased on the Homestead Allotment.

Northern harriers generally prefer hunting habitats that promote adequate prey base, such as early successional, dense grasses (NatureServe 2004). Owing to grass cover changes, hunting habitat quality for this species has likely been decreasing slightly on the Davenport Allotment and has remained stable or increased on the Homestead Allotment.

Golden eagles forage primarily in open grasslands, though the primary prey of this species in this area is the black-tailed jackrabbit, which is more abundant in shrublands where this species also forages (Saab et al. 1995). The nearest golden eagle nest is approximately 1 mile from the Homestead Allotment boundary and approximately 4 miles from the Davenport Allotment boundary, putting the allotments well within the foraging areas for these birds. Some of the open grasslands have been encroached by trees, leading to reduced availability of foraging habitat for this species, but increased availability of black-tailed jackrabbit prey on both allotments.

Prairie falcons are strongly dependent on populations of their primary prey, ground squirrels. Ground squirrels uniformly prefer early successional, short-stature, dense grasses (NatureServe 2004). Owing to grass cover changes, hunting habitat quality for this species has likely been decreasing slightly on the Davenport Allotment and has remained stable or increased slightly on the Homestead Allotment.

Swainson’s hawks prefer open, short-stature grassland with scattered trees for hunting and nesting (Latta et al. 1999). They prey on mammals, especially young ground squirrels and pocket gophers, as well as insects. The presence of grass cover is likely important to most of these prey species. Therefore, owing to grass cover changes, hunting habitat quality for this species has likely been

decreasing slightly on the Davenport Allotment and has remained stable or increased slightly on the Homestead Allotment.

Local Species of Concern – Gunnison’s prairie dog

Gunnison’s prairie dogs prefer open grasslands and short shrublands, with low vegetation (Boddicker 1983) and less grass cover. Prairie dogs are found on both the Davenport and Homestead allotments. Grass cover on the Davenport Allotment has been declining, while cover on the Homestead Allotment has remained stable, suggesting that habitat quality for this species has increased slightly on the Davenport Allotment and remained stable or decreased slightly on the Homestead Allotment.

B. Aquatic Species

Management Indicator Species – Cinnamon teal

Cinnamon teal were selected as an MIS to represent species using the late-seral wetlands within the Forest. Cinnamon teal are ground-nesting birds that prefer dense vegetative cover, 12 to 15 inches high, near water. The cinnamon teal eats aquatic vegetative seeds, and also insects and snails. They may use stock tanks that are scattered around the allotments if water levels are adequate. The environments surrounding these tanks are unsuitable for cinnamon teal nesting, owing to the lack of vegetative cover near these waters. Aquatic vegetation around and within the stock tanks has likely decreased on both allotments, owing to drought conditions and associated increases in wildlife and livestock use. Ephemeral wetland habitat at Davenport Lake provides occasional habitat for this species, but it is only likely to support nesting during very heavy flooding periods, when water and lush grass cover last through the breeding season.

Arizona, and likely Forest, population trends are down according to Breeding Bird Survey data (Sauer et al. 2003). Climate-caused impacts to this species may be difficult to separate from potential management impacts.

Environmental Effects

A. Grassland or Savannah Species

Two key effects are addressed: 1) effects of changes in forage and grass cover on grassland and savannah species, and 2) effects of changes in fencing on the American pronghorn antelope. None of the alternatives would affect the presence or abundance of nutritional forbs for the pronghorn antelope because a) there is a relatively low level of dietary overlap between cattle and pronghorn (<30% for 9 of 10 studies; Yoakum and O’Gara 1990), and b) heavy grazing, which would not occur under any of the alternatives, could have balancing negative (conversion of forbs and grasses to unsuitable shrublands) and positive (conversion of thick grasslands to areas with forbs and shrubs) effects (Yoakum and O’Gara 1990). Habitat and population trends from the two key effects are discussed at species-specific levels. Population viability would not be affected for any species under any of the alternatives because only localized positive, slight negative, or stable effects are anticipated as a result of any of the alternatives. These effects are minor relative to the overall population sizes of the species.

Current Management - Alternative 1

Current management would be likely to continue to decrease forage and grass cover on the Davenport Allotment for the following species or their prey: Chihuahuah savannah sparrow, Navajo

Mountain Mexican vole, northern goshawk, Rocky Mountain elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk. Therefore, this alternative would result in continued slight decreases in habitat trends for these species on the Davenport Allotment. Forage and grass cover for these species or their prey on the Homestead Allotment are likely to remain stable or increase, resulting in stable to upward habitat trends for these species on this Allotment. Increased forage and grass cover would improve foraging success or survival of individuals of these species within the allotments, while decreases in these habitat attributes would have the opposite effect. In addition, grass cover is a particularly important determinant of the presence of the Navajo Mountain Mexican vole.

Current management would have the opposite effects on the burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog because of their preference for grasslands with less grass cover. Therefore, this alternative would result in continued slight increases in habitat trends for these species on the Davenport Allotment and stable or slight decreases in such trends on the Homestead Allotment. Increased forage and grass cover would decrease foraging success or survival of individuals of these species within the allotments, while decreases in these habitat attributes would have the opposite effect.

Herbaceous vegetation height that is important for pronghorn antelope fawning and nursing cover is likely correlated to some degree with changes in grass cover and general range condition on the Davenport Allotment, suggesting that this alternative would result in continued slight decreases in pronghorn habitat trends on this Allotment, owing to slight decreases in herbaceous vegetation height. Slight decreases in herbaceous vegetation height may slightly decrease pronghorn fawn survival within the Davenport Allotment. On the Homestead Allotment, herbaceous vegetation height is likely limited by the rocky, arid conditions on this Allotment below levels that could support pronghorn fawning and therefore, pronghorn habitat trends would not be affected on this Allotment. Because there is no proposed fence construction or removal under this alternative, pronghorn antelope movement would not be affected.

Population trends of the Navajo Mountain Mexican vole, elk, turkey, burrowing owl, and Gunnison's prairie dog are likely to be correlated with habitat trends. Under current management, population trends of the Navajo Mountain Mexican vole, elk, and turkey would decrease slightly on the Davenport Allotment and would remain stable or increase slightly on the Homestead Allotment. On the other hand, population trends of the burrowing owl and Gunnison's prairie dog would continue to increase slightly on the Davenport Allotment and would remain stable or decrease slightly on the Homestead Allotment. Slight changes in population trends of all of these species under current management would be attributed to changes in grass cover and associated survival and displacement to other areas with appropriate cover characteristics. Because the AGFD manages populations of the elk and turkey, population effects to these species would be less apparent. The Forest-level population trends identified under the Affected Environment for elk and turkey would be decreased slightly in GMU 8 and would not be affected or would be increased slightly in GMU 7, barring hunt-limit changes by the AGFD.

Population trends of the pronghorn antelope are also likely to be correlated with habitat trends. Under current management, population trends of the pronghorn antelope would decrease slightly on the Davenport Allotment, owing to slight decreases in herbaceous vegetation height and associated slight decreases in fawn survival. On the Homestead Allotment, pronghorn population trends would not be affected. Because the AGFD manages populations of this species, population effects would be less apparent. The Forest-level population trends, identified in the Affected Environment Section, would not be affected in GMU 7, while the currently stable trend in GMU 8 may be decreased slightly, barring hunt-limit changes by the AGFD.

No other species would incur changes in population trends under this alternative. Chihuahua savannah sparrow, northern harrier, and chestnut-collared longspur population trends are not likely to be affected because these three species are only found on the allotments during the winter. Population trends of the northern goshawk are also not likely to be affected because grasslands and grassland prey species constitute a minor portion of the vegetation types and prey base used by this species. Further, owing to the very large foraging areas used by the ferruginous hawk, golden eagle, prairie falcon, and Swainson's hawk, relative to the amount of foraging habitat present on the allotments, and the small scale of effects on habitat trends for these species and their prey from this alternative, population trends of these species are not likely to be affected. The Forest-level population trend of the northern goshawk identified in the Affected Environment Section would not be affected.

Proposed Action - Alternative 2

The Proposed Action would be likely to slightly increase forage and grass cover on the Davenport Allotment for the following species or their prey: Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, Rocky Mountain elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk. Therefore, this alternative would result in slight increases in habitat trends for these species on the Davenport Allotment. Forage and grass cover for these species or their prey on the Homestead Allotment would be likely to remain stable or increase, resulting in stable to upward habitat trends for these species on this Allotment. Increased forage and grass cover would improve foraging success or survival of individuals of these species within the allotments, while decreases in these habitat attributes would have the opposite effect. In addition, grass cover is a particularly important determinant of the presence of the Navajo Mountain Mexican vole.

The Proposed Action would have the opposite effects on the burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog because of their preference for grasslands with less grass cover. Therefore, this alternative would result in slight decreases in habitat trends for these species on the Davenport Allotment and stable or slight decreases in such trends on the Homestead Allotment. Increased forage and grass cover would decrease foraging success or survival of individuals of these species within the allotments, while decreases in these habitat attributes would have the opposite effect.

Herbaceous vegetation height that is important for pronghorn antelope fawning and nursing cover is likely correlated to some degree with changes in grass cover and general range condition on the Davenport Allotment, suggesting that this alternative would result in slight increases in pronghorn habitat trends on this Allotment, owing to slight increases in herbaceous vegetation height. Slight increases in herbaceous vegetation height may slightly increase pronghorn fawn survival within the Davenport Allotment. On the Homestead Allotment, herbaceous vegetation height is likely limited by the rocky, arid conditions on this Allotment below levels that could support pronghorn fawning and therefore, pronghorn habitat trends would not be affected on this Allotment.

In accordance with the final Proposed Action, fence construction is proposed to create a holding pasture just north of the Davenport Allotment. Minor impacts to pronghorn antelope movement would occur under this alternative because of the proposed 1.8 miles of new fence construction. Newly constructed fence would be 'pronghorn friendly', with a smooth bottom wire no less than 18 inches above the ground. Therefore, direct death and injury from new fence would not be likely to occur, though daily and seasonal movement may be slightly negatively affected. Slight impediment of daily and seasonal movement may result in slight effects to survival or reproductive success of individuals on the holding pasture and Davenport Allotment.

Population trends of the Navajo Mountain Mexican vole, elk, turkey, burrowing owl, and Gunnison's prairie dog are likely to be correlated with habitat trends. Under the Proposed Action, population trends of the Navajo Mountain Mexican vole, elk, and turkey would increase slightly on the Davenport Allotment and would remain stable or increase slightly on the Homestead Allotment. On the other hand, population trends of the burrowing owl and Gunnison's prairie dog would decrease slightly on the Davenport Allotment and would remain stable or decrease slightly on the Homestead Allotment. Slight changes in population trends of all of these species under the Proposed Action would be attributed to changes in grass cover and associated survival and displacement to other areas with appropriate cover characteristics. Because the AGFD manages populations of elk and turkey, population effects to these two species would be less apparent. The Forest-level population trends identified under the Affected Environment for elk and turkey would be increased slightly, barring hunt-limit changes by the AGFD.

For the pronghorn antelope, minor positive effects under the Proposed Action on herbaceous vegetation height and associated fawn survival within the Davenport Allotment would be balanced by minor negative effects from fence construction on pronghorn movement on this Allotment and the adjacent holding pasture. Therefore, pronghorn population trends on the Davenport Allotment would not be affected by this alternative. On the Homestead Allotment, pronghorn population trends would not be affected. The Forest-level population trends identified in the Affected Environment Section would not be affected.

No other species would incur changes in population trends under this alternative. Chihuahua savannah sparrow, northern harrier, and chestnut-collared longspur population trends are not likely to be affected because these three species are only found on the allotments during the winter. Population trends of the northern goshawk are also not likely to be affected because grasslands and grassland prey species constitute a minor portion of the vegetation types and prey base used by this species. Further, owing to the very large foraging areas used by the ferruginous hawk, golden eagle, prairie falcon, and Swainson's hawk, relative to the amount of foraging habitat present on the allotments, and the small scale of effects on habitat trends for these species and their prey from this alternative, population trends of these species are not likely to be affected. The Forest-level population trend of the northern goshawk identified in the Affected Environment Section would not be affected.

No Action - Alternative 3

The No Action Alternative would likely result in increases in forage and grass cover on both allotments for the following species or their prey: Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, Rocky Mountain elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk. Therefore, this alternative would result in increases in habitat trends for these species on the allotments, owing to increases in forage and grass cover. Increases in forage and grass cover and habitat trends would be greater than they were under Alternative 2. Increased forage and grass cover would improve foraging success or survival of individuals of these species within the allotments, while decreases in these habitat attributes would have the opposite effect. In addition, grass cover is a particularly important determinant of the presence of the Navajo Mountain Mexican vole.

The No Action Alternative would have the opposite effects on the burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog because of their preference for grasslands with less grass cover. Therefore, this alternative would result in decreases in habitat trends for these species on both allotments. Decreases in habitat trends for these species would be greater than they were under Alternative 2. Increased forage and grass cover would decrease foraging success or survival of individuals or result in displacement of individuals to other areas with appropriate cover characteristics, while decreases in these habitat attributes would have the opposite effect.

