Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessment

Whiterock–Soapstone #4804

I. Introduction

The Whiterock-Soapstone Allotment Assessment was conducted in accordance with directions set forth in the Washington Office Instruction Memorandum No. 98-91 and Arizona State Instruction Memorandum No. 99-012 for implementation of Standards for Rangeland Health and Guidelines for Grazing Administration (Standards and Guides).

The purpose of Standards and Guides is to ensure the health of public rangelands. These standards help the Bureau of Land Management (BLM), rangeland users, and interested members of the public achieve a common understanding of acceptable resource conditions, and work together to implement that vision (see appendices for a copy of the Standards and Guidelines).

Arizona's Standards and Guides were developed by the BLM State Standards and Guides Team and the Arizona Resource Advisory Council (RAC), a state level council appointed by the Secretary of the Interior.

The Secretary of the Interior approved the Standards and Guides in April 1997. The Decision Record, signed by the BLM State Director (April 1997) provides for full implementation of the Standards and Guides in all Arizona Land Use Plans.

This assessment was conducted by an interdisciplinary assessment team (IAT) of resource specialists from:

- BLM.
- Natural Resource Conservation Service (NRCS).
- Arizona Game and Fish Department (AGFD).
- Mohave County Extension.

The IAT was assisted by the Rangeland Resource Team (RRT), a diverse group of local residents formed and appointed under the RAC charter (see Appendix B for a list of members on both teams). The RRT may provide informal advice to the BLM managers regarding implementation of Standards and Guides, and "will have opportunities to raise any matter of concern with the resource advisory council and ... to provide information and options to the council for their consideration" as provided for by regulations at 43 CFR 1784.6-2(a)(2)(iv)(A).

The BLM/RAC Implementation Strategy for Arizona states that the RRT's primary role is to assist BLM managers in assuring the Standards and Guides are consistently applied and technically sound. The IAT analyzed all available information in cooperation with

the RRT. Based on field observations, team members determined whether rangeland conditions were meeting, progressing toward meeting, or not meeting the Standards for Rangeland Health.

The RRT, IAT, permittees and other interested parties were invited to attend an issue scoping meeting on March 31, 2004, and a field visit on May 19, 2004. In cases where standards were not being met, the group identified which resource uses needed to be addressed, and teams presented recommendations to improve resource conditions.

After consultation with interested persons, permittees, and the IAT, the Authorized Officers will select the appropriate actions. The selected management actions will then be analyzed through the National Environmental Policy Act (NEPA) process and a proposed decision will be issued.

II. Grazing Use

A. Total grazing privileges

Active Grazing Use: 1,320 AUMs
Suspended Non-use: 0 AUMs

(Note: an AUM, or Animal Unit Month, is a unit of measurement indicating how much forage is eaten by a cow/calf pair in one month.)

B. Season(s) of use

August 1 through May 31

C. Kind and class of livestock

Cow/calf

D. Percent federal range

100%

III. Allotment Profile

A. Description

The Whiterock-Soapstone Allotment is located approximately twenty-five miles south of St. George, Utah. Approximately 77% of this allotment is within the Arizona Strip Field Office (FO), and the remaining portion is within Grand-Canyon Parashant National Monument (Monument).

The allotment is in the Colorado Plateau Sagebrush-Grassland (Land Resource Unit 35-3AZ). Elevations average just over 5,100 feet on the allotment with Mustang Knoll in the northwest portion reaching 6,000 feet. This area is characterized by sagebrush flats (vegetated with big sagebrush and an understory of mid and short grasses). Juniper and pinyon are scattered across the shallower soils. Indian ricegrass, needle and thread, and western wheatgrass are the dominant cool season grasses. Galleta, black grama, blue grama, and sand dropseed are the major warm season grasses. Winterfat, fourwing saltbush, and Wyoming big sagebrush are the dominant shrubs.

Water on the allotment consists of one small mineralized spring on the north end and reservoirs scattered throughout the pastures. A pipeline, which provides water at four additional locations, crosses the center of the allotment from a well west of the allotment.

The Whiterock-Soapstone Allotment is categorized as a "maintain" (M) allotment. This means that:

a) Present range condition is satisfactory;
b) The allotments have high or moderate resource potential and are producing near their potential (or trend is moving in that direction);
c) No serious resource-use conflicts/controversy exists;
d) Opportunities may exist for positive economic return from public investments; and
e) Present management is satisfactory.

B. Acreage

The allotment contains:

- 18,614 acres of federal land
- 0 acres of state land
- 0 acres of private land

C. Objectives

1. Land Use Plan Objectives

Arizona Strip Field Office Resource Management Plan (RMP) and Grand Canyon – Parashant National Monument RMP[a]

[a] Text in **BOLD** type are the differences in the Grand Canyon-Parashant National Monument RMP objectives from those in the Arizona Strip Field Office RMP.

Objectives are labeled according to the applicable resource or resource use and sequentially numbered in the RMPs. Listed here are the Desired Future Condition (DFC) decisions that will be assessed in this document. The codes are as follows:

RP= Riparian Ecological Zone
WS=Air, Water and Soils
VM=Vegetation
WF=Wildlife and Fisheries
GM=Livestock Grazing
TE=Special Status Species
WC=Wilderness Characteristics
RR=Recreation Resources
WM=Designated Wilderness
VR=Visual Resources
FM=Fire and Fuels Management

Watershed/Soil Stability

DFC-VM-03 and **DFC-VM-04**
Vegetative communities will provide sufficient plant cover and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity, even during drought years.

DFC-WS-06
The natural hydrologic functions of all watersheds will be intact.

DFC-WS-07
Soils will exhibit infiltration, permeability, and erosion rates appropriate for the soil type, climate, and landform.

DFC-WS-08
Physical soil crusts will show an increase in organic cover including cryptobiotic colonies, moving them towards being organic crusts.

Ecological Processes

DFC-VM-04 and **DFC-VM-05**
Ecological processes and functions will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Standards for Rangeland Health **and NPS Vital Signs and enhance Monument values**.

