BIOLOGICAL ASSESSMENT AND EVALUATION
Anita, Cameron, and Moqui Allotments
Tusayan Ranger District
Kaibab National Forest
USDA Forest Service
Coconino County, Arizona

PREFERRED ALTERNATIVE

The preferred alternative is Alternative 1 as described in the Environmental Assessment (EA). The Anita, Cameron, and Moqui Allotments consist of approximately 260,415 acres in the Tusayan Ranger District of the Kaibab National Forest, Coconino County, Arizona. The District Ranger of the Tusayan Ranger District of the Kaibab National Forest is the responsible official.

AFFECTED ENVIRONMENT

The rangeland environment within the Anita, Cameron, and Moqui 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. There are also pockets of sagebrush found along drainage bottoms and other grassland and shrubland areas scattered across the three allotments. There are no wetlands, perennial streams, or riparian zones within the allotments.

For some threatened, endangered, and sensitive species addressed, habitat does not exist within the allotments, their range does not overlap with the allotments, and/or Alternative 1 would result in no impacts to their habitat or population trends (see Appendix 1 for species and rationale). These species will not be discussed further in this document.

SPECIES IDENTIFICATION

FEDERALLY LISTED SPECIES

No federally listed species will be affected by the Proposed Action (see Appendix 1 for species and rationale).

Sensitive Species - Chihuahua savannah sparrow, Navajo Mountain Mexican vole, northern goshawk, Mojave giant skipper.

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).

Navajo Mountain Mexican voles prefer ponderosa-pine or pinyon-juniper savannah with dense carpets of herbaceous or woody shrub cover. Dense grassy and woody shrub areas may occur along the drainages and Coconino Rim on the allotments. Voles typically eat green shoots, leaves, stems, seeds, herbaceous vegetation, and grasses.

Northern goshawks have seven delineated nest areas and 2,813 acres of post-fledging family area (PFA) within the allotments. All three 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. Trends in shrub cover by some shrub species, including big sagebrush (*Artemesia tridentata*) and rabbitbrush (*Chrysothamnus spp.*), have likely increased on the allotments due to historical absence of fire and heavy livestock grazing.

The **Mojave giant skipper** has some small to moderate chance of occurring on the allotments based upon limited available information. This species is known to occur in Coconino County. The Mojave giant skipper uses open pine woodland canyons and desert with *Agave utahensis*, which may occur in some drainages and dryer rims on the allotments. The current condition of *Agave* habitat within the allotments is unknown, though if livestock affect the reproductive capabilities and/or availability of *Agave*, then the condition of *Agave* habitat is likely stable to slightly decreasing.

EFFECTS

Grassland and Shrubland Species

Alternative 1 would increase forage and grass cover within grasslands and shrublands on all three allotments for the following species or their prey: Chihuahua savannah sparrow, Navajo Mountain Mexican vole, and northern goshawk. These increases in forage and grass cover would occur because, Alternative 1 would reduce livestock numbers and season of use. This alternative would, therefore, result in slight increases in habitat trends for these species on the allotments. Increased forage and grass cover would improve foraging success or survival of individuals of these species within the allotments. Herbaceous vegetation height, which is likely correlated with grass cover is an important determinant of the presence of the Navajo Mountain Mexican vole.

Under the proposed action, population trends of the Navajo Mountain Mexican vole would increase slightly on the three allotments. Slight changes in population trends for this 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.

No other species would incur changes in population trends under the alternatives. Chihuahua savannah sparrow population trends are not likely to be affected because this species may only be 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.

Shrubland Species

Cattle may forage on young, reproductive *Agave* stalks, which could preclude these plants from flowering. Flowering occurs between May-July for *A. utahensis*, which includes the period during which cattle would be on the allotments under the grazing alternatives. Because *Agave* are semalparous or monocarpic, flowering only once and then dying, seemingly subtle effects from livestock foraging on flowers could have large impacts to *Agave* reproduction and availability. Because Alternative 1 would result in reduced livestock use levels, on the Anita and Cameron allotments and change to a range of stocking with the highest stocking level at current stocking on the Moqui Allotment, this alternative on these three allotments could slightly increase *Agave* reproduction and availability and *Agave* habitat for the Mojave giant skipper. Continued potential foraging on *Agave* by elk and deer would lessen benefits. Therefore, this alternative would result in slight increases in habitat trends for these species on the three allotments. Slight increases in *Agave* reproduction and availability may improve foraging success or survival of individuals of these species within these two allotments.