Herbaceous vegetation height that is important for pronghorn antelope fawning and nursing cover is likely correlated to some degree with changes in grass cover and general range condition on the Davenport Allotment, suggesting that this alternative would result in increases in pronghorn habitat trends on this Allotment, owing to increases in herbaceous vegetation height. Increases in herbaceous vegetation height may increase pronghorn fawn survival within the Davenport Allotment. Herbaceous vegetation height is likely limited by the rocky, arid conditions on the Homestead Allotment below levels that could support pronghorn fawning, and therefore, pronghorn habitat trends would not be affected on this Allotment. No impacts to pronghorn antelope movement would occur because there would be no fence construction, gapping, or removal under this alternative.

Population trends of the Navajo Mountain Mexican vole, elk, turkey, burrowing owl, and Gunnison's prairie dog are likely to be correlated with habitat trends. Under the No Action Alternative, population trends of the Navajo Mountain Mexican vole, elk, and turkey would increase on both allotments, at a greater rate than under Alternative 2. On the other hand, population trends of the burrowing owl and Gunnison's prairie dog would decrease on both allotments, at a greater rate than under Alternative 2. Changes in population trends of all of these species under the No Action Alternative would be attributed to changes in grass cover and associated survival and displacement to other areas with appropriate cover characteristics. Because the AGFD manages elk and turkey, population effects to these species would be less apparent. The Forest-level population trends identified under the Affected Environment for elk and turkey would be increased, barring hunt-limit changes by the AGFD.

For the pronghorn antelope, positive effects under the No Action Alternative on herbaceous vegetation height and associated fawn survival within the Davenport Allotment may result in increased pronghorn population trends on the Davenport Allotment under this alternative. On the Homestead Allotment, pronghorn population trends would not be affected. Because the AGFD manages populations of this species, population effects would be less apparent. The Forest-level population trends, identified in the Affected Environment Section, would not be affected in GMU 7, while the currently stable trend in GMU 8 may be increased, barring hunt-limit changes by the AGFD.

No other species would incur changes in population trends under this alternative. Chihuaha savannah sparrow, northern harrier, and chestnut-collared longspur population trends would not likely be affected because these three species are only found on the allotments during the winter. Population trends of the northern goshawk are also not likely to be affected because grasslands and grassland prey species constitute a minor portion of the vegetation types and prey base used by this species. Further, owing to the very large foraging areas used by the ferruginous hawk, golden eagle, prairie falcon, and Swainson's hawk, relative to the amount of foraging habitat present on the allotments, population trends of these species are not likely to be affected. The Forest-level population trend of the northern goshawk identified in the Affected Environment Section would not be affected.

B. Aquatic species

One key effect on the cinnamon teal is addressed in this analysis: changes to vegetation within and around stock tanks. Cattle disturbance of nesting cinnamon teal is unlikely under any of the alternatives because of the following: a) the environments surrounding tanks on the allotments with adequate water levels are unsuitable for cinnamon teal nesting, owing to the lack of vegetative cover within and near these stock tanks; b) ephemeral wetland habitat at Davenport Lake provides occasional habitat for this species, but it is only likely to support nesting during very heavy flooding periods, when water and emergent vegetation exist, and lush grass cover lasts through the breeding season; and c) the ephemeral wetlands at Davenport Lake would not be stocked with cattle

during periods when the lake is still wet – this management is included as a mitigation measure under the Action Alternatives 1 and 2 (Current Management and Proposed Action). Habitat and population trends from the key effect are discussed for the cinnamon teal. Cinnamon teal population viability would not be affected under any of the alternatives because only localized positive, slight negative, or stable effects are anticipated as a result of any of the alternatives. These effects are minor relative to the overall population size of the Cinnamon Teal.

Current Management - Alternative 1

Assuming drought conditions continue as predicted, current management would be likely to maintain or slightly reduce the current low levels of vegetation within and immediately surrounding stock tanks that may be used by the cinnamon teal on both allotments. Therefore, this alternative would result in continued poor habitat conditions in stable to slightly decreasing trends, depending on drought severity, for this species on both allotments. Though this alternative would not disallow stocking of cattle on ephemeral wetlands at Davenport Lake, mitigation measures contain provisions to keep cattle out of Davenport Lake while it is wet.

Population trends of the cinnamon teal are likely to be correlated with habitat trends, which are influenced greatly by climate and the relationship between drought and the use of waters by livestock and elk. Under current management, population trends of this species would remain stable or would decrease slightly, depending on drought severity, on both allotments. Slight changes in population trends of this species under current management would be attributed to changes in vegetative cover within and around waters and associated survival and displacement to other areas with appropriate cover characteristics. Forest-level population trends identified in the Affected Environment Section would not be affected or would be decreased slightly, depending on drought severity.

Proposed Action - Alternative 2

The Proposed Action would slightly increase vegetative cover within and around stock tanks on the Davenport Allotment for the cinnamon teal, though this relationship is strongly influenced by climate and worsening drought conditions could cancel out any improvements from management. Therefore, this alternative would result in slightly increasing or stable habitat trends for this species on the Davenport Allotment. Vegetative cover within and around stock tanks on the Homestead Allotment would be likely to remain stable or slightly decrease, depending on drought severity, resulting in stable to downward habitat trends for this species on this Allotment. Mitigation measures under this alternative would not allow grazing of the ephemeral wetlands at Davenport Lake while it is wet.

Throughout their range, population trends of the cinnamon teal would be likely to be correlated with habitat trends and climate. Observations of cinnamon teal within the Davenport Lake area have been closely tied to standing water (PR# 78). Given standing water in the ephemeral wetlands, the Proposed Action would result in slightly increased or stable population trends of the cinnamon teal on the Davenport Allotment. On the Homestead Allotment, populations would remain stable or decrease slightly. Forest-level population trends identified in the Affected Environment Section would not be affected.

No Action - Alternative 3

The No Action Alternative would increase vegetative cover within and around waters on both allotments for the cinnamon teal, though this relationship is strongly influenced by climate, and worsening drought conditions, along with continued use of waters by elk, could lessen or offset any improvements from management. Therefore, this alternative would result in slight increasing

habitat trends for this species on both allotments. This alternative would have no livestock grazing of the ephemeral wetlands at Davenport Lake.

Population trends of the cinnamon teal would be likely to be correlated with habitat trends and climate. Given standing water, population trends of the cinnamon teal would increase slightly on both allotments under the No Action Alternative. Forest-level population trends identified in the Affected Environment Section could be increased slightly.

Cumulative Effects

Cumulative effects include past, present, and reasonably foreseeable future activities that are likely to occur. The geographical extent of analysis includes the Cataract Spring Valley and Sycamore Canyon watersheds. This analysis area incorporates a landscape scale (i.e., two watersheds encompassing the allotments) as well as the home ranges of all of the far-ranging ungulates and birds analyzed and those of shorter-ranging species during their use of the allotments.

Activities and Projects Included in the Analysis

The following key activities within the cumulative effects analysis area are considered relevant in analyzing cumulative impacts from grazing on the Davenport and Homestead allotments:

Tree Thinning

Thinning small- and medium-diameter pines provides a temporary opening up of the canopy. This activity improves forage and grass cover and increases the availability of grasslands. Such activities benefit the following species or their prey: Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, pronghorn antelope, elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, Swainson's hawk, burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog. Benefits include more available forage, better quality grass cover, higher herbaceous vegetation, and more grassland habitat, leading to a greater ability for grassland species or grassland prey to survive and reproduce. Anticipated levels of thinning are at or below historical levels for large-diameter trees, but at or above historical levels for small- and medium-diameter trees. Future benefits to forage, grass cover, herbaceous vegetation height, and grassland habitat would be maintained or increased and would be within the range of natural variability.

Projects - Past and current activities of this sort in the analysis area include the Round/Oak/Tule, Elk/Lee, Beacon, Old Frenchy, Spring Valley, Clover High, Hardy, Johnson, Homestead, Pedigo Tank, Brannigan, and El Paso vegetative treatments and grassland improvement projects. Reasonably foreseeable activities include the Frenchy, Pineaire, Community Tank, Dogtown, and City projects.

Prescribed Fire

Prescribed fires temporarily remove forage and expose soil, but shortly afterwards, promote growth of new grass and forb forage and cover. Because fires open up the canopy and remove down woody material, they may also eventually promote development of higher herbaceous vegetation. Prescribed fires benefit the Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, pronghorn antelope, elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk or their prey, by increasing grass and forb forage and cover, and possibly herbaceous vegetation heights over the longer term.

Projects - Past and current prescribed fires in the analysis area include prescribed burns (Aspen and Old Twin burns) and pile and broadcast burning associated with the Round/Oak/Tule, Elk/Lee, and

Old Frenchy vegetative treatments south and west of the Allotments. Future fire management activities include prescribed burns (Twin, South Williams Grasslands), and pile and broadcast burning associated with the Frenchy, Clover High, Beacon, City, Dogtown, and Pineaire vegetative treatment projects.

Domestic Livestock Grazing

Domestic livestock grazing has altered, and continues to alter forage and grass cover, herbaceous vegetation heights (where not limited by other factors) and vegetation within and around stock tanks and ephemeral wetlands within the analysis area. Past, present, and reasonably foreseeable livestock management actions within the analysis area indicate an increasing trend in forage and grass cover and a likely increasing trend in herbaceous vegetation heights, where not limited by other factors. The increasing trend in forage and grass cover and the likely increasing trend in herbaceous vegetation heights is occurring on all allotments that have recently completed or are undergoing NEPA planning. These increases benefit the Chihuahuah savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, pronghorn antelope, elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk or their prey, by increasing forage availability, grass cover, and herbaceous vegetation heights used by these species for foraging and reproduction. These increases are negative to the burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog because of their preference for grasslands with less grass cover. Vegetation within and around stock tanks and ephemeral wetlands in the analysis area that are used for reproduction and feeding by the cinnamon teal are in a stable to slightly declining trend.

Projects – Recent NEPA decisions were issued for the Big Springs (10/03/1995), Garland Prairie (10/3/1995), Tule (2/12/2004) and Hat (12/07/1992) Allotments, which are south and west of the Davenport and Homestead Allotments. Future NEPA planning is scheduled for the Garland Prairie and Pomeroy allotments (scheduled 2008-2010) both south of the Davenport Allotment and the Chalender and Bellemont Allotments (scheduled 2003-2006) to the south and southeast, respectively of the Davenport Allotment.

Fence Construction

Fence construction is identified as an important factor in impeding movement, and causing injury and possibly reduced survival of the pronghorn antelope. Over the past century, fencing has increased within the analysis area. Past, present, and reasonably foreseeable fence construction actions indicate an increasing trend in number and length of fences within the analysis area. Recent and future livestock enclosure fences have and would continue to be constructed with smooth bottom wires and height specifications to promote movement and reduce the potential for injury and mortality of pronghorn antelope.

Projects – Approximately 800 miles of fence exist within the Williams Ranger District. Over the past 15-20 years, approximately 6 miles of fencing were removed from the Homestead Allotment, 2 miles of new fence were constructed on the Spitz Hill Allotment, and approximately 14 miles of new fence were constructed in other locations across the analysis area. All recent fence construction has included specifications to promote pronghorn movement, i.e., smooth bottom wire no less than 18 inches from the ground. No fence additions were included in recent NEPA decisions for the Big Springs and Garland Prairie allotments, which are sheep allotments. Approximately 80 locations along 40 miles of fence in the analysis area were modified to promote pronghorn passage. Modifications included raising the bottom wire up to a minimum height of 18 inches and inserting a sleeve of PVC pipe along the barbed bottom wire, at locations where pronghorn passage was evident.

Estimated Cumulative Effects

The above activities and projects suggest the following trends across the analysis area: 1) an improving trend in forage and grass cover used for reproduction and/or feeding by the Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, Rocky Mountain elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk; 2) a decreasing trend in habitat characteristics for reproduction and/or feeding by the burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog, because of their preference for grasslands with less grass cover; 3) a likely improving trend in herbaceous vegetation height important for pronghorn antelope fawning cover; 4) a decreasing trend in vegetation within and immediately surrounding waters used for reproduction and feeding by the cinnamon teal; and 5) a slightly worsening trend in the numbers and lengths of fences within the analysis area that impede pronghorn antelope movement and cause pronghorn injury and mortality. Potential impacts to species or their prey include: 1) ability to survive, 2) a change in feeding and/or reproductive success, and 3) hindered passage and potential injury and mortality from fences.

Forage and Grass Cover

The direct and indirect effects from Alternatives 1-3 would result in the cumulative effect of maintaining or accelerating the current improving trend in forage and grass cover characteristics for the Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, elk, turkey, ferruginous hawk, golden eagle, northern harrier, prairie falcon, and Swainson's hawk. The degree of positive change in this improving trend would be from most to least in the following order: Alternative 3 (accelerated on both allotments) > Alternative 2 (slightly accelerated on the Davenport Allotment; maintained or slightly accelerated on the Homestead Allotment) > Alternative 1 (maintained, but slightly decelerated on the Davenport Allotment; maintained or slightly accelerated on the Homestead Allotment). These cumulative effects would result in the concomitant maintenance or improvement of the ability of these species to survive and forage and reproduce successfully.

The direct and indirect effects from Alternatives 1-3 would result in the cumulative effect of maintaining or contributing to the current decreasing trend in these habitat characteristics for the burrowing owl, chestnut-collared longspur, and Gunnison's prairie dog. The degree of negative change in this decreasing trend would be from most to least in the following order: Alternative 3 (accelerated on both allotments) > Alternative 2 (slightly accelerated on the Davenport Allotment; maintained or slightly accelerated on the Homestead Allotment) > Alternative 1 (maintained, but slightly decelerated on the Davenport Allotment; maintained or slightly accelerated on the Homestead Allotment). These cumulative effects would result in the concomitant maintenance or decreases of the ability of these species to survive and forage and reproduce successfully.