DFC-WF-01
Ecological conditions will be within the range of natural variability and will be functional for dependant animal species.

DFC-WF-11 and **DFC-WF-12**
The natural biological diversity of fish, wildlife, and plant species will be maintained or, where necessary and feasible, restored throughout the Arizona

Strip FO **(Monument)**. Habitats will be managed on an ecosystem basis, ensuring that all parts of the ecosystem and natural processes are functional.

Invasive Plants

DFC-VM-05 and **DFC-VM-06**
Invasive plant species will be contained, controlled, or eliminated and native species restored to meet desired plant community (DPC) objectives.

No Net Loss

DFC-VM-12 and **DFC-VM-15**
There will be no net loss of total acres within sagebrush communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

Livestock Grazing

DFC-GM-02
Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed, public rangeland ecosystems will be improved to meet objectives.

DFC-GM-04
Monument values will be maintained, protected, and improved.

Desired Plant Community

DFC-GM-01
Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Arizona's Standards for Rangeland Health, and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.

DFC-VM-02 and **DFC-VM-03**
Native vegetative communities will be protected. A mosaic of native perennial and non-invasive annual vegetative communities will be present across the landscape with diversity of species, canopy, density, and age class reflecting its local ecological site potential and naturally occurring habitat conditions.

DFC-VM-11 and **DFC-VM-14**
Sagebrush (primarily Artemisia tridentata) communities will consist of a healthy, diverse mosaic of different height and age structures with a thriving community of native grasses and forbs. Mosaics may include stands of young and old sagebrush, openings (ranging from bare ground to short or sparse vegetation to high-density grasslands), wet meadows, seeps, healthy streamside (riparian) vegetation, and other interspersed shrub and woodland habitats.

DFC-VM-13 and **DFC-VM-16**
Treatment objectives in sagebrush communities will focus on restoring natural disturbance processes, such as by using fire, increasing vegetative ground cover of native grasses and forbs, and removing invasive non-native plants.

DFC-VM-14 and **DFC-VM-18**
Existing stands of sagebrush will have a balance between shrub and perennial grass cover, for open to moderate shrub canopy cover (5 to 25%), and multiple height classes. This mosaic will include young, sparse stands to support Vesper sparrows and lark sparrows, and older, dense stands to benefit Brewer's sparrows, sage sparrows, black-throated sparrows, gray flycatchers, and sage thrashers.

DFC-VM-15 and **DFC-VM-19**
Sagebrush communities will include small, grassy openings to support long-billed curlews and burrowing owls.

DFC-VM-16 and **DFC-VM-20**
Sagebrush communities will include large, continuous blocks (≥300 acres) of unfragmented sagebrush habitat, including mosaics of open to moderate shrub canopy cover (5 to 25%) and multiple age and height classes to benefit sage-dependent species.

DFC-VM-17 and **DFC-VM-21**
Sagebrush communities will include openings of short vegetation surrounded by sagebrush for ground foraging by sage thrashers, loggerhead shrikes, Brewer's sparrows, and sage sparrows.

DFC-VM-18 and **DFC-VM-22**
Sagebrush communities will include openings of short vegetation (2 to 8 in.) with wide visibility to provide breeding habitat for long-billed curlews, and burrowing owls.

DFC-VM-19 and **DFC-VM-23**
Sagebrush communities will include native grass and forb cover in balance with open to moderate (5 to 25%) shrub canopy cover and within ecological site

potential. Perennial grass components will be at or above 10%. Native forb composition will be at or above 5%.

DFC-VM-20 and **DFC-VM-24**
Fragmentation of sagebrush habitat will be less than 50% of the treatment area.

DFC-VM-21 and **DFC-VM-25**
Healthy, diverse woodland communities will consist of a mosaic of trees, shrubs, grasses, and forbs. Mosaic patches can include stands of young and old pinyon-juniper, openings, wet meadows, seeps, and other interspersed shrub habitats. The communities will be composed of a variety of different height structures and age classes, with a thriving understory community of native grasses, forbs, and shrubs.

DFC-VM-24 and **DFC-VM-28**
Stands of pinyon-juniper will include a balance between tree, shrub, and perennial grass cover to support pinyon jay and mule deer. This mosaic will include stands of old growth pinyon-juniper to support juniper titmouse; large openings of grasses, forbs and shrubs to support mule deer and provide foraging habitat for raptors such as sharp-shinned hawk, northern goshawk, Coopers hawk, American kestrel, and red-tailed hawk; and areas of sparse to dense tree canopy cover to support pinyon jay.

DFC-VM-25 and **DFC-VM-29**
Individual old growth trees will be present and will be protected during treatment implementation.

DFC-VM-23
Treatment objectives in the pinyon-juniper vegetation communities will focus on restoring the natural disturbance regime; increasing vegetative ground cover of native grasses, forbs, and shrubs; and removing non-native invasive species.

DFC-WF-16 and **DFC-WF-17**
Mule deer habitat in pinyon-juniper woodland sites will include a healthy diverse mosaic of trees, shrubs, grasses, and forbs.

Wildlife Habitat

DFC-WF-02
Native wildlife communities, ***as Monument objects,*** will be protected. A complete range of diverse, healthy, and self-sustaining populations of native animal species will occupy all available suitable habitats.

Habitat Connectivity

DFC-WF-06
Habitat connectivity and wildlife movement between ecological zones will be maintained.

Fences

DFC-WF-05
Fences will be the minimum necessary for effective livestock control or other administrative purposes. Fences will be wildlife passable, consistent with the species found in the area.

DFC-WF-19 and **DFC-WF-20**
All fences in mule deer habitat will be deer passable.

Healthy Wildlife Populations

DFC-WF-03
Forage, water, cover, and space will be available to wildlife of sufficient quantity and quality to support productive and diverse wildlife populations.