Population trend of the Mojave giant skipper is likely to be correlated with habitat trends. Population trend of this species on the Anita and Cameron allotments would increase slightly under Alternatives 1, 2, and 4, with increases being from most to least in the following order: Alternative 2 > Alternative 4 > Alternative 1. Population trends under Alternative 3 on these two allotments would remain the same or slightly decrease. On the Moqui Allotment, slight increases in population trend of the Mojave giant skipper would be greatest under Alternative 2, but would also occur under Alternative 1. Population trend for this species under Alternative 3 would remain the same as current trends on the Moqui Allotment because there would be no change in management of this allotment under this alternative. Slight changes in population trend of this species would be attributed to slight changes in *Agave* reproduction and availability and associated slight changes in survival and reproductive success of these species.

CUMULATIVE EFFECTS

Cumulative effects include past, present, and reasonably foreseeable future activities that are likely to occur. The geographical extent of analysis includes the Red Horse Wash, Heather Wash, Lower and Upper Cedar Washes, Lee Canyon-Lower Little Colorado River, and Miller Wash watersheds. This analysis area incorporates a landscape scale, as well as the home ranges of all birds analyzed and those of shorter-ranging species during their use of the allotments. Past (past 20 years), present, and future activities and projects within the analysis area are listed in Table 1.

Table 1. Past, Present, and Reasonably Foreseeable Activities and Projects in the Cumulative Effects Analysis Area.

Activity	Project Name	Timeframe	Acres
Livestock Grazing	Rain Tank Allotment	Past; vacant for past ~5 years	63,632
Grassland Improvement – Tree Removal	No Name	Past	505
Grassland Improvement –	Harbison	Past	429

Tree Removal			
Grassland Improvement – Tree Removal	Nameless	Past	540
Grassland Improvement – Big Sagebrush Mowing	O'Connell	Past	500
Grassland Improvement – Big Sagebrush Mowing	Brush Tank	Current	500
Grassland Improvement – Big Sagebrush Mowing	Sage Tank	Current	145
Fuelwood Sale	Moqui	Past	30
Fuelwood Sale	Harbison	Past	550
Fuelwood Sale	Huff	Past	300
Vegetation Treatment	Hammer	Past	7417
Vegetation Treatment	Gallo	Past	11,056
Vegetation Treatment	Upper Ten-X	Past	2315
Fuel Reduction	Java	Past	540
Fuel Reduction	Tusayan West	Past	1,100
Fuel Reduction	X-B	Past	3,400
Fuel Reduction	Moqui	Past	80
Fuel Reduction	Rain Tank	Past	500
Fuel Reduction	Scott	Past	5300
Fuel Reduction	Lone Tree	Past	1500
Fuel Reduction	Camp 36	Past	4480
Fuel Reduction	Topeka	Present	1,800
Fuel Reduction	Ten X	Present	2,600
Fuel Reduction	Redhorse/Mudersbach	Past	8700
Fuel Reduction	Boggy Tank	Foreseeable	1848
Antelope Fence Modification	Antelope Fence Modification	Past	33 miles
Fence Removal	McRae Tank Fence Removal	Past	3 miles
Antelope Fence Modification	Antelope Fence Modification	Foreseeable	5 miles
Livestock Fence Construction	Moqui Allotment	Past	1 mile

Two key direct and indirect effects were identified in this analysis: 1) effects of changes in forage or grass cover on grassland and savannah species and 2) effects of changes in shrubs on shrubland species.

Other livestock grazing, grassland improvement, fuelwood sale, and fuel reduction projects listed in Table 1 have resulted in a positive trend in the abundance of forage and grass cover. Effect number 1 from the alternatives 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, and northern goshawk on all

three allotments. The degree of positive change in this improving trend would be from most to least in the following order: Alternative 2 > Alternative 4 > Alternative 1 > Alternative 3. These cumulative effects would result in the concomitant maintenance or improvement of the ability of these species to survive and forage and reproduce successfully.