Herbaceous Vegetation Height

The direct and indirect effects from Alternatives 1-3 would result in the cumulative effect of maintaining or improving the current likely improving trend in herbaceous vegetation height important for pronghorn fawning cover and fawn survival. The degree of positive change in this improving trend would be from most to least in the following order: Alternative 3 (accelerated on the Davenport Allotment; maintained on the Homestead Allotment) > Alternative 2 (slightly accelerated on the Davenport Allotment; maintained on the Homestead Allotment) > Alternative 1 (maintained, but slightly decelerated on the Davenport Allotment; maintained on the Homestead Allotment). These cumulative effects would result in the concomitant maintenance or improvement of the ability of this species to survive and reproduce successfully.

Vegetation Within and Around Stock Tanks

The direct and indirect effects from Alternatives 1 and 2 would result in the cumulative effect of maintaining or contributing slightly to the decreasing trend in this habitat characteristic with concomitant maintenance or slight reductions in the ability of the cinnamon teal to survive and feed and reproduce successfully. Direct and indirect effects from Alternative 3 would result in a slight reversal of the declining trend in this habitat attribute with slight improvements in survival and feeding and reproductive success of the cinnamon teal. These conclusions are based on the assumption of continued drought conditions.

Fences

The minor increases in fence length with pronghorn passage design specifications would result in a small to negligible cumulative effect of contributing to the worsening trend in the number and length of fences within the analysis area for pronghorn antelope and decreasing movement capability of the pronghorn antelope across the area.

Economic and Social Factors

Affected Environment

Federal rangelands are critical to the economic viability of the livestock industry. In the Southwest, approximately 22% of livestock producers hold Federal grazing permits. The high ratio of Federal to private lands forces potential livestock operators to explore permits on public lands, where permit costs are lower than purchasing large private ranches or irrigated lands.

Ranching is a traditional and accepted lifestyle in rural Northern Arizona. The grazing of livestock has occurred at varying intensities within the project area since the late 1880's. Together with logging and mining, it was an important component of Euro-American settlement of the Western United States. Within the Davenport allotment, the old town site of Chalender, located in the extreme south end of Pittman Valley, adjacent to the railroad, included holding pens that were constructed to ship beef by the railroad. Though it is not clear in the record, it is thought this line was associated with railroad logging since it eventually was removed when the town was abandoned. Since Pittman Valley did have a somewhat dependable groundwater supply, numerous homesteads were established and trespass livestock became a serious enforcement problem for the local Forest Rangers. Though no one knows for sure how many head were turned out on Federal lands, the notes indicate the numbers were high and the range was overstocked. Today, grazing intensities are closely regulated by the Forest Service, and are much lower than they were at the turn of the century.

The current permit for the Homestead and Davenport Allotments is tied to a family-run operation. In addition to the financial benefits derived from this livelihood, the permittee and his family also enjoy the ranching lifestyle for a variety of personal reasons. Personal traits typically associated with ranching include self-sufficiency, independence, family closeness, ties to the land, and a predilection for hard work.

Public perceptions of livestock grazing on Forest lands are quite variable. They are dependent on many factors, including background, culture, personal values, and specific experiences. Those who have grown up in a rural setting or those who live adjacent to a National Forest are accustomed to the presence of open space and rural atmosphere. These people may typically accept livestock grazing as part of the use of the Forest as long as it is properly managed and regulated. To some Forest visitors, the scene of cattle grazing in open grasslands with forested hills in the background

represents a pleasing rural western lifestyle. On the other hand, others interpret such a scene as disruptive to the “natural” environment, and are opposed to livestock grazing anywhere under any management scenario. Depending upon individual perspectives and type of recreational activity being pursued, recreational users may or may not view cattle grazing as an annoyance that decreases the quality of their recreational experience.

Although there are diverse public viewpoints relative to livestock grazing on public lands, the Forest Service is required by law and the Kaibab National Forest Plan to provide the opportunity for livestock grazing on public lands, consistent with other resource values, and without impairing land productivity. From an economic standpoint, the ranching industry in Coconino County is a minor component. However, it supports a lifestyle that is important socially and financially to quite a number of individuals and families.

Economic/Social Effects

The following table summarizes the economic effects of the alternatives. Values are on an Annual Basis for the Homestead and Davenport Allotments only.

Table 7: Summary of Economic Attributes and Effects

Evaluation Criteria	Alternative 1 Current Management	Alternative 2 Proposed Action	Alternative 3 No Action
Livestock Activity Permitted	Yes	Yes	No
Estimated Gross Revenue	\$98,530	\$89,700	None
Estimated Operational/Maintenance Costs	\$34,037	\$32,070	None
Grazing Fees	\$2,190	\$2,078	None
Estimated Net Revenue	\$62,303	\$55,552	None
Number of Jobs Created	2.0	1.9	None
Contributions to the Range Betterment Fund*	\$1,095	\$1,039	None
Contributions to Coconino County	\$548	\$520	None
Contributions to the U.S. Treasury	\$548	\$520	None
Estimated Cost to the Government	\$10,300	\$10,300	\$6,000
Receipt/Cost Ratio	0.21:1	0.20:1	N/A

*** The Public Rangelands Improvement Act (PRIA) of 1976 allows up to 50% of the grazing fees to go back to the Forest where the grazing fees were generated. These funds are to be used for range improvements such as grassland maintenance or water development projects.**

It is apparent from the table that the receipts/cost ratio is substantially less than 1:1 for all action alternatives. However, it is also important to understand that current policies and laws prohibit the Forest Service from charging fair-market value. In addition, there are also a number of intangible benefits associated with the Range Management program that are not easily quantified. Two of these are listed below:

- Waters that are developed for livestock are also available for wildlife. Natural water sources are rare on the District, so these developed waters help to provide needs for deer, elk, antelope, turkey, and in some cases, wetland species.
- Tree encroachment into natural grasslands has been a resource issue for quite a number of years in the Southwest. As grasslands become invaded, they shrink in size and affect habitat availability for a number of grassland-dependent species, such as pronghorn antelope, Gunnison's prairie dog, and small mammals that serve as prey for raptors. The Forest Service has very limited funding to restore and maintain these grasslands. Several permittees on the District have assisted significantly over the past decade in providing their own resources (tractors equipped with shears) to remove encroaching trees from these historic natural grasslands.

Effects Common to Alternatives 1 (Current Management) and 2 (Proposed Action)

If either Alternative 1 or 2 is implemented, the ranching lifestyle would be maintained, and the permittee would continue to make a livelihood from cattle-grazing operations on these allotments. As the table indicates, net revenue would be lower for the Proposed Action alternative. This is the consequence of the removal of 25 adult livestock from the Davenport Allotment under Alternative 2. However, this loss would be offset to some degree by the anticipated improvement in the overall calf crop as well as average livestock weights as the cool season grass frequency improves.

There are no known high-use recreational areas within either allotment, and dispersed recreational use is low to moderate. Therefore, it is estimated that potential conflict between recreational use and cattle grazing within these allotments would be minor under both of these alternatives. Implementation of these alternatives would not meet the expectations of those publics who view cattle grazing (and possibly other evidence of human use) as an intrusion into the "natural" environment.

Alternative 3 – No Action

Under Alternative 3, a new term permit would not be issued, and the opportunity for the permittee to pursue the ranching lifestyle and make a livelihood from grazing operations on these allotments would be ended. Total revenues would drop to zero and roughly two jobs would be eliminated.

The cessation of livestock grazing on these allotments would resolve any potential conflicts that might occur between grazing and recreational users. It would provide a higher quality experience for those who see cattle grazing as an intrusion or as "unnatural". On the other hand, it would detract from the experience of those who view cattle as an integral part of the rural western landscape.

Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."* This Executive Order was designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. It requires federal agencies to adopt strategies to address environmental justice concerns within the context of existing laws, including NEPA. The goal of Environmental Justice Analysis is not to shift risks among populations, but to identify potential disproportionately high and adverse effects, and to identify Alternatives that may mitigate these impacts.

The Indian Tribes listed in Chapter 4 were consulted regarding this proposal and no concerns were expressed. Individual tribal members may use the area for the personal collection of traditional or medicinal plants. Low income groups may use the area for the collection of fuelwood. None of the alternatives would have adverse effects on these uses or to low income and minority populations in the area.

Chapter 4 – Consultation and Coordination

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

ID Team:

John Brink, Team Leader	Technical Services Branch Leader
Paul Webber	Range Specialist
Lauren Johnson	Soils and Watershed
Chuck Nelson	Wildlife Biologist
George Sheppard	Wildlife Biologist

Support:

Ariel Leonard	NEPA Planner
Neil Weintraub	Archeologist
Bonnie Neilsen	Wildlife Biologist
Ron Auler	Stewardship Staff
David Brewer	Range and Watershed Specialist
Gary Hase	Range Management Specialist
Bill Noble	Wildlife Biologist
Stephanie Morgan	NEPA Assistant

Federal, State, and Local Agencies:

US Fish & Wildlife Service
Arizona Game and Fish Department
Arizona Department of Agriculture
Arizona Department of Environmental Quality

Permitee:

Frank & Dave McNelly	McNelly Ranches, LLC
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Indian Tribes

Hopi Tribe

Navajo Nation

Hualapai Tribe

Havasupai Tribe

Yavapai-Prescott Indian Tribe

Pueblo of Zuni

Others:

Warren Leek, Dave Brown, Jim Unmacht

Martin Taylor, Greta Anderson

Mike Perkinson

Donald Cox

Rick Erman

Billy Stern

Jeff Burgess

Kali Kaliche

Arizona Antelope Foundation

Center for Biological Diversity

Arizona Wildlife Federation

Sun City Sportsmen

Arizona Wildlife Federation

Forest Guardians

Glossary

Affected Environment: The biological, physical, social, and economic environment subject to changes that will or may take place as the result of proposed human activity.

Allotment: An area of federal lands designated for the grazing of a prescribed number and kind of livestock under a specific plan of management.

Allotment Management Plan (AMP): A plan cooperatively developed by the Range Permittee and the Forest Service that lists the management practices, livestock numbers, lists of improvement needs, salting practices, and administrative policies.

Allowable Use: The degree of utilization considered desirable and attainable on various parts of an allotment.

Animal Unit Month (AUM): Amount of forage required by an animal-unit for one month.

Animal Head Month: A month of use or occupancy of the range by one animal. For grazing fee purposes, it is a month's use and occupancy of range by one weaned or adult cow with or without calf, bull, steer, heifer, horse, burro, or mule, or a specified number of sheep or goats.

Annual Operating Instructions (AOI): A set of instructions developed by the U.S. Forest Service and given to the Range Permittee on an annual basis, that explains the specific pastures to be used, and adjustments to the Allotment Management Plan for the current year.

Best Management Practices (BMP): A practice or combination of practices that are the most effective and practical means of achieving resource protection objectives during resource management activities.

Browse: Twigs, leaves, and young shoots of trees and shrubs on which animals feed.

Capability: The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity.

Carrying Capacity: In grazing management, the maximum level at which animals can graze an area without damage to the vegetation or related uses. Generally includes both livestock and wild ungulates.

Condition: As evaluated and ranked by the Forest Service, is a subjective expression of the status or health of the vegetation and soil relative to their combined potential to produce a sound and stable biotic community. Soundness and stability are evaluated relative to a standard that encompasses the composition, density, and vigor of the vegetation and the physical characteristics of the soil.

Cool-Season Plant: a plant which generally makes the major portion of its growth during the winter and spring and sets seed in the late spring or early summer. Cool season plants include mutton bluegrass, Junegrass, Arizona fescue, western wheatgrass, and bottlebrush squirreltail.

Cumulative Effects: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7).

Dispersed Recreation: Recreation use that occurs outside of developed sites and requires few, if any, improvements other than roads and trails. Representative activities are hiking, backpacking, driving for pleasure, viewing scenery, snowmobiling, cross-country skiing, hunting, off-road vehicle use, and berry picking.

Deferment: delay or discontinuance of livestock grazing in an area for an adequate period of time to provide seed production, establish new plants, or restore vigor of existing plants.

Deferred Rotation: moving grazing animals to various parts of a range in succeeding years or seasons to provide for seed production, plant vigor, and seedling growth.

Diversity: "The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan." (36 CFR 219.3)

Effects: The results expected to be achieved from implementation of actions relative to physical, biological, and social (cultural and economic) factors resulting from the achievement of outputs.

Encroachment: An invasion or advancement.

Environmental Impact Statement (EIS): The documentation of environmental effects and action required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

Ephemeral Wetlands: Wetlands that are generally shallow and only hold water for very short periods, typically in wetter seasons and years.

Exclosure: An area of land enclosed by a barrier, such as a fence, to protect vegetation and prevent grazing by animals.

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

Forage Production: The weight of forage produced within a designated period of time on a given area.

Forage Utilization: The degree to which animals have consumed or trampled the total current production of plants, expressed in percent. It may refer to the use of a pasture or use of an individual plant.

Grasslands: Lands where the vegetation is dominated by grasses, grass-like plants, and/or forbs. Non-Forest land is classified as grassland when herbaceous vegetation provides at least 80 percent of the canopy cover excluding trees. Lands not presently grasslands that were originally or could become grasslands through natural succession may be classified or potential natural grasslands.