DFC-WF-12 and **DFC-WF-13**
Mule deer habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-34 and **DFC-WF-35**
Desert cottontail habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-36 and **DFC-WF-37**
Migratory bird habitats will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-44 and **DFC-WF-45**
Carnivore habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

Wildlife Population Numbers

DFC-WF-13 and **DFC-WF-14**
On BLM administered lands, Mule deer populations will be at or near maximum levels sustainable for the habitat.
DFC-WF-35 and **DFC-WF-36**
Desert cottontail rabbits will be present in sufficient quantity to provide an adequate prey base for raptors, carnivores, and other predatory species, as well as ample recreational opportunities for hunting and wildlife viewing.

DFC-WF-37 and **DFC-WF-38**
Migratory birds that nest in the Monument and in the Arizona Strip FO will have resources of sufficient quantity and quality to provide for nesting sites and to fledge young successfully.

Wildlife Waters

DFC-WF-04
All waters will be safely accessible to wildlife.

DFC-WF-17 and **DFC-WF-18**
Water sources within mule deer habitat will be safely accessible to deer and other wildlife.

DFC-WF-18 and **DFC-WF-19**
On BLM administered lands, Water sources within mule deer habitat will be spaced no more than 3 miles apart.

DFC-WF-42 and **DFC-WF-43**
Water sources within game bird habitats will be safely accessible by all wildlife.

DFC-RP-09
A sufficient quantity of water with safe access for wildlife will be available, where appropriate.

Threatened and Endangered Species Habitat

DFC-TE-03
The Arizona Strip / **the Monument** will provide a block of remote, contiguous habitat that will serve as refugia for populations of special status species.

DFC-TE-25 and **DFC-TE-21**
Habitat areas for special status raptors will provide sufficient forage and cover attributes to support thriving populations of the species.

DFC-TE-27 and **DFC-TE-23**
Potential roosting and nesting sites (for special status raptors) will be abundant.

Healthy Threatened and Endangered Populations

DFC-TE-24 and **DFC-TE-20**
Special status raptor populations will be healthy and self-sustaining throughout their range.

DFC-TE-29 and **DFC-TE-25**
Rodent populations, as a prey base (for special status raptors), within the Arizona Strip FO **and the Monument** will be abundant.

No Net Loss of Threatened and Endangered Species Habitat

DFC-TE-04 and DFC-TE-08
There will be no net loss in the quality or quantity of special status species habitat throughout the Arizona Strip FO.

DFC-TE-26 and **DFC-TE-22**
No net loss will occur in the quality and quantity of suitable habitat for special status raptors within the Arizona Strip FO / **the Monument**.

Condors

DFC-TE-31 and **DFC-TE-27**
The experimental non-essential population of California condor will be at or above 150 individuals, viable, and stable to increasing in number.

Recreation and Visitor Services

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of both:

1. Structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings and/or,
2. Dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues (extensive recreation management areas (ERMAs).

DFC-RR-01

Recreation and visitor services will be managed to provide varying levels of structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings.

DFC-RR-04 and **DFC-RR-05**

The excellent opportunities that exist to enjoy remote, rustic settings that provide moderate challenge and solitude in the Specialized TMAs [Travel Management Areas] will be maintained/enhanced.

DFC-RR-05 and **DFC-RR-06**

In Backways and Specialized TMAs, recreation opportunities associated with somewhat remote settings, such as exploring backcountry roads, vehicle camping, hunting, sightseeing, recreation aviation, and picnicking will be maintained/enhanced on existing roads, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

DFC-RR-06 and **DFC-RR-07**

In the Primitive TMA, high quality recreation opportunities associated more with primitive recreation experience opportunities and non-motorized uses such as camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

Visual Resources

DFC-VR-01

Public lands will be managed in a manner which will protect the quality of the scenic (visual) values of these lands. (43 U.S. Code [USC] 1701, Section 102 (a) (8)).

DFC-VR-03

The region's scenic beauty, open space landscapes, and other high-quality visual resources will be maintained within the Arizona Strip FO/**the Monument**.

2. Specific Resource Objectives

Whiterock-Soapstone Allotment Management Plan (AMP) objectives (1968, revised in 1973)

a. Increase the grazing capacity for livestock from 1,120 AUMs to 1,728 AUMs
b. Increase the number of mule deer by 300%.
c. Increase quail and dove populations by locating multiple-use waters.
d. Increase distribution of livestock on the allotment to cover 90% of the area. The other 10% is unusable.
e. Improve the natural beauty of the area by changing sage brush areas to grassy covered valleys, creating grassy parks in otherwise solid pinyon-juniper woodlands, increasing the density of native grasses, reducing erosion and healing gullies.

Desired Plant Community Objectives (DPC) developed during this process

The 2008 RMPs called for establishing DPC objectives to measure resource response to management activities, as does Standard 3: of the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration. The Arizona Standards for Rangeland Health and Guidelines for Grazing Administration state, "Desired plant community objectives will be developed to assure that soil conditions and ecosystem function as described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health."

In conformance with the RMPs, this assessment for the Whiterock-Soapstone Allotment replaces the 1973 key area vegetation objectives developed when the AMP was written (AMP objectives were based on frequency, which is used to detect degree of change) with new key area DPC objectives. DPC[b] objectives are based on plant composition and cover. The potential composition of a plant species is determined from the ecological site guides, and is based upon the soil type of the site. Composition is better for reflecting a desired plant community than frequency. According to Despain, (Despain 2008), ". . . a comparison of frequency values over time indicates a degree of change, but the values do not in and of themselves have direct quantitative meaning." Despain further explains, "For example, a 10% change in frequency indicates that a change has occurred while a 20% change in frequency simply means that a change of greater degree

[b] DPC is one of the several plant community types that may occupy an ecological site, the one or combination that meets the minimum quality criteria for the soil, water, air, plant, and animal resources, and that meets the resource objectives established for that ecological site. The DPC must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or combination of the two.

has occurred. Therefore, to set a management goal to increase frequency of a plant species, say by 10 or 20%, would be entirely arbitrary and without foundation. We do not at this time know what it would require to increase frequency by 20% for a specific species and quadrat size, or under what circumstances it is even possible!"