Three grassland improvement projects (O'Connell, Brush Tank, and Sage Tank) and one fuels reduction project (Java) listed in Table 1 affected browse and shrub cover. These activities resulted in reduced abundance of big sagebrush in the project areas and no changes to browse or other shrub species. These project-related reductions in big sagebrush are countered and superceded by increasing abundance of big sagebrush and other shrubs in grasslands across the district, owing to fire exclusion and heavy grazing over the past century. Other browse species, including winterfat, fourwing saltbush, and black sagebrush are in decreasing trend because of heavy use by elk, deer, and past livestock grazing. Therefore, effect number 2 under all of the alternatives would have a cumulative effect of offsetting or reducing the rate of decline of this trend in browse and shrub cover. Reversal of the declining trend would not be expected without reductions in the numbers of elk within the allotments. The degree of positive change to this declining trend in browse and shrub cover would be from most to least in the following order: Alternative 2 (offset to slightly declining) > Alternative 4 (offset to slightly declining; Anita and Cameron allotments only) > Alternative 1 (declining at a slightly reduced rate of decline) > Alternative 3 (declining trend maintained).

Past livestock grazing on the Rain Tank Allotment may have reduced availability of *Agave* habitat in the analysis area, however this would have been countered by the absense of livestock on this Allotment over the past five years, and so recent trends in *Agave* habitat availability have likely been stable to slightly increasing. Foraging of *Agave* by elk and deer may limit potential benefits from reduced livestock grazing. Therefore, the trend in *Agave* habitat availability for the Mojave giant skipper within the analysis area is likely stable to slightly increasing. As a result, effect number 2 under all of the alternatives would have a cumulative effect of maintaining or increasing the stable to slightly increasing trend in *Agave* habitat availability. The degree of positive change to this stable to slightly increasing trend in *Agave* habitat availability would be from most to least in the following order: Alternative 2 (improvements) > Alternative 4 (improvements; Anita and Cameron allotments only) > Alternative 1 (slight improvements) > Alternative 3 (maintained).

CONTACTS/CONTRIBUTORS/PREPARERS

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VI. LITERATURE AND WEBSITES CITED

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Appendix 1. Species that would not have habitat or population trends affected by the Proposed Action.

Common Name	Scientific Name	Status	Rationale
Amphibians			
Northern Leopard Frog	*Rana pipiens*	Sensitive	Not likely to occur within allotments - Surveys have been done on the Williams Ranger District since 1990, with only one known recent occurrence in the far southern portion of the Williams Ranger 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 depauperate of aquatic vegetation and likely unsuitable for this species.
Birds			
American Peregrine Falcon	*Falco peregrinus anatum*	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	*Haliaeetus leucocephalus*	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
California Condor	*Gymnogyps californianus*	Endangered, Experimental/Nonessential (Northern Arizona)	No likely impacts – this experimental population occurs within the Vermillion Cliffs, Paria Plateau, and areas surrounding the Grand Canyon. Only one report of one condor exists on the Tusayan Ranger District, in an area outside of the allotments. No potential breeding sites occur within the District or allotments.
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened	No potential habitat - no protected, restricted, or proposed critical habitat exists within or near the allotments.
Yuma Rufous-Crowned Sparrow	*Aimophila ruficeps rupicola*	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	*Oncorhynchus apache*	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

Common Name	Scientific Name	Status	Rationale
Little Colorado Spinedace	*Lepidomeda vittata*	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	*Meda fulgida*	Threatened	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 60 miles) of the Complex to the allotments.
Invertebrates			
A Tiger Beetle	*Amblycheila picolominii*	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
A Tiger Beetle	*Amblycheila schwarzi*	Sensitive	No impacts to habitat or population trends – not known to occur within the allotments; uses rocky sand crevices, bare rock, talus, and scree that would not be affected by livestock grazing
A Tiger Beetle	*Cicindela hirticollis corpuscular*	Sensitive	No potential habitat – occurs along sandy banks of river terraces
A Tiger Beetle	*Cicindela purpurea cimarrona*	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