Grazing Capacity: The maximum level at which animals can graze an area without damage to the vegetation or related uses."

Grazing Period: Time that livestock are allowed in each pasture or allotment.

Heritage Resource: Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. It also includes properties of traditional religious or cultural importance to an Indian tribe that meet the National Register criteria.

Interdisciplinary Team (ID): A group of individuals with skills from different disciplines. An interdisciplinary team is assembled because no single scientific discipline is sufficient to adequately identify, analyze, and resolve issues or problems.

Key Areas: “areas normally ¼ to 1 mile from water, located on productive soils on level to intermediate slopes, and readily accessible for grazing” (Kaibab Forest Land Management Plan 1996).

Litter: the uppermost layer of organic debris on the soil surface; the freshly fallen or slightly decomposed vegetal material.

Management Indicator Species: Any species, group of species, or species habitat element selected to focus management attention for the purpose of resource production, population recovery, maintenance of population viability, or ecosystem diversity (FSM 2605)."

Mitigation Measures: Actions that are taken to lessen the severity of effects of other actions.

Objective: "A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals." (36 CFR 219.30)

Permittee (Grazing): An individual who has been granted a Federal permit to graze livestock for a specific period of time on a range allotment, also referred to as a grazing “permit holder.”

Potential Natural Community: The biotic community that would be established if all successional sequences of its ecosystem were completed without additional human-caused disturbance under present environmental conditions.

Range Condition: A generic term relating to the present status of a unit of range in terms of various values or potentials.

Range Improvement: Any activity or program on or relating to rangelands which is designed to improve production of forage, change in vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, or provide habitat for wildlife or livestock.

Rest-Rotation: A system in which animals are moved from one range unit pasture to another on a scheduled basis.

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

Soil Condition Class: A reference to soil stability primarily based on the amount of ground cover weighted by the degree of accelerated erosion.

Stock Tank: An earthen tank for providing water for livestock and wildlife.

Stocking: the number of specified kinds and classes of animals utilizing a unit of land for a specific time period.

Species Composition: proportions of various plant species in relation to the total on a given area. Proportions may be expressed in percentages based on weight, cover, or density.

Trend: The direction of change in ecological status or resource value rating over a period of time. Trend in a value rating should be described as up, down, or not apparent.

Utilization: Proportion of a current years forage production consumed by grazing animals. May refer to the use of a pasture or individual species

Vigor: Relates to the relative robustness of a plant in comparison to other individuals of the same species. Reflected primarily by the size of a plant and its parts in relation to its age and the environment in which it is growing.

Wetland: An area with shallow standing water or seasonal to year-long saturated soils.

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Appendices

1. Summary of Key Resource Concerns
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Appendix 1. Summary of Key Resource Concerns

A summary of the key resource concerns identified from the initial Proposed Action scoping are listed below.

1. Concern: *The current range condition is the result of real, not permitted numbers. As a result, the stocking level determination should be made based on actual, not permitted cattle.*

Response: The stocking level determination was based on actual use.

2. Concern: *Elk and other wild ungulates influence utilization and should be factored into allowable use.*

Response: Actual and allowable utilization estimates incorporate use by ALL ungulates, not just domestic ones. Once the allowable utilization levels are met, the cattle are removed from the pasture.

3. Concern: *In the absence of site-specific information, the allowable use levels set in the Kaibab Forest Plan, Grazing Management Guidelines should not be exceeded. The initial Proposed Action did not mention site-specific information that would allow for these levels to be exceeded.*

Response: While not explained in detail, the initial Proposed Action did make reference to site-specific range analysis conducted on both the Homestead and Davenport Allotments. Allowable utilization percentages for Homestead and Davenport were established based on site-specific soil characteristics, annual use monitoring, and other vegetation data. Forest Plan utilization levels are conservative and are only used when site-specific information is not available.

4. Concern: *If grazing is deferred from Davenport Lake until it is dry, it may cause overuse in other pastures.*

Response: Pastures are monitored and cattle are moved when utilization reaches 30%. If needed, the rotation schedule for the Davenport Allotment would be adjusted to allow earlier entry onto one of the other three pastures. Livestock are placed in each pasture for one use period only. Once the cattle have rotated through each of the pastures, they are completely removed from the allotment. Achieving the utilization standards during drier years may require reduced numbers or a shorter grazing season.

5. Concern: *Fences impede movement of large wildlife, especially pronghorn antelope.*

Response: Although two new fences (totaling less than two miles) are planned as part of the Proposed Action, they will be constructed to meet AGFD fence standards to facilitate pronghorn passage.

The fence that would split the Depot Pasture adjoins a large block of private land containing multiple fences and structures. Over the past 15 years, Forest Service biologists have informally observed the general area where the proposed fence would be located and have never observed pronghorn using the area.

Additionally, several fence improvements on the allotments have been made in recent years. During 2002, perimeter fences on both allotments were inventoried and wildlife “crossings” were installed in areas used by wild ungulates (evidenced by game trails, hair, and scat). A total of 49 crossings were installed on the Homestead Allotment, and 31 crossings were installed on the Davenport Allotment. The crossings were

constructed by placing PVC pipe over the top and bottom wires of the fence. The bottom wire was then raised to a height of 20 inches to facilitate pronghorn passage underneath. The crossings were monitored 7-10 days after they were installed, and 80% of the crossings had been used by either antelope or elk.

In addition, six miles of interior barbed wire fence was removed from the Homestead Allotment and some interior fences were modified. On the Davenport Allotment, several sections of interior fence are being reconstructed to meet AGFD pronghorn standards and most of the interior pasture fences already have a smooth bottom wire.

6. Concern: *Pronghorn antelope populations are not self-sustaining on the Kaibab National Forest.*

Response: AGFD monitors population trends of pronghorn antelope in the allotment areas. Game Management Unit 7 occupies the entire Homestead Allotment and the northern half of the Davenport Allotment. Population trends for Unit 7 have been slightly decreasing since the early 1990s and have remained stable in Unit 8 since the mid-1990's. Although there have been wide annual variations in both herds, the populations that seasonally occupy Kaibab National Forest lands are estimated to be well above minimum viable levels (Management Indicator Species Report for the Kaibab National Forest 2002).

Additional resource concerns identified during the Notice and Comment Periods:

7. Concern: *Reducing livestock numbers on the Davenport Allotment by 25 head will probably not improve the degraded condition.*

Response: The current condition of the Davenport Allotment is a "high-poor" condition with a slightly downward trend. Forest Service resource specialists believe that the reduced numbers combined with the additional pasture will result in an improving trend and an improved range condition over time. Monitoring will be used to adjust grazing management as needed to maintain stable to improving conditions.

8. Concern: *Monitoring of riparian areas in the Davenport Lake Allotment is needed to prevent the long-term degradation of riparian habitat.*

Response: Monitoring of the ephemeral wetland in Davenport Lake is planned as part of the Proposed Action. The Davenport Allotment contains three ephemeral wetlands; however, these are not considered "riparian" areas.

9. Concern: *Davenport Lake is already fenced, and would not require "a fair amount of fence" to exclude Davenport Lake from grazing.*

Response: Only the core part of Davenport Lake is fenced. The Davenport Lake ephemeral wetland is a significantly larger area, and it would require "a fair amount of fence" to build a cattle enclosure.

10. Concern: *The "digging of stock ponds" in the Davenport wetlands alters the soil moisture and vegetative regime of the area.*

Response: Because the proposed action does not include the construction or clean out of tanks, this concern is technically outside the scope of the proposal. However, the presence of the stock ponds relative to wetland hydrology may have some minimal negative effects. This concern is addressed in Chapter 3 of

the EA under the Soil and Watershed Effects section. The analysis showed that that due to the small water-holding capacity of the stock ponds, the withheld water would only increase the depth of the wetland by up to half an inch and prolong the period of standing water by a few days. In addition, the heavy clay nature of the soils makes water movement through the soil exceedingly slow, and evaporative wicking is negligible.

11. Concern: *Livestock trampling and disturbance may reduce nesting success of waterfowl (specifically cinnamon teal).*

Response: The key factor affecting the presence of teal and availability of nesting habitat is winter precipitation and the presence of standing water. The ephemeral wetlands on the Davenport Allotment are highly variable; the last time the lake was flooded was in 1995. Because cattle are excluded from the Davenport Lake wetland area during wet periods, the potential effect of cattle grazing on cinnamon teal nesting is negligible.

Appendix 2. Williams Area Precipitation Data 1990 to Present

(Source: Western Regional Climate Center)

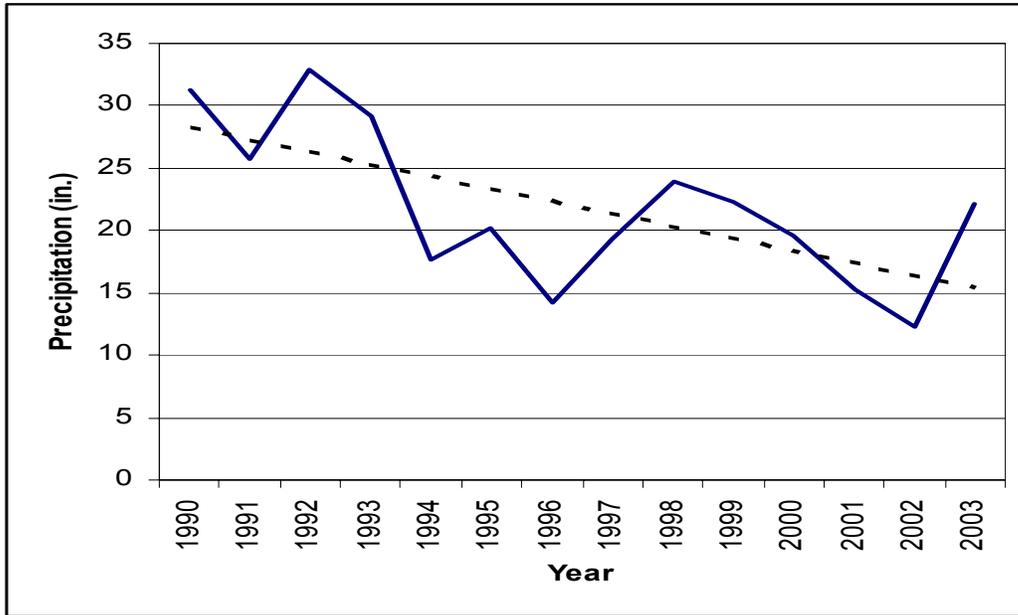


Figure 2a. Total Precipitation By Year for the Williams Area, 1990-Present

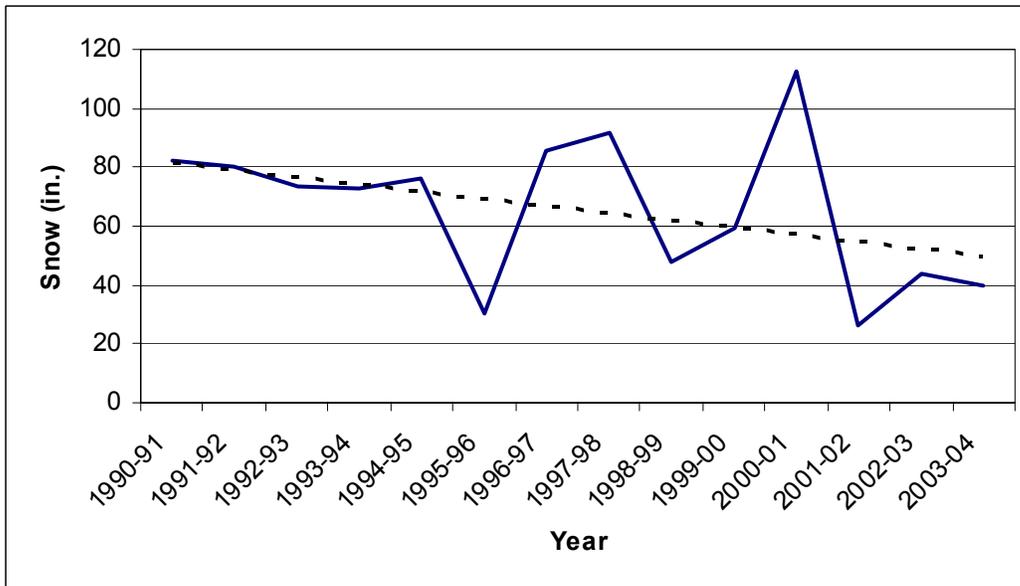


Figure 2b. Snowfall by Year for the Williams Area 1990-Present

Appendix 3. Listed and Sensitive Plant Species in Coconino, Arizona

Table 3a. USFWS Listed Plant Species in Coconino County, Arizona

Common Name	Scientific Name	Status	Possible Suitable Habitat	No Suitable Habitat
Brady pincushion cactus	<i>Pediocactus bradyi</i>	Endangered		X
Navajo sedge	<i>Carex specuicola</i>	Threatened		X
San Francisco Peaks groundsel	<i>Senecio franciscanus</i>	Threatened		X
Sentry milkvetch	<i>Astragalus cremnophylax v. cremnophylax</i>	Endangered		X
Siler pincushion cactus	<i>Pediocactus sileri</i>	Threatened		X
Welsh's milkweed	<i>Asclepias welshii</i>	Threatened		X
Fickeisen plains cactus	<i>Pediocactus peeblesianus v. fickeiseniae</i>	Candidate		X
Arizona bugbane	<i>Cimicifuga arizonica</i>	Conservation Agreement		X
Paradine (Kaibab) plains cactus	<i>Pediocactus paradinei</i>	Conservation Agreement		X