The following DPC objectives were developed during this evaluation process by the IAT, by consulting the Ecological Site Guides for key areas, as provided by Natural Resource Conservation Service, and site-specific information of the potential of the site to produce vegetation. These DPC objectives include species composition by weight (CBW), and percent basal vegetative cover.

The IAT believe that these DPC objectives should be attainable under current management. DPC objectives, when obtained, will assure rangeland health, forage on a sustained yield basis, and habitat for wildlife species. The species listed below reflect plant species to be monitored to measure success of management actions.

Desired Plant Community (DPC) Objectives

Key Area #2: Whiterock Reservoir Pasture (Pasture #2)

- Maintain galleta grass composition by dry weight of 25-35%
- Increase squirreltail composition by dry weight to 1%-5%
- Increase western wheatgrass composition by dry weight to 1-5%
- Increase Indian ricegrass composition by dry weight to 1-5%
- Increase Mormon tea composition by dry weight to 1-5%
- Decrease sagebrush composition by dry weight to 1-15%

Rationale: The ecological site for this key area is a Loamy Upland 10-14" precipitation zone (pz). Galleta grass, squirreltail, western wheatgrass, Indian ricegrass, and Mormon tea are key species recognized to be important for forage, browse, watershed, and cover, and are components of the ecological site.

The site guide allows 5-15% composition by dry weight for galleta grass, 5-10% for squirreltail, 20-30% for western wheatgrass, 5-20% for Indian ricegrass, and 1-10% for Mormon tea. This key area received a vegetation treatment in 1967 to increase forage plants. The DPC objectives reflect this desire; as such, CBW for some species may differ from the ecological site guide based on what their potential is believed to be at the key area.

Although the drought in this area has resulted in a downward trend of several species including snakeweed (not a key species), galleta grass, squirreltail, it is believed that there should be enough seed in the soils to allow DPC objectives to

be attained once precipitation amounts improve if competition from sagebrush can be reduced. In order to reduce sagebrush to the DPC objective level of 1-15% CBW and allow the other DPC objectives to be attained, a vegetative maintenance treatment would need to be completed.

Key Area #6: Hole Pasture (Pasture #1)

- Maintain galleta grass composition by dry weight of 25-35%
- Maintain squirreltail composition by dry weight of 1-5%
- Maintain Indian rice grass composition by dry weight of 1-5%
- Maintain cliffrose/antelope bitterbrush composition by dry weight of 1-5%
- Decrease sagebrush composition by dry weight to 1-5%

Rationale: The ecological site for this key area is a Limestone Slopes 13-17" pz.

The site guide allows 1-10% composition by dry weight for galleta grass, 1-10% for squirreltail, 1-5% for other perennial grasses, which Indian ricegrass is grouped with, and 1-5% for cliffrose/antelope bitterbrush. This key area was treated and seeded in 1967, and maintained with an herbicide in 1996 to improve the watershed function and increase forage plants. The DPC objectives reflect this desire; as such, CBW for some species may differ from the ecological site guide based on what their potential is believed to be at the key area. As discussed later in this assessment (on pages 33, 50, and 51), there is a need to reduce sagebrush in portions of this pasture in order to increase ground cover and vegetative diversity.

Although the drought in this area has resulted in a downward trend of several species including big sagebrush, snakeweed, western wheatgrass, (not a key species), galleta grass, and squirreltail (key species), it is believed that there should be enough seed in the soils to allow DPC objectives to be attained once precipitation amounts improve.

Galleta grass, squirreltail, and Indian ricegrass, are species recognized to be important for forage, browse, watershed, and cover, and are components of the ecological site. Cliffrose is also a desirable browse plant that has the potential to be more prevalent in the composition. The grasses should be able to maintain themselves or increase when climatic conditions are more favorable (i.e., "normal" precipitation).

Key Area #10: Hole Pasture (Pasture #1)

- Maintain western wheatgrass composition by dry weight of 45-60%
- Maintain Indian ricegrass composition by dry weight of 5-15%
- Maintain squirreltail composition by dry weight of 1-5%
- Maintain cliffrose/antelope bitterbrush composition by dry weight of 1-5%
- Maintain Mormon tea composition by dry weight of 1-5%
- Maintain sagebrush composition by dry weight of 1-15%

Rationale: The ecological site for this key area is a Loamy Upland 10-14" pz. Western wheatgrass, Indian ricegrass, squirreltail, and Mormon tea are species recognized to be important for forage, browse, watershed, and cover, and are components of the ecological site.

The site guide allows 20-30% composition by dry weight for western wheatgrass, 5-20% for Indian ricegrass, 5-10% for squirreltail, 1-5% for other shrubs, which cliffrose/antelope bitterbrush is part of, and 1-10% for Mormon tea. This key area received a vegetation treatment in 1967 to increase forage plants. Maintaining shrubs like sagebrush at lower levels would help maintain old treatments. The DPC objectives reflect this desire; as such, CBW for some species may differ from the ecological site guide based on what their potential is believed to be at the key area. This key area is at late seral and believed to be functioning properly.

Although the drought in this area no doubt has affected the key forage plants, by 2005, when the last data was collected from the key areas, some plants had improved from the base year of 1984. However, some of the plants had not come back to the 1998 levels due to drought but are still within the range described by the DPC objectives. Several key species included in this group are cliffrose, Indian ricegrass, and squirreltail; however, it is believed that there should be enough seed in the soils to allow DPC objectives to be attained once precipitation amounts improve.

Key Area #13: Corral Pasture (Pasture #3)

- Maintain galleta grass composition by dry weight of 50-70%
- Maintain sand dropseed composition by dry weight of 1-10%
- Increase squirreltail composition by dry weight of 5-10%
- Increase Indian ricegrass/needlegrass composition by dry weight to 5-20%
- Decrease big sagebrush composition by dry weight to 1-15%

Rationale: The ecological site for this key area is a Loamy Upland 10-14" pz. Galleta grass, squirreltail, and Indian ricegrass are species recognized to be important for forage, watershed, and cover, and are components of the ecological site.