Common Name	Scientific Name	Status	Rationale
Antioch Potter Wasp	*Microdynerus arenicolus*	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
Arizona Giant Sand Treader Cricket	*Daihinibaenetes arizonensis*	Sensitive	Not likely to occur on allotments – only two records exist from Apache County in high desert plateau
Arizona Snaketail	*Ophiogomphus arizonicus*	Sensitive	No potential habitat – occurs along the sides of perennial streams
Early Elfin Butterfly	*Incisalia (Callophrys) fotis*	Sensitive	No impacts to habitat or population trends – the host of this species, cliffrose, is limited by the abundance of encroaching trees and not livestock grazing
Freeman's Agave Borer	*Agathymus baueri freemani*	Sensitive	No potential habitat and host range does not overlap – occurs in south central Arizona canyons with its host plant, *Agave chrysantha*
Maricopa Tiger Beetle	*Cincindela oregona maricopa*	Sensitive	No potential habitat – occurs along sandy stream banks or sand bars
Mountain Silverspot Butterfly	*Speyeria Nokomis nitocris*	Sensitive	No potential habitat – occurs in open seepage areas, which do not exist within the allotments
Navajo Jerusalem Cricket	*Stenopelmatus navajo*	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	*Agathymus neumoegeni*	Sensitive	No potential habitat and host range does not overlap – occurs from central Arizona south with its host plant, *Agave parryi*
Obsolete Viceroy Butterfly	*Limenitis archippus obsoleta*	Sensitive	No potential habitat – occurs in riparian canyons and desert arroyos

Common Name	Scientific Name	Status	Rationale
Spotted Skipperling	*Piruna polingii*	Sensitive	No potential habitat – occurs in moist meadows in coniferous and mixed woodlands; which do not occur on the allotments
Mammals			
Black-Footed Ferret	*Mustela nigripes*	Endangered	No potential habitat – one female ferret and her litter are estimated to require approximately 598 acres of habitat; no towns greater than 200 acres exist within the allotments
Cactus Mouse	*Peromyscus eremicus papagensis*	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	*Ovis canadensis mexicana*	Sensitive	No impacts to habitat or population trends – occurs within the Grand Canyon area and the southern portion of the state. The allotments would not be used by domestic sheep under any of the alternatives, so there would be no potential for spread of disease from domestic to wild sheep
Mexican Gray Wolf	*Canis lupus baileyi*	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
Wupatki Arizona Pocket Mouse	*Perognathus amplus cineris*	Sensitive	No potential habitat – occurs in desert scrub habitats
Reptiles			
Arizona Night Lizard	*Xantusia vigilis arizonae*	Sensitive	No potential habitat – occurs in granite outcrops

Common Name	Scientific Name	Status	Rationale
Snails			
Brown Springsnail	*Pyrgulopsis sola*	Sensitive	Range not likely to overlap – found in the Lower Verde Watershed in Yavapai County; the *Pyrgulopsis* genus tends to be highly endemic
Cumming's Mountainsnail	*Oreohelix yavapai cummingsi*	Sensitive	Range not likely to overlap – most records from New Mexico, northeast of Santa Fe; very rare in Arizona
Desert Springsnail	*Pyrgulopsis deserta*	Sensitive	Range not likely to overlap – found in the Upper and Lower Virgin River watersheds in Mohave County, Arizona and Washington County, Utah; the *Pyrgulopsis* genus tends to be highly endemic
Fossil Springsnail	*Pyrgulopsis simplex*	Sensitive	Range not likely to overlap – found in the Lower Verde Watershed in Yavapai and Gila counties; the *Pyrgulopsis* genus tends to be highly endemic
Grand Wash Springsnail	*Pyrgulopsis bacchus*	Sensitive	Range not likely to overlap – found in the Grand Wash Watershed, Mohave County; the *Pyrgulopsis* genus tends to be highly endemic
Kingman Springsnail	*Pyrgulopsis conica*	Sensitive	Range not likely to overlap – found in the Havasu-Mohave Lakes and Sacramento Wash watersheds in Mohave County; the *Pyrgulopsis* genus tends to be highly endemic
Montezuma Well Springsnail	*Pyrgulopsis montezumensis*	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 *Pyrgulopsis* genus tends to be highly endemic
Niobrara Ambersnail	*Oxyloma haydeni haydeni*	Sensitive	No potential habitat – occurs in perennial riverside springs with wetland vegetation

Common Name	Scientific Name	Status	Rationale
Verde Rim Springsnail	*Pyrgulopsis glandulosa*	Sensitive	Range not likely to overlap – found in the Agua Fria Watershed in Yavapai County; the *Pyrgulopsis* genus tends to be highly endemic