Table 3b. Region 3 Sensitive Plant Species that may occur on the south Kaibab NF

Common Name	Scientific Name	Possible Suitable Habitat	No Suitable Habitat
Mt. Dellenbaugh sandwort	<i>Arenaria aberrans</i>	X	
Gumbo milkvetch	<i>Astragalus ampullarius</i>		X
Marble Canyon milkvetch	<i>Astragalus cremnophylax v. hevronii</i>		X
Cliff milkvetch	<i>Astragalus cremnophylax v. myriorrhaphis</i>		X
Rusby's milkvetch	<i>Astragalus rusbyi</i>	X	
Kaibab paintbrush	<i>Castilleja kaibabensis</i>		X
Tusayan rabbitbrush	<i>Chrysothamnus molestus</i>	X	
Utah solitaire lily	<i>Eremocrinum albomarginatum</i>		X
Cliff fleabane	<i>Erigeron saxatilis</i>		X
Morton wild buckwheat	<i>Eriogonum mortonianum</i>		X
Flagstaff pennyroyal	<i>Hedeoma diffusum</i>		X
Kaibab bladderpod	<i>Lesquerella kaibabensis</i>		X
Mt. Trumbull beardtongue	<i>Penstemon distans</i>		X
Flagstaff beardtongue	<i>Penstemon nudiflorus</i>	X	
Grand Canyon rose	<i>Rosa stellata ssp. abyssa</i>		X

Appendix 4. Maps of the 4th, 5th, and sub-5 Code Watersheds

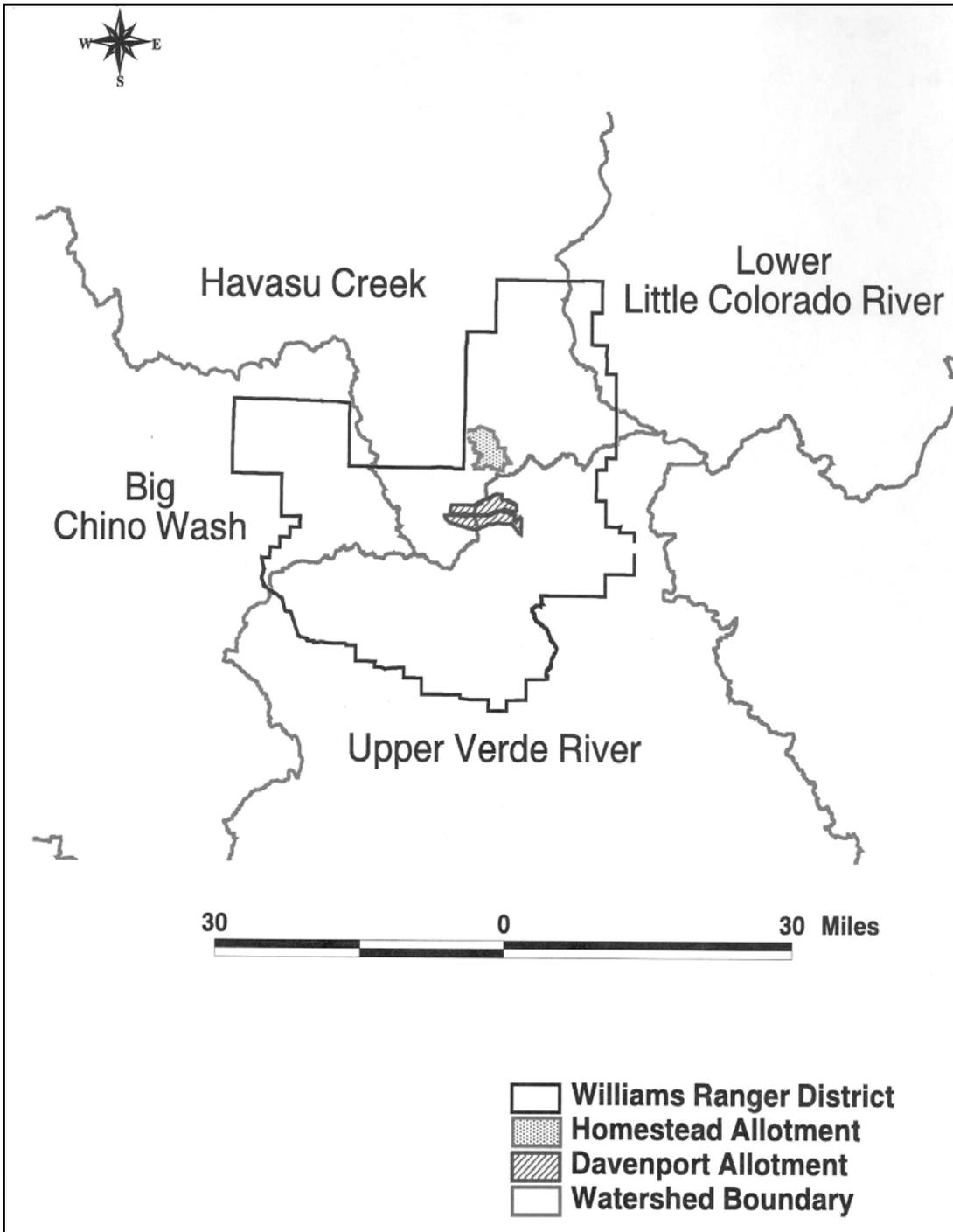


Figure 4a. 4th Code Watersheds Williams District, Kaibab National Forest

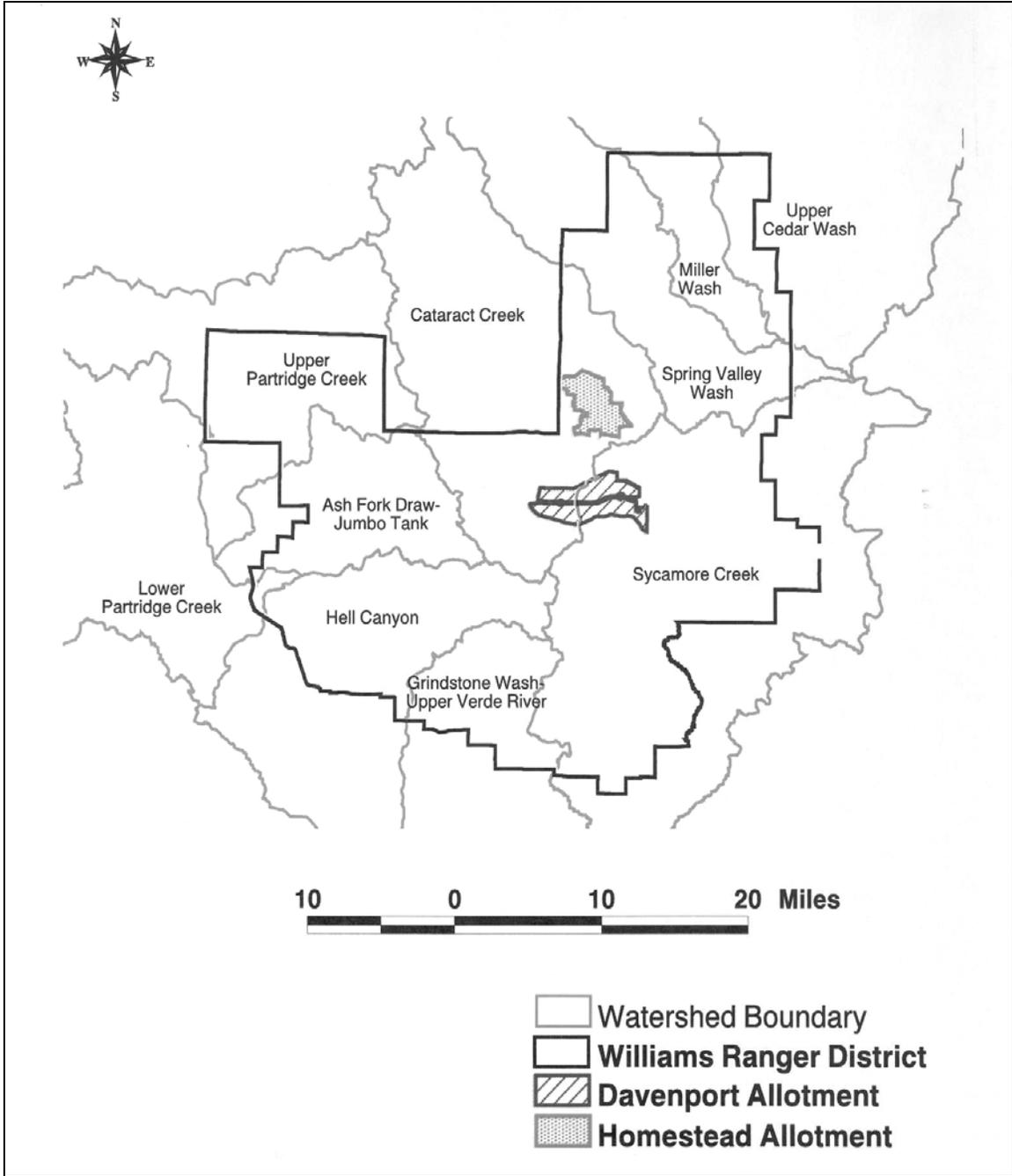


Figure 4b. 5th Code Watersheds, Williams District, Kaibab National Forest

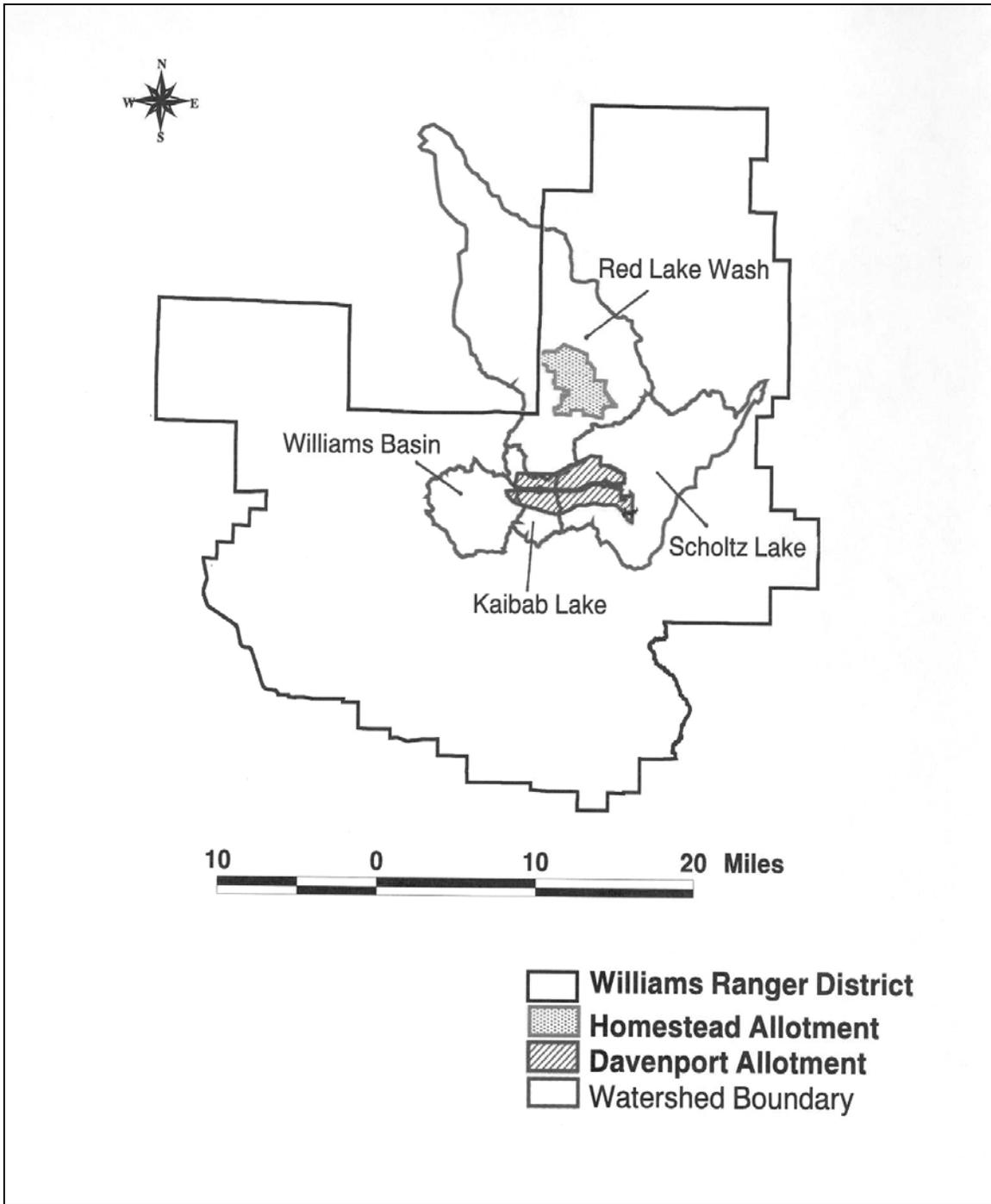


Figure 4c. Sub 5th Code Watersheds affected by the Homestead and Davenport Allotments, Williams District, Kaibab National Forest