For the key species, the site guide allows 5-15% composition by dry weight for galleta grass, 1-3% for sand dropseed, 5-10% for squirreltail, 5-10% for needlegrass and 5-20% for Indian ricegrass. This key area received a vegetation treatment in 1967, and maintained with an herbicide in 2008 to reduce sagebrush composition, to improve the watershed function and increase forage plants. The DPC objectives reflect this desire; as such, CBW for some species may differ from the ecological site guide based on what their potential is believed to be at the key area.

Key Area #15: Whiterock Reservoir Pasture(Pasture #2)

- Maintain galleta grass composition by dry weight of 35-45%
- Maintain squirreltail composition by dry weight of 5-10%
- Maintain Indian ricegrass composition by dry weight of 3-7%
- Maintain needle and thread grass composition by dry weight of 1-5%

Rationale: The ecological site for this key area is a Loamy Upland 10-14" pz. Galleta grass, squirreltail, Indian ricegrass, and needle and thread are species recognized to be important for forage, watershed, and cover, and are components of the ecological site.

For the key species, the site guide allows 5-15% composition by dry weight for galleta grass, 5-10% for squirreltail, 5-20% for Indian ricegrass, and 5-10% for needle and thread grass. This key area was chained and seeded in 1948, and treated again in 1967, to decrease sagebrush and improve the watershed function and increase forage plants. The DPC objectives reflect this desire; as such, CBW for some species may differ from the ecological site guide based on what their potential is believed to be at the key area.

This key area again was treated with herbicide to remove sagebrush and release the grass and forb species. With less sagebrush and reduced competition for available soil moisture, the grass species have been able to withstand the recent drought better than in areas where sagebrush is still dominant. Maintaining the grass species and keeping sagebrush in a reduced state has allowed the site to progress from presumed early seral in 1948 to late seral. Maintaining the grasses would make the site more productive and protect the watershed by increasing understory plant cover.

D. Key Species

Management of the allotment is based on a selection of key species. These species are selected for their similarity to other grasses and browse species that occur in the allotment. The definition of key species is: (1) forage species of sufficient abundance and palatability to justify its use as an indicator to the *degree of use* of associated species, and (2) those species which must, because of their importance, be considered in the management program. Key species for this allotment are listed below.

Grasses
Bottlebrush Squirreltail
Indian ricegrass
Western wheatgrass
Needlegrass
Galleta
Sand dropseed

Shrubs
Cliffrose
Mormon Tea
Big Sagebrush
Antelope bitterbrush

E. Grazing System

In 1973, a three pasture deferred rotation grazing system was established for this allotment. Grazing occurred in pastures #2 and #3 (see map page 57), from October 16 through February 28. Livestock were then moved to pasture #1 to graze from March 1 through May 31 then the cattle were removed from the allotment. The next year pastures #1 and #3 were grazed from October 16 through February 28 and pasture #2 was grazed from March 1 through May 31. The third year pastures #1 and #2 were grazed from October 16 through February 28 and pasture #3 was grazed from March 1 through May 31. This system allowed each pasture to be rested during the spring growing season two out of three years, and the allotment was never grazed during the summer growing season.

Because this system appeared to be favoring warm season grasses at the expense of cool season grasses, it was decided in 1988 to allow 80 head of the cattle that normally grazed from October 16 through May 31 to graze during the summer. Because of drought and the unavailability of water during that time, very few cattle were ever grazed during the summer and the trial was abandoned in 1994. However, in 2002, due to a grazing transfer, summer use was again reinstituted

which allowed the new permittee to synchronize use on this allotment with the grazing system on his other allotments (see discussions under Issues relating to Rangeland Health, "Why was the season of use changed" in sections IV.C.1.b., and V.B.1.b, this document). To resolve the unavailability of water on this allotment the Mustang Pipeline was installed placing reliable waters in each of the pastures at several locations.

F. Other uses

1. Special Status Species

Threatened and Endangered Species

There is no suitable habitat for any Federally-listed species on this allotment. There are no deep, narrow canyons on the allotment that would provide suitable nesting habitat for Mexican spotted owls.

The California condor is currently listed as endangered under the Endangered Species Act (ESA). A reintroduction program began on the BLM's Arizona Strip District in 1996. This reintroduced population has been designated experimental, non-essential, as defined under Section 10(j) of the ESA. They are scavengers by nature and can fly hundreds of miles in their search for carrion. They may either fly over or forage on carrion found within this allotment, but they do not nest (or roost) in this allotment.

Sensitive Species

Sensitive species are usually rare within at least a portion of their range. Many are protected under certain State and/or Federal laws. Species listed as sensitive by the BLM typically consist of small and widely dispersed populations, inhabit ecological refugia or specialized or unique habitats, could become endangered or extirpated from the State or within a significant portion of its range; are under status review by the U.S. Fish and Wildlife Service (USFWS); or are State-listed, but may be better conserved through application of BLM sensitive species status. Arizona wildlife species of special concern are ones whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Arizona Game and Fish Department's (AGFD) listing of Wildlife of Special Concern in Arizona. Table 1 lists the sensitive animal species that may occur within the Whiterock-Soapstone Allotment.

Table 1. Sensitive Species that are Known to Occur or have the Potential to Occur* in the Allotment

Species	Whiterock-Soapstone	BLM Sensitive	Arizona Wildlife Species of Concern
Bald eagle (*Haliaeetus leucocephalus*)	potential	no	endangered
American peregrine falcon (*Falco peregrinus*)	verified	yes	yes
Northern goshawk (*Accipiter gentilis*)	potential	no	yes
Ferruginous hawk (*Buteo regalis*)	potential	yes	yes
Spotted bat (*Euderma maculatum*)	verified	yes	yes
Western small-footed myotis (*Myotis ciliolabrum*)	verified	yes	no
Fringed myotis (*Myotis thysanodes*)	verified	yes	no
Big free-tailed bat (*Nyctinomops macrotis*)	verified	yes	yes

* "Potential to occur" means that suitable habitat exists, but species presence has not been verified.