Appendix 5. Maps of the Sheet and Rill Erosion Risk

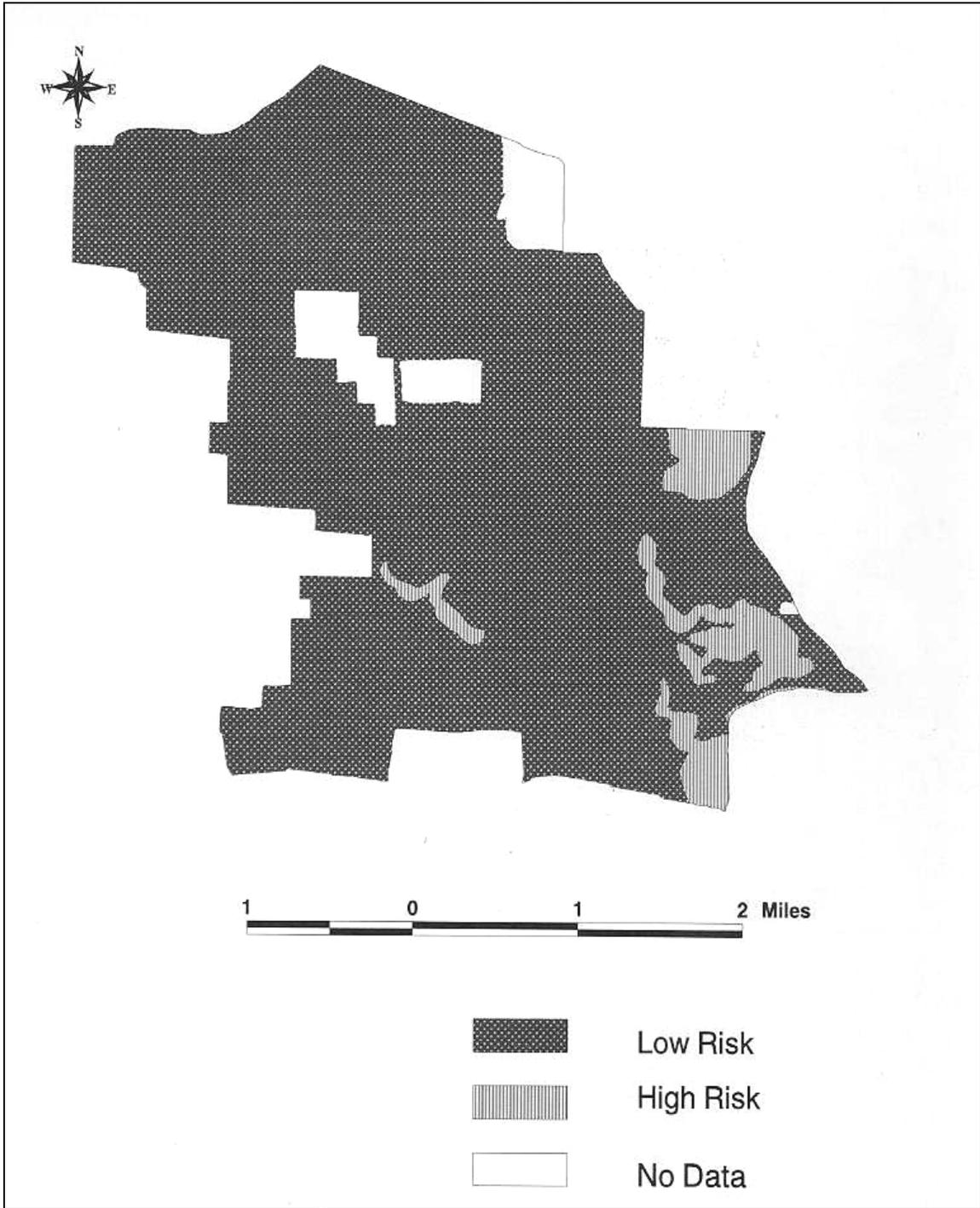


Figure 5a. Sheet and Rill Erosion Risk for the Homestead Allotment

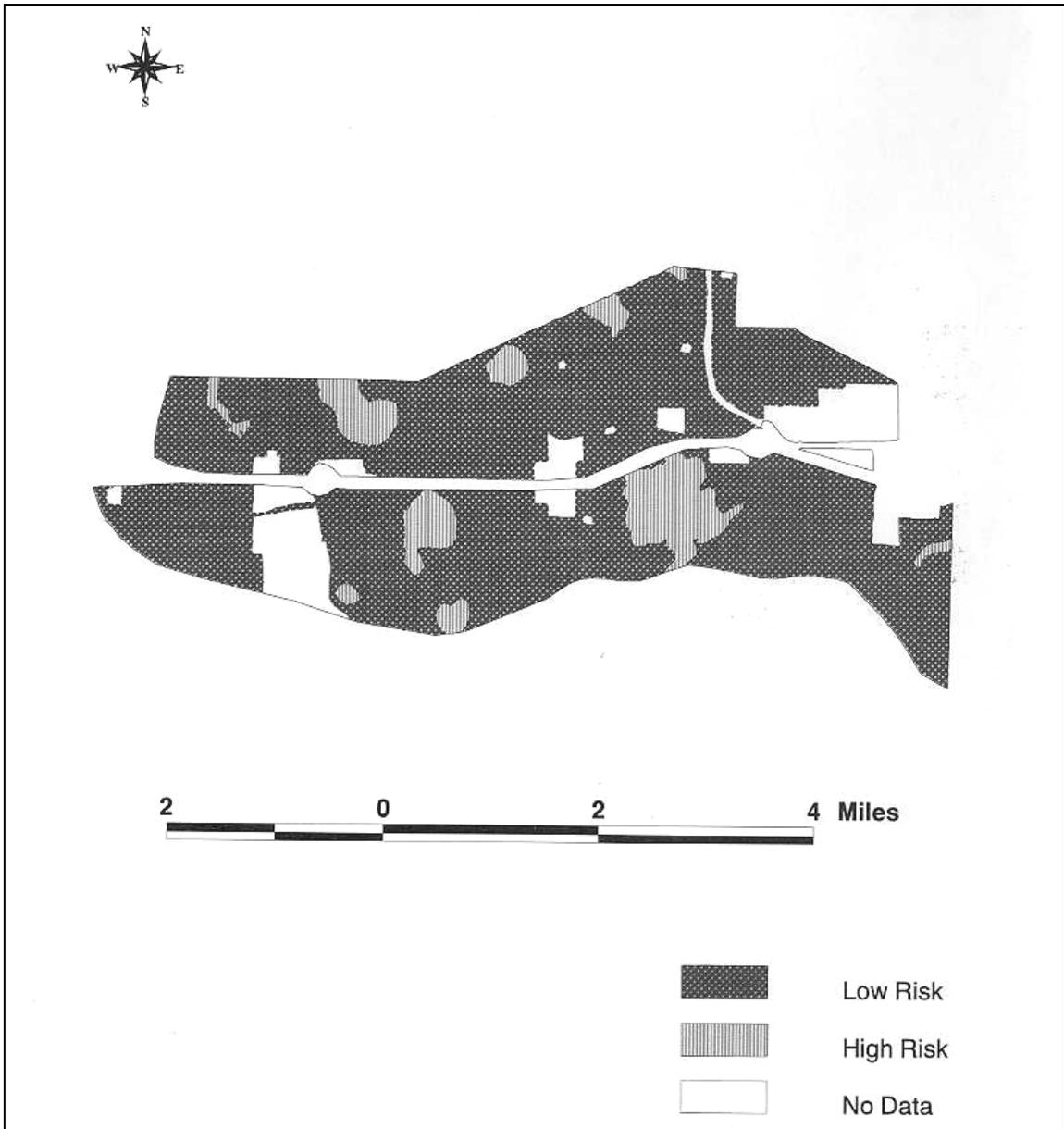


Figure 5b. Risk of Sheet and Rill Erosion Risk for the Davenport Allotment

Appendix 6. Table of Species Not Affected by the Alternatives

Common Name	Scientific Name	Status	Rationale
Amphibians			
Lowland Leopard Frog	<i>Rana yavapaiensis</i>	Sensitive	Range does not overlap – occurs below 5,500 feet elevation and is primarily found below 3,000 feet
Northern Leopard Frog	<i>Rana pipiens</i>	Sensitive	Not likely to occur within allotments - over 105 surveys at 52 different locations on the District since 1990, with only one known recent occurrence in the far southern portion of the District. Found in fresh-water ponds or streams that typically hold water year-round and have aquatic vegetation. A few tanks on the allotments hold water year-round, though they are generally depauperate of aquatic vegetation, providing only marginal potential habitat for this species.
Birds			
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Delisted, Sensitive	No impacts to habitat or population trends – nests on cliffs that would incur little to no use by livestock; forages on a variety of bird species, including doves, pigeons, shorebirds, waterfowl, and passerines, that use a variety of habitats, many of which would incur little to no use by livestock grazing.

Common Name	Scientific Name	Status	Rationale
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	No effect - breeding range does not overlap; no management activities (beyond livestock presence) within 0.25 miles of a bald eagle winter roost during any time of occupation by bald eagles; winter roost site habitat would not be affected by livestock grazing; little seasonal overlap of livestock grazing and winter occupation by bald eagles; opportunistic nature of bald eagle foraging and winter perching
Bendire's Thrasher	<i>Toxostoma bendirei</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – uses sagebrush and scattered junipers; no sagebrush occurs on either allotment and junipers would not be affected by livestock grazing
Black Swift	<i>Cypseloides niger</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – forages over forests and open areas and breeds in cliffs near waterfalls that do not occur within or near the allotments
Black-Throated Gray Warbler	<i>Dendroica nigrescens</i>	FWS Bird of Conservation Concern; AZ Partners in Flight Priority Bird Species of pinyon-juniper habitat	No impacts to habitat or population trends – uses pinyon pines and junipers that would not be affected by livestock grazing

Common Name	Scientific Name	Status	Rationale
California Condor	<i>Gymnogyps californianus</i>	Endangered, Experimental/Nonessential (Northern Arizona)	Range does not overlap – this experimental population occurs within the Vermillion Cliffs, Paria Plateau, and areas surrounding the Grand Canyon
Common Black Hawk	<i>Buteogallus anthracinus</i>	Sensitive	No potential habitat - occurs in lowland forest, especially cottonwoods, along rivers and streams
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	AZ Partners in Flight Priority Bird Species of pine habitat	No impacts to habitat or population trends – uses pine or aspen forests with substantial canopy cover that would not be affected by livestock grazing
Crissal Thrasher	<i>Toxostoma crissale</i>	FWS Bird of Conservation Concern	No potential habitat – occurs in chaparral habitat
Flammulated Owl	<i>Otus flammeolus</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – uses mature montane forest, usually with an open canopy with yellow pine, brush, and saplings and often on ridges and upper slopes that would not be affected by livestock grazing
Gunnison Sage Grouse	<i>Centrocercus minimus</i>	Candidate; Sensitive; FWS Bird of Conservation Concern	Range does not overlap – now restricted to western Colorado and eastern Utah
Grace's Warbler	<i>Dendroica graciae</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – uses ponderosa pine and Gambel oak trees that would not be affected by livestock grazing

Common Name	Scientific Name	Status	Rationale
Gray Flycatcher	<i>Empidonax wrightii</i>	AZ Partners in Flight Priority Bird Species of pinyon-juniper habitat	No impacts to habitat or population trends – ponderosa pine, pinyon pine, and juniper trees that would not be affected by livestock grazing
Gray Vireo	<i>Vireo vicinior</i>	FWS Bird of Conservation Concern; AZ Partners in Flight Priority Bird Species of pinyon-juniper habitat	No impacts to habitat or population trends – uses shrubby vegetation and junipers that would not be affected by livestock grazing
Hairy Woodpecker	<i>Picoides villosus</i>	MIS of snag habitat in ponderosa pine, mixed conifer, and spruce fir	No impacts to habitat or population trends – uses snags in ponderosa pine, mixed conifer, and spruce fir forests that would not be affected by livestock grazing
Juniper Titmouse	<i>Baeolophus griseus</i>	AZ Partners in Flight Priority Bird Species of pinyon-juniper habitat	No impacts to habitat or population trends – uses tall, moderately dense junipers that would not be affected by livestock grazing
Lewis' Woodpecker	<i>Melanerpes lewis</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – uses old growth ponderosa pine, Gambel oak, or pinyon-pine trees or snags that would not be affected by livestock grazing
Lucy's Warbler	<i>Vermivora luciae</i>	MIS of late seral, low elevation (<7,000 feet) riparian habitat	No potential habitat – occurs in riparian cottonwood and willow habitat in mountain foothills and desert riparian mesquite

Common Name	Scientific Name	Status	Rationale
Marbled Godwit	<i>Limosa fedoa</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – transient in flooded plains or open shallow water along shorelines; no livestock use of ephemeral Davenport Lake when it is wet
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened; Proposed Critical Habitat	There are 667 acres of Mexican spotted owl restricted pine-oak habitat within the Davenport Allotment. This habitat is on steep upper slopes, where little to no livestock use occurs. No proposed critical habitat exists within the allotments. USDI Fish and Wildlife Service concurrence with a not-likely-to-adversely-affect determination for the Proposed Action was received for this species on February 26, 2003.
Mountain Plover	<i>Charadrius montanus</i>	Proposed Threatened; FWS Bird of Conservation Concern	Breeding and wintering ranges do not overlap – breeding range borders eastern AZ; winter range includes southern AZ
Olive-Sided Flycatcher	<i>Contopus borealis</i>	AZ Partners in Flight Priority Bird Species of mixed conifer and pine habitats	No impacts to habitat or population trends – uses high-elevation ponderosa pine trees that would not be affected by livestock grazing

Common Name	Scientific Name	Status	Rationale
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	FWS Bird of Conservation Concern; AZ Partners in Flight Priority Bird Species of pinyon-juniper habitat	No impacts to habitat or population trends – uses pinyon pines, junipers, ponderosa pines, and oak trees that would not be affected by livestock grazing
Purple Martin	<i>Progne subis Linnaeus</i>	AZ Partners in Flight Priority Bird Species of pine habitat	No impacts to habitat or population trends – uses snags that would not be affected by livestock grazing
Pygmy Nuthatch	<i>Sitta pygmaea</i>	MIS of late seral ponderosa pine	No impacts to habitat or population trends – uses late seral ponderosa pine snags that would not be affected by livestock grazing
Red Naped (Yellow Bellied) Sapsucker	<i>Sphyrapicus nuchalis</i>	MIS of late seral aspen and snags in aspen	No impacts to habitat or population trends – uses snags in late seral aspen forests that would not be affected by livestock grazing. Very little to no aspen habitat on the Davenport Allotment; no habitat on the Homestead Allotment
Sage Sparrow	<i>Amphispiza belli</i>	FWS Bird of Conservation Concern	No potential habitat – occurs in sagebrush and associated habitats
Short-Eared Owl	<i>Asio flammeus</i>	FWS Bird of Conservation Concern	No potential habitat - occurs in fresh or saltwater marshes, bogs, dunes, or tundra

Common Name	Scientific Name	Status	Rationale
Snowy Plover	<i>Charadrius alexandrinus</i>	Coastal Subspecies Threatened; FWS Bird of Conservation Concern	No impacts to habitat or population trends - does not breed or winter within allotments; possible transient on lakes and ponds; no livestock use of ephemeral Davenport Lake when it is wet
Solitary Sandpiper	<i>Tringa solitaria</i>	FWS Bird of Conservation Concern	Breeding and wintering ranges do not overlap – does not breed or winter within Arizona
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Endangered	No potential habitat – occurs along rivers, streams, and other wetlands with dense riparian vegetation
Sprague's Pipit	<i>Anthus spragueii</i>	FWS Bird of Conservation Concern	Breeding and wintering ranges do not overlap – does not breed in Arizona; winters in southern Arizona
Virginia's Warbler	<i>Vermivora virginiae</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – uses ponderosa pine, Gambel oak, pinyon pine, and juniper trees that would not be affected by livestock grazing
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – uses aspen or ponderosa pine trees that would not be affected by livestock grazing

Common Name	Scientific Name	Status	Rationale
Wilson's Phalarope	<i>Phalaropus tricolor</i>	FWS Bird of Conservation Concern	No impacts to habitat or population trends – does not breed or winter within allotments; possible transient on lakes and ponds; no livestock use of ephemeral Davenport Lake when it is wet
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	Candidate, Warranted but Precluded; Sensitive; FWS Bird of Conservation Concern	No potential habitat – occurs in large blocks of riparian woodlands (cottonwood, willow, or tamarisk)
Yellow Breasted Chat	<i>Icteria virens</i>	MIS of late seral, low elevation (<7,000 feet) riparian habitat	No potential habitat – occurs in riparian associated dense shrubby habitat
Yuma Rufous-Crowned Sparrow	<i>Aimophila ruficeps rupicola</i>	Sensitive	No impacts to habitat or population trends – uses pinyon pine and juniper trees that would not be affected by livestock grazing

Fish

Apache (Arizona) Trout	<i>Oncorhynchus apache</i>	Threatened	Range does not overlap and no potential habitat – restricted to perennial streams of upper Salt, Blue, and Little Colorado drainages and introduced to North Canyon and Grant Creek
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Common Name	Scientific Name	Status	Rationale
Little Colorado Spinedace	<i>Lepidomeda vittata</i>	Threatened	Range does not overlap and no potential habitat – occurs in north-flowing tributaries of the Little Colorado River with slow to moderate water currents
Spikedace	<i>Meda fulgida</i>	Threatened, Critical Habitat	No potential habitat – occurs in moderate to large perennial streams with moderate to swift water velocities. No effects to Critical Habitat Complex 1 (Verde River) owing to the large distance (approximately 35 miles) of the Complex to the Davenport Allotment; the Homestead Allotment is within a different watershed and further distance.

Invertebrates

A Tiger Beetle	<i>Amglycheila picolominii</i>	Sensitive	No impacts to habitat or population trends – not known to occur within the allotments; uses bare rock, talus, and scree that would not be affected by livestock grazing
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Common Name	Scientific Name	Status	Rationale
A Tiger Beetle	<i>Cicindela purpurea cimarrona</i>	Sensitive	No impacts to habitat or population trends likely – not known to occur within the allotments; family uses open, sunny situations, especially dry paths, fields, and sandy areas; potential balance in positive (e.g., promoting open situations and dry paths) and negative effects (e.g., trampling of larval burrows) to individuals
Antioch Potter Wasp	<i>Microdynerus arenicolus</i>	Sensitive	No impacts to habitat or population trends – not known to occur within the allotments; subfamily uses burrows, cavities in twigs or logs, or abandoned nests of other wasps that are not likely to be affected by livestock grazing
Aquatic Macroinvertebrates	<i>Several species – Mayflies, Stoneflies, Caddisflies</i>	MIS of late seral riparian habitats	No impacts to habitat or population trends – represented habitat of healthy, aerated streams does not exist within the allotments; individuals may occur along-side tanks or in ephemeral Davenport Lake while it is wet, however, populations of these species do not likely exist within the allotments, owing to the lack of stream habitat

Common Name	Scientific Name	Status	Rationale
Arizona Giant Sand Treader Cricket	<i>Daihinibaenetes arizonensis</i>	Sensitive	Not likely to occur on allotments – only two records exist from Apache County in high desert plateau
Arizona Snaketail	<i>Ophiogomphus arizonicus</i>	Sensitive	No potential habitat – occurs along the sides of perennial streams
Aryxna Giant Skipper	<i>Agathymus aryxna</i>	Sensitive	No potential habitat and host range does not overlap – occurs in southern Arizona canyons with its host plant, <i>Agave palmeri</i>
Freeman’s Agave Borer	<i>Agathymus baueri freemani</i>	Sensitive	No potential habitat and host range does not overlap – occurs in south central Arizona canyons with its host plant, <i>Agave chrysantha</i>
Mountain Silverspot Butterfly	<i>Speyeria Nokomis nitocris</i>	Sensitive	No potential habitat – occurs in open seepage areas, which do not exist within the allotments
Navajo Jerusalem Cricket	<i>Stenopelmatus navajo</i>	Sensitive	No impacts to habitat or population trends – not known to occur within the allotment; occurs on hillsides under rocks that are not likely to be affected by livestock grazing
Neumogen’s Giant Skipper	<i>Agathymus neumogeni</i>	Sensitive	No likely habitat – uses dry, open woodlands or shrublands with <i>Agave parryi</i>
Obsolete Viceroy Butterfly	<i>Limenitis archippus obsoleta</i>	Sensitive	No potential habitat – occurs in riparian canyons and desert arroyos

Common Name	Scientific Name	Status	Rationale
Spotted Skipperling	<i>Piruna polingii</i>	Sensitive	No potential habitat – occurs in moist meadows in coniferous and mixed woodlands; which do not occur on the allotments

Mammals

Allen's Lappet-Browed Bat	<i>Idionycteris phyllotis</i>	Local Concern	No impacts to habitat or population trends – uses ponderosa pine snags and trees that would not be affected by livestock grazing
Black-Footed Ferret	<i>Mustela nigripes</i>	Endangered	No potential habitat – one female ferret and her litter are estimated to require approximately 598 acres of Gunnison's prairie dog habitat; no Gunnison's prairie dog towns greater than 200 acres exist within the allotments
Cactus Mouse	<i>Peromyscus eremicus papagensis</i>	Sensitive	No impacts to habitat or population trends – occurs on bare rock/talus/scree substrates in oak woodland that would incur little use by livestock
Desert Bighorn Sheep	<i>Ovis canadensis mexicana</i>	Sensitive	Current range does not overlap – occurs within the Grand Canyon area and the southern portion of the state

Common Name	Scientific Name	Status	Rationale
Mexican Gray Wolf	<i>Canis lupus baileyi</i>	Endangered	Range does not overlap – formally occurred in SE AZ and possibly central Arizona in Upper Sonoran woodlands and grasslands; an experimental/non-essential population has been introduced to the Blue Primitive Area of Greenlee and Apache counties
Mule Deer	<i>Odocoileus hemionus</i>	MIS	No impacts to habitat or population trends – forage items mostly consist of woody browse, with less than 5% grasses in their diet; woody browse occurs on steeper slopes on the allotments, which would not be affected by livestock grazing; deer prefer upper slopes, ridgetops, and steep slopes greater than 30% while livestock prefer lower finger ridges, lower slopes, and slopes less than 30% (Salas and Crocker-Bedford 1986)
Spotted Bat	<i>Euderma maculatum</i>	Local Concern	No impacts to habitat or population trends – roosts in caves and rock crevices near water that do not occur within the allotments; forages in open ponderosa pine forest that is not likely to be affected by the alternatives

Common Name	Scientific Name	Status	Rationale
Tassel Eared (Abert's) Squirrel	<i>Sciurus aberti</i>	MIS of early seral ponderosa pine	No impacts to habitat or population trends – uses early seral ponderosa pine forest that would not be affected by livestock grazing
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii townsendii</i>	Local Concern	No impacts to habitat or population trends – roosts in coniferous forests and tree cavities that would not be affected by livestock grazing
Western Red Bat	<i>Lasiurus blossevillii</i>	Local Concern	No potential habitat - occurs in riparian habitat with cottonwoods, oaks, and sycamores
Wupatki Arizona Pocket Mouse	<i>Perognathus amplus cineris</i>	Sensitive	No potential habitat – occurs in desert scrub habitats

Reptiles

Arizona Night Lizard	<i>Xantusia vigilis arizonae</i>	Sensitive	No potential habitat – occurs in granite outcrops
Narrow-Headed Garter Snake	<i>Thamnophis rufipunctatus</i>	Sensitive	No potential habitat – occurs in or next to perennial rocky streams

Snails

Brown Springsnail	<i>Pyrgulopsis sola</i>	Sensitive	Range not likely to overlap – found in the Lower Verde Watershed in Yavapai County; the <i>Pyrgulopsis</i> genus tends to be highly endemic
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Common Name	Scientific Name	Status	Rationale
Cumming's Mountainsnail	<i>Oreohelix yavapai cummingsi</i>	Sensitive	Range not likely to overlap – most records from New Mexico, northeast of Santa Fe; very rare in Arizona
Desert Springsnail	<i>Pyrgulopsis deserta</i>	Sensitive	Range not likely to overlap – found in the Upper and Lower Virgin River watersheds in Mohave County, Arizona and Washington County, Utah; the <i>Pyrgulopsis</i> genus tends to be highly endemic
Fossil Springsnail	<i>Pyrgulopsis simplex</i>	Sensitive	Range not likely to overlap – found in the Lower Verde Watershed in Yavapai and Gila counties; the <i>Pyrgulopsis</i> genus tends to be highly endemic
Grand Wash Springsnail	<i>Pyrgulopsis bacchus</i>	Sensitive	Range not likely to overlap – found in the Grand Wash Watershed, Mohave County; the <i>Pyrgulopsis</i> genus tends to be highly endemic
Kingman Springsnail	<i>Pyrgulopsis conica</i>	Sensitive	Range not likely to overlap – found in the Havasu-Mohave Lakes and Sacramento Wash watersheds in Mohave County; the <i>Pyrgulopsis</i> genus tends to be highly endemic

Common Name	Scientific Name	Status	Rationale
Montezuma Well Springsnail	<i>Pyrgulopsis montezumensis</i>	Sensitive	No potential habitat and range not likely to overlap – occurs in perennial springs and spring brooks; benthic; found in the Upper Verde Watershed in Yavapai County; the <i>Pyrgulopsis</i> genus tends to be highly endemic
Niobrara Ambersnail	<i>Oxyloma haydeni haydeni</i>	Sensitive	No potential habitat – occurs in perennial riverside springs with wetland vegetation
Verde Rim Springsnail	<i>Pyrgulopsis glandulosa</i>	Sensitive	Range not likely to overlap – found in the Agua Fria Watershed in Yavapai County; the <i>Pyrgulopsis</i> genus tends to be highly endemic

Appendix 7. Applicable Range and Watershed Best Management Practices (Forest Service Handbook 2509.22, parts 22 and 25)

22 - RANGE MANAGEMENT.

The use of National Forest System (NFS) lands for grazing in the Southwestern Region generally predates the establishment of individual Forests. Grazing continues as a recognized tool for vegetation management on NFS lands and is considered a compatible use of public lands. Designated ranges are managed to accommodate grazing along with other uses. NFS rangelands are divided into allotments for administration. Allotments are used by rancher permittees who pay a mandated fee for each month of use for each animal (and its 6 month or older offspring).