Executive Order 13186 requires the BLM and other Federal agencies to work with the USFWS to provide protection for migratory birds. These species are protected by legislation and it is important to maintain habitat for these species so migratory patterns are not disrupted. All migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703), which limits the taking of any migratory birds, their parts, nests, or eggs. Additional protection is provided by the Neotropical Migratory Bird Conservation Act of 2000 (16 USC Chapter 80).

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c). This law, enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The peregrine falcon (delisted in 1999) may occasionally fly over the area.

2. Other Wildlife

Mule deer may be present at times on this allotment, and pronghorn may occasionally use the area. Nongame wildlife found on the allotment is typical of the area, including a variety of small mammals, grassland birds, raptors, and

reptiles. Small game species include doves, quail, and rabbits. Coyotes are relatively common.

3. Recreation

General Management. The allotment's recreation values are important because of its geology, scenic viewsheds, and remoteness. General recreation activities include: sightseeing, horseback riding, hiking, camping, hunting, photography, bird watching, and nature study. The portion of the allotment within the Monument is in the Parashant Special Recreation Management Area (SRMA) and the Shivwitz Frontier Recreation Management Zone (RMZ). The primary strategy for the Parashant SRMA is to target a demonstrated undeveloped recreation-tourism market demand from local community and regional/national visitors for trophy hunting opportunities, guided backcountry tours, hiking, viewing and appreciating wildland landscapes and cultural sites, canyoneering, and motorized/mechanized/non-mechanized exploring on designated routes, as applicable. The area's distinctive remote, rugged landscape; its proximity to the Grand Canyon; its vast size; and the largely open and undeveloped character of its recreation settings support this demand. Regional and local recreation-tourism visitors value this area for the distinctive kinds of dispersed recreation it offers. The Shivwits Frontier RMZ is managed for sustainable access for scenic, natural, open-space appreciation, and exploration recreation adventure somewhat close to nearby communities.

The portion of the allotment outside the Monument is within the extensive recreation management area (ERMA) of the Arizona Strip Field Office, which is managed for dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues while maintaining the area's naturalness/remoteness.

Off Highway Vehicle Management (OHV). The OHV designation in the allotment is "limited to designated roads and trails."

Visual Resource Management (VRM). Two VRM Class designations are found in this allotment: Class II on that portion of the allotment within Grand Canyon-Parashant National Monument, and Class III on the portion of the allotment outside the Monument.

The objectives for these VRM classes are:

Class II - The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color,

and texture found in the predominant natural features of the characteristic landscape.

Class III - The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Trails. No national scenic, recreation or historic trails occur in this allotment.

Wilderness Characteristics: There are no areas managed to maintain wilderness characteristics in this allotment.

Wild and Scenic Rivers. No eligible or suitable wild and scenic river segments occur in the allotment.

4. Wilderness

No designated wilderness occurs in this allotment.

G. Issues brought out in scoping.

1. Issues relating to Rangeland Health and Guidelines for Grazing

a. Concern about the invasion of woody species in the northeastern corner of the allotment.

b. Why was the season of use changed?

c. Concern as to whether livestock grazing is causing soil erosion on the west side of the allotment.

d. Concern about the invasion of woody species west of Larson Tank.

e. Concern that the vegetative community is not as diverse as it should be.

f. Concern that dirt tanks result in headcutting as in the northeastern corner of the allotment.

2. Issues not relating to Rangeland Health, and not discussed further in this document.

None

IV. Management Evaluation

A. Purpose of Evaluation

The purpose of this assessment is to determine if the existing soil, water, and vegetative resources are meeting, making progress toward meeting, or are not meeting, the Arizona Standards for Rangeland Health in this allotment. These resources are managed according to resource management plans, allotment management plans, and other activity plans which identify terms and conditions for management of public lands within the allotment. If the current livestock grazing practices are determined to be causing non-attainment of standards, they will be modified to comply with the Guidelines for Grazing Administration. This assessment will also evaluate and update existing activity plan objectives to ensure multiple use objectives are tied to the indicators for rangeland health. Evaluation of rangeland conditions are based on all available monitoring, inventory, and assessment data.

B. Summary of Studies Data

1. Livestock Actual Use

Active use on the Whiterock-Soapstone Allotment is 1320 AUMs. Below are the number of AUMs actually used starting in 1982.

YEAR	AUMS USED	PERCENT OF ALLOWABLE USE
1982-83	1,432	108%
1983-84	1,346	102%
1984-85	1,330	101%
1985-86	800	61%
1986-87	1245	94%
1987-88	1,187	90%
1988-89	813	81%
1989-90	615	47%
1990-91	949	72%
1991-92	749	57%
1992-93	763	58%
1993-94	465	35%
1994-95	865	66%
1995-96	805	61%
1996-97	1,080	82%
1997-98	1,023	78%

1998-99	1,032	78%
1999-00	1,160	88%
2000-01	610	46%
2001-02	595	45%
2002-03	398	30%
2003-04	777	59%
2004-05	684	52%
2005-06	843	64%
2006-07	762	58%
2007-08	934	71%

2. Precipitation

Precipitation data applicable to this allotment is collected at two locations, the Mustang and Wolfhole rain gauges. The Mustang rain gauge, located on the north end of the allotment just underneath Wolfhole Mountain, has recorded the following average precipitation information:

Fall	Winter	Spring	Summer	Total
2.23"	5.90"	2.83"	4.16"	15.11"

The Wolfhole rain gauge, located three miles east of the allotment, has recorded the following average precipitation:

Fall	Winter	Spring	Summer	Total
1.68"	3.83"	1.53"	3.56"	10.60"

Precipitation data for each rain gauge (starting in 1978 for the Mustang gauge and 1983 for the Wolfhole gauge) is located in Appendix C of this report. Table 2 lists yearly seasonal averages over time for each precipitation gauge.

Table 2. Yearly Seasonal Precipitation (Percent of Average)

Mustang Precipitation Rain Gauge Number: 19

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Fall	122	205	39	65	85	230	119	83	176	100	202	40	37	67	43	112
Winter	237	119	177	41	73	97	30	125	38	85	39	68	63	80	93	267
Spring	121	163	102	192	159	141	29	65	141	159	95	47	71	65	228	124
Summer	42	99	92	120	130	117	114	77	107	97	86	70	96	102	52	90
Annual	145	134	120	95	106	130	66	94	97	104	86	60	70	82	100	169
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Fall	129	120	22	140	59	140		120	34	84	34	359	67	62	6	93
Winter	78	209	87	95	135	27	83	111	32	83	93	216	21	32	166	93
Spring	97	186	22	49	124	106	21	49	22	97	53	141	168	31	32	27
Summer	301	84	78	250	199	48	91	72	45	72	36	54	66	111	71	
Annual	151	157	63	136	139	65	61	90	34	83	61	179	68	58	91	56

Wolfhole Precipitation Rain Gauge Number: 30															
Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Fall	298	129	76	135	123	228	39	42	64	57	119	108	88	30	134
Winter	149	32	151	37	120	39	93	56	105	104	313	70	222	78	111
Spring	86	46	148	140	121	182	71	118	80	321	98	98	101	98	82
Summer	148	184	74	147	92	71	81	162	84	74	25	197	97	77	197
Annual	163	100	113	104	111	100	77	98	88	118	155	123	142	73	139
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009			
Fall	52	129		108	89	74	30	298	74	52	22	118			
Winter	134	35	85	116	33	140	85	147	13	29	105	89			
Spring	98	98	33	33		124	73	189	114	41	9	41			
Summer	183	123	52	70	49	28	84	63	49	88	46				
Annual	132	88	53	87	42	90	74	149	50	54	58	57			

3. Utilization

Utilization is the proportion or degree of current year's forage production that is consumed or removed by animals (both livestock and wildlife). Estimates of utilization are made using the key species grazed class method, a procedure in which photo guides are used to estimate utilization. Utilization was read at the key areas. Table 3 below shows the utilization data that has been compiled for this evaluation.

Table 3. Utilization Data

Pasture: 2											Key Area Number: 1				
	1981	1982	1984	1988	1990	1991	1993	1994	1997	1998					
Indian ricegrass	33			28	37	24	22	19	18	30					
Bottlebrush Squirreltail		28	44	36	40	22	36	35	19	35					
Western wheatgrass			42												
Galleta	40	13	27	49	48	17	24	26	20	22					
Cliffrose	18			45	45	40	35	31	42	42					
Pasture: 2									Key Area 2						
	1975	1976	1979	1981	1984	1985	1986	1988	1990	1993	1994	1995	1997	2003	2004
Indian ricegrass	69	79		33	67	38	54	49	54	37	35	27	22	30	39
Bottlebrush Squirreltail			47	35	21	17	37	55	60	43	34	30	18	30	40
Western wheatgrass								54	60	31					
Galleta	41	53	25	23	37	27	3	48	55	35	25	23	21	38	33
Sand dropseed														43	
Blue grama														45	
Cliffrose			80				46	46	65	43	38	29	17		

Pasture 3											Key Area Number 3					
	1971	79	80	81	82	83	85	86	87	88	90	91	92	93	94	97
Indian ricegrass	50	32	5		31	32	64	37	48	21	8	33	28	11	33	37
Bottlebrush Squirreltail		30			31	41	42	22		23	14	52	40	19	39	36
Needlegrass						27				29		30				
Crested wheatgrass				52	36											
Western wheatgrass					20	34			50	10	23	26	36	24	37	42
Galleta	27	29	5	39	18	16	35	2	9	23	8	25	30	14	38	35
Sand dropseed								32	30	38	10	29	32	26	29	35
Cliffrose								26	58	38						

Pasture 1											Key Area Number 4
	1983	1984	1985	1986	1987	1988	1989	1993	1995	1997	1999
Indian ricegrass	7	41	58	5	49	42	19	14	12	23	12
Bottlebrush Squirreltail	15	57	59	11	37	43	17	14	14	25	17
Western wheatgrass	5	33									
Galleta	5	22	25	3	26	16	6	16	12	23	12
Cliffrose			53	10	50	17	25	18	27	40	22

Pasture 1								Key Area Number: 6
	1984	1986	1987	1988	1992	1995	1996	1999	2005
Indian ricegrass	61	57	15	15	19	15	23	9	3
Bottlebrush Squirreltail	51	48	23	16	16	18	28	16	4
Western wheatgrass		18							5
Galleta	17	19	16	13	13	14	22	8	4
Cliffrose	40	53	10	9	15	18	40	26	4

Pasture #1					Key Area Number 10
	1983	1984	1986	1995	1996
Indian ricegrass	16	55	16	31	17
Bottlebrush Squirreltail	30	42	25	31	42
Crested wheatgrass	27		31		
Western wheatgrass	18	52	17		
Galleta				9	11
Cliffrose		42	19	29	34

Pasture #3											Key Area Number 13					
	1971	74	76	77	78	82	83	85	86	87	88	89	91	92	94	97
Indian ricegrass	82			84	82	58	59	71		58	30	34	36	20	37	35
Bottlebrush Squirreltail						50	62		30	42	27	26	33	23	42	47
Crested wheatgrass							48									
Galleta	50	61	43	57	64	22	26	32	24	21	18	15	22	18	28	16
Sand dropseed							45	52	48	30	18	18	36	14	46	41
Blue grama				37		19	13									
Cliffrose					70											

	Pasture #2							Key Area Number 15							
	1970	1978	1981	1982	1984	1985	1986	1988	1990	1991	1994	1994	1997	1998	2005
Indian ricegrass	67	50	43	30	68	38	57	47	55	34	29	25	22	32	29
Bottlebrush Squirreltail		60		24	36	22	52	56	51	33	31	31	23	32	29
Galleta	18	13	22	19	36	10	33	48	52	29	31	26	22	20	39
Sand dropseed								46		7					

4. Trend

The trend of an area may be judged by noting changes in vegetation attributes such as species composition, density, cover, production, and frequency. Vegetation data is collected at different points in time on the same key area, and the results are compared to detect change.

Trend data was collected using the Pace-Frequency method, which measures the occurrence frequency of forage and non-forage vegetative species. This monitoring is conducted at five key areas on the allotment. Ground cover data, which is the percent of bare ground, litter, rock and live basal vegetation, is also collected. Ground cover is determined by dividing the total number of hits for all categories except bare ground by the total number of hits (including bare ground) – see page 73 of TR 1734-4 (*Sampling Vegetation Attributes*). In addition, the occurrence frequency of all plant species is collected. The first readings established a baseline for comparison to all future readings. To determine a trend or direction of change, current frequency data may be compared to a base year's data by examining overlap of computed confidence intervals. Tables for 95% confidence intervals for the number of study plots read each year is used [see page 20 "Analysis, Interpretation, and Evaluation" TR 4400-7] to detect a change in direction or trend in a plant species when comparing current data with the first collected data or base year data. For example at a key area where 200 plots are read and the frequency of species for the current reading is at 10%, statistically to detect a change in plant frequency at the 95% confidence level, means that a difference in sampling variations would allow for any reading from 6-14% to be static trend; a reading of 15% would be upward trend and 5% would be a downward trend.

While readings on individual plant species have fluctuated over the years, overall key species trend was upward by 1998, followed in 1999 by a severe drought that influenced all vegetation, causing a die-off in some areas of many plants, resulting in more static to downward trends of key species.

Monitoring data (1981 to 2009) from the Whiterock-Soapstone Allotment, Table 4, indicates that drought (1999 to 2004) has impacted trends on all key areas. On the 5 key areas 6 key species showed improving trends, 15 remained static, and 7 were down. Similarly trend data from the exclosure (See Appendix D, pages 88

& 89) showed 2 key species with an upward trend, 6 were static, and 4 were down.

Ground cover showed a decreasing trend at Key Area #13 and remained static on the remaining 4 key areas. However, since the 2008 vegetation treatment at Key Area #13, signs of improvement are evident based on the vegetative change that has occurred. At Key Area #13, since 2004, shrubs such as sagebrush and broom snakeweed have decreased in frequency (30% to 11% and 4% to 0% respectively), and grasses such as sand dropseed and galleta have increased in frequency (0% to 17% and 59% to 64% respectively).

Annual precipitation, which has a major influence on plant production etc., has been below average every year since 1998 except for 2005. (For specific information, see pace frequency analysis tables in Appendix D.)

Table 4

Changes to basal cover, litter and key plant species by key area from base year

Key Area		Years plots were read							
2	Key Species or Cover Category	1985	1987	1990 trend	1998	2004			Trend
	Bare ground	48	53	56	50	48			Static
	Vegetation (basal cover)	5	2	3	5	3			Static
	Indian ricegrass	4	1	2	3	2			Static
	Bottlebrush squirreltail	32	34	36	41				Down
	Western wheatgrass		1	2	5				Static
	Galleta	55	47	61	63	34			Down
	Mormon tea				1				Static
	Sagebrush	33	43	50	53	46			Upward
6		1981	1984	1988	1993	1998	2004	2009	Trend
	Bare ground	63	55	48	53	49	49	61	Static
	Vegetation (basal cover)	7	5	4	4	6	3	1	Down
	Indian ricegrass	9	15	11	15	14	7	6	Static
	Bottlebrush squirreltail	24	23	3	25	29	3	7	Down
	Galleta	46	41	16	43	41	38	45	Static
	Cliffrose	1	2	4	9	10	3	3	Static
	Purshia tridentate		1					T	Static
	Artemisia tridentate	7	7	6	7	11	3	13	Upward
10		1984	1988	1993	1998	2005			Trend
	Bare ground	48	46	50	48	48			Static
	Vegetation (basal cover)	5	5	6	7	3			Static
	Western wheatgrass	72	52	74	66	58			Down
	Indian ricegrass	13	18	13	23	10			Static
	Bottlebrush squirreltail	15	11	13	15	1			Down
	Cliffrose	1		9	17	5			Upward
	Mormon tea		1						Static
	Purshia tridentata	6	10			17			Upward

		1985	1987	1991	1997	2004	2009	Trend
	Bare ground	46	44	48	49	45	74	Down
	Vegetation (basal cover)	9	3	9	6	4	3	Down
	Indian ricegrass		4	4	3			Static
13	Needlegrass	1	4	3			2	Static
	Bottlebrush squirreltail	7	18	18	22	3	3	Down
	Galleta	60	72	68	62	59	64	Static
	Sand dropseed	32	26	26	20		17	Down
	Sagebrush	5	4	5	4	30	11	Upward
		1985	1988	1993	1998	2004	2006	Trend
	Bare ground	55	49	53	47	63	55	Static
	Vegetation (basal cover)	6	6	4	5	4	8	Static
15	Indian ricegrass	17	19	22	31	8	12	Static
	Bottlebrush squirreltail	41	29	43	43	15	62	Upward
	Needlegrass	1	1	2	2	1	1	Static
	Galleta	32	35	33	37	36	37	Static

5. Ecological Site Inventory

The "Dry Weight Rank" vegetative sampling method was used to measure composition, which is the proportion (percentage) of various plants in relation to the total at a particular area. This vegetation attribute is also used to describe ecological sites. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. It is the product of all the environmental factors responsible for its development. Ecological sites have developed a characteristic kind and amount of vegetation. The natural plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in annual production (*Ecological Site Inventory,* BLM, 2001). While the natural plant community of a particular ecological site is recognized by characteristic *patterns* of species associations and community structure, the *specific species* present from one location to another may exhibit natural variability - the natural plant community is not a precise assemblage of species for which the proportions are the same from place to place, or even in the same place from year to year. Variability is the rule rather than the exception.

The distinctive plant communities associated with each ecological site (including the variability which frequently occurs) can be identified and described, and are called ecological site descriptions. These ecological site descriptions (or guides) are provided by the Natural Resource Conservation Service. The ecological site's potential for change in composition over time was considered along with other vegetation attributes to quantify desired plant community objectives for