Range vegetation management involves such activities as range analysis, allotment management planning and improvement, and a grazing permit system. It includes controlling overall livestock numbers, season of use, livestock distribution, constructing structural and non-structural improvements, maintaining or enhancing diverse landscapes for the benefit of the overall biological aspects of the ecosystem including fish and wildlife and other resources, and restoration of deteriorated rangelands. The actual physical activities include grazing, trampling, ponding, salting, fencing, sediment traps, fuelwooding, prescribed burning, using herbicides, site preparation, seeding, and other activities associated with forage establishment. Livestock can be an effective tool in managing vegetation.

Successful range vegetation management is measured by the results on-the-ground through production utilization surveys (range inspections) and compared to the environmental protection attainment identified and addressed in range analyzes and allotment plans made by interdisciplinary teams through the IRM process.

Water and soil management concerns can be effectively included into the Range Management Planning Process when the Allotment Management Plan is written or revised. Allotment planning is accomplished using the Region's IRM process and must be consistent with the Forest's Land Management Plan.

22.1 - Range Analysis, Allotment Management Plan, Grazing Permit System, and Permittee Operating Plan.

1. Objective. To manage rangelands through IRM and ensure they are meeting Forest Land Management Plan objectives.
2. Explanation. An analysis of a potential and/or existing grazing area is conducted by an interdisciplinary team to evaluate its productive capabilities, inherent hazards, resource values, and uses for the purpose of meeting Forest Land Management Plan objectives. Following this analysis the Forest Service, in cooperation with the permittee, prepares a written allotment management plan and authorizes livestock grazing as per stipulations in the management plan. These documents include measures to protect other resource values, such as water quality, riparian area resource management, and to coordinate livestock grazing with other resource uses. Specific methods for controlling when, where, amount of utilization, and numbers of livestock to be grazed are covered in the plan. Also included are needed rangeland improvements, monitoring methods, and an implementation schedule.

A permittee operating plan is prepared, reviewed, and revised annually to reflect direction in the allotment management plan.

The amount of livestock use is determined primarily through measurement of vegetative utilization.

Allowable use is set to meet the objectives of the Forest Land Management Plan. The maintenance of soil productivity and stability is considered in determining allowable use.

3. Implementation. The District Ranger is responsible for analysis of range allotments, completion of environmental assessment reports, preparation of management plans, and processing of grazing applications. The Forest Supervisor or District Ranger approves management plans and issues grazing permits with stipulations and conditions. Most permits are issued for 10 year terms. Revise allotment management plans as needed to meet the Forest Land Management Plan objectives. Annually prepare a operating plan with the permittee to allow for current allotment conditions. The permittee carries out the plans under the immediate direction and review of the District Ranger. Take corrective action if a permittee does not comply with grazing permit conditions designed to protect soil and water resources.

22.11 - Controlling Livestock Numbers and Season of Use.

1. Objective. Safeguard water and soil resources under sustained forage production. Managed forage utilization by livestock to maintain healthy ecosystems for all resource objectives.

2. Explanation. In addition to proper stocking rate and season of use specified in the grazing permit, periodic field checks are made to identify needed adjustments in season and livestock numbers. Checks include:

- a. Range readiness evaluations to assure that the soil is not too wet and that sufficient forage growth has occurred.
- b. Stock counts to assure that only permitted livestock enter the allotment.
- c. Forage utilization measurements to provide data, for grazing use pattern, improved livestock distribution, and stocking.
- d. Assessment of rangeland to verify soil and vegetative condition and trend.
- e. Assessment of streambanks to assure banks are not being degraded and contributing sediment to water courses.

When standards for allowable utilization are established they are incorporated into the allotment management plan.

3. Implementation. Allotments are administered by the District Ranger. Provisions are carried out by the grazing permittee as permit requirements. Field check and measurements are made periodically by the Forest Service. Livestock numbers and seasons of use may be changed annually to reflect current year's climatic condition.

22.12 - Controlling Livestock Distribution.

1. Objective. To manage sustained forage production and forage utilization by livestock while protecting soil and water resources. Maintaining healthy ecosystems for wildlife and other resources.

2. Explanation. Livestock use within allotments is typically not uniform due to variations in topography, water availability, vegetation type and condition. Several techniques are used to achieve proper distribution, or lessen the impact on areas which are sensitive or which would naturally be overused. These techniques include:

- a. Construction of fences, and implementation of seasonal or pasture systems of management.
- b. Water development in areas that receive little use and closing off water developments when proper use has been achieved.
- c. Riding and herding to shift livestock locations.
- d. Using salt or supplement feed as tools to gain proper distribution of livestock.
- e. Range improvements, prescribed burning, trail construction, or seeding.
- f. Prevention of intensive livestock grazing or concentrated livestock use on soils that have low bearing strength and are wet.

Open herding, limiting trailing, and use of new bed grounds are additional techniques used for sheep. Developing sufficient watering places is one way to limit the amount of trailing. Livestock distribution needs are determined through evaluations of range conditions and trends, including watershed condition assessments and utilization studies.

3. Implementation. Livestock distribution practices are carried out by the permittee under the direction and review of the District Ranger. Direction is incorporated in the allotment management plan and the annual operating plan, which are integral parts of the grazing permit and provides current Forest Service instructions. The instructions reflect current allotment conditions and vegetative trends.

22.13 - Rangeland Improvements.

1. Objective. To improve, maintain or restore range resources, including soil and water through the use of rangeland improvements.

2. Explanation. Rangeland improvements are intended to enhance forage quality, quantity, and/or availability, and to provide protection to the other resources. Building fences to control the movement of livestock, improve watershed condition, and develop watering sites are just a few of the types of rangeland improvements implemented by the permittee or Forest Service as identified in the allotment plan. If a structure is causing soil erosion or water quality degradation the allotment plan will identify it and state corrective measures. Other measures may include stream channel stabilization efforts such as riprapping, gully plugging, and planting; or mechanical treatments such as pitting, chiseling, or furrowing. Reseeding and/or fertilization may be done alone or in conjunction with any of these measures.

3. Implementation. The permittee is involved as a cooperator in rangeland improvements and may actually complete the work under Forest Service direction. Implementation may also be done by Forest Service crews or contractors. Range improvement needs are recognized in the range allotment planning process and are scheduled for implementation in the allotment plan and the 10-Year Forest Plan Implementation Schedule.

22.14 - Determining Grazing Capability of Lands.

1. Objective. To maintain or improve soil stability, soil productivity, and water quality by grazing the land within its capability.
2. Explanation. This practice is an administrative and preventative control. Soil condition classes, based on the relationship of current and natural soil loss tolerances, are used to determine grazing capability. Only land with soils in stable condition are considered as "full capability" range. Grazing capability ratings are then used in conjunction with other grazing considerations to determine the actual grazing capacity of an area.
3. Implementation. Soil condition class is determined by qualified soil scientists using Terrestrial Ecosystem Survey (TES). A range conservationist will use the soil condition class in determining the grazing capacity.

25 - WATERSHED MANAGEMENT.

The objective of watershed management is to protect watersheds by implementing practices designed to retain soil stability, improve or maintain site productivity, secure favorable conditions of water flow, and preserve or enhance aquatic values. The watershed management program is oriented towards maintenance or improvement of watershed conditions, restoration of National Forests lands damaged by catastrophic events or degraded by past use, and monitoring of soil and water quality.

25.12 - Protection of Wetlands and Riparian Areas.

1. Objective. To avoid adverse impacts, including impacts to water quality, associated with disturbance or modification of wetlands.
2. Explanation. The Forest Service recognizes the beneficial values of wetlands, and will, in accordance with Executive Order 11990 of May 24, 1977, take action to minimize destruction, loss, or degradation of wetlands.
3. Implementation. During project planning, all potentially impacted wetlands are mapped. Wetland values are considered and evaluated as an integral part of the project planning process. Mitigating measures are incorporated into project plans and designs to maintain the hydrologic and biologic function of the wetlands.

25.14 - Control of Activities Under Special Use Permit.

1. Objective. To protect surface and subsurface water quality from physical, chemical, and biological pollutants resulting from activities that are under special use permit.
2. Explanation. Many activities and uses take place on National Forest System (NFS) lands which are not directly related to Forest Service management activities. Some examples are: electronic sites, highway and railroad rights-of-way, wastewater treatment and disposal, solid waste disposal, and power transmission lines. There are other uses which are recognized Forest Service land management activities which are achieved through permits to a public or private

agency, group, or individual. Examples of these types of uses are; organization camps, recreation residence tracts, and ski areas.

Activities on lands withdrawn under Federal Energy Regulatory Commission (FERC) authority may be exempt from Forest Service control. When the FERC permit is renewed, the Forest Service makes a complete restudy of water quality and quantity impacts and updates the constraints with which the permittee must operate. (FSM 2726.11)

3. Implementation. The special use permit under which agencies, groups, or individuals operate, shall detail the conditions they must meet to continue operating including measures necessary to comply with state and Federal water quality standards. The permittees shall conform to all applicable State and Local regulations governing water quality and sanitation. The regulations may in turn require the permittee to obtain a waste discharge permit from the state. Failure on the part of the permittee to meet the conditions of the special use permit may result in the permit being revoked.

25.2 - Evaluation of Cumulative Watershed Condition Effects.

1. Objective. To protect the beneficial uses of water from adverse effects of multiple land management activities.

2. Explanation. Watershed condition is a description of the health of a watershed in terms of water quality, quantity, and timing. Many management activities have an effect, either positive or negative, on watershed condition. Usually the effects of management activities are temporary, or declining in magnitude over time. Natural events may also have a positive or negative effect on watershed condition.

The ability and rate of a watershed to recover from negative effects is determined primarily by climate and soil. Each watershed has some tolerance for negative effects. When this tolerance is exceeded, permanent impairment to the watershed may result. Measures of groundcover, estimates of erosion, road density, water yield or macro-invertebrate diversity, can be used as indicators of the management effects on watershed condition. These indicators can also be used to set watershed tolerances. When a watershed tolerance will be exceeded by a proposed activity, managers will consider changing the activity, changing the activity schedule, or employing mitigative measures to reduce the effects.

3. Implementation. Conduct the cumulative watershed condition effects evaluation as part of the IRM process.

25.21 - Soil Quality Monitoring.

1. Objective. To assure that management practices do not allow significant or permanent impairment of the productivity of the land.

2. Explanation. Soil quality monitoring is used to evaluate the effects of management activities on soil productivity, and determine if soil management objectives have been achieved. Monitoring can be implementation, effectiveness, or validation types of monitoring.

3. Implementation. Soil scientists and other trained personnel routinely conduct implementation monitoring. Additional effectiveness or validation monitoring may be identified through the IRM Process, in which case a complete Soil quality monitoring plan will be prepared by the soil scientist or other trained Forest personnel.

**Appendix 7. Noxious and Invasive Weed Strategic Plan, Working Guidelines
Relating to Range Management**

Objective	Best Known Practice
Range Management	Grazing
<p>RM-1) Consider noxious weed prevention and control practices in the management of grazing allotments.</p>	<p>1.1) Include weed prevention practices, inspection and reporting direction, and provisions for inspection of livestock concentration areas in allotment management plans and annual operating instructions for active grazing allotments.</p> <p>1.2) For each grazing allotment containing existing weed infestations, include prevention practices focused on preventing weed spread and cooperative management of weeds in the annual operating instructions. Prevention practices may include, but are not limited to:</p> <ul style="list-style-type: none"> ▪ Maintaining healthy vegetation ▪ Preventing weed seed transportation ▪ Minimize potential ground disturbance - Altering season of use or Exclusion ▪ Weed control methods ▪ Revegetation ▪ Inspection and Monitoring ▪ Reporting ▪ Education
<p>RM-2) Minimize transport of weed seed into and within allotments.</p>	<p>2.1) If livestock are potentially a contributing factor to seed spread, schedule units with existing weed infestations to be treated prior to seed-set before allowing livestock on those units. Schedule these infested units to be the last in the rotation.</p> <p>2.2) If livestock were transported from a weed-infested area, corral livestock with weed free feed, and annually inspect and treat allotment entry units for new weed infestations.</p> <p>2.3) Designate pastures as unsuitable range to livestock grazing when infested to the degree that livestock grazing will continue to either exacerbate the condition on site or contribute to weed seed spread.</p>
<p>RM-3) Maintain healthy, desirable vegetation that is resistant to weed establishment.</p>	<p>3.1) Through the allotment management plan or annual operating instructions, manage the timing, intensity (utilization), duration, and frequency of livestock activities associated with harvest of forage and browse resources to maintain the vigor of desirable plant species and retain live plant cover and litter.</p> <p>3.2) Manage livestock grazing on restoration areas to ensure that vegetation is well established. This may involve exclusion for a period of time consistent with site objectives and conditions. Consider practices to minimize wildlife grazing on the areas if needed.</p>

<p>RM-4) Minimize ground disturbance.</p>	<p>4.1) Include weed prevention practices that reduce ground disturbance in allotment management plans and annual operating instructions. Consider for example: changes in the timing, intensity, duration, or frequency of livestock use; location and changes in salt grounds; restoration or protection of watering sites; and restoration of yarding/loafing areas, corrals, and other areas of concentrated livestock use.</p> <p>4.2) Inspect known areas of concentrated livestock use for weed invasion. Inventory and manage new infestations.</p>
<p>RM-5) Promote weed awareness and prevention efforts among range permittees.</p>	<p>5.1) Use education programs or annual operating instructions to increase weed awareness and prevent weed spread associated with permittees' livestock management practices.</p> <p>5.2) To aid in their participation in allotment weed control programs encourage permittees to become certified pesticide use applicators.</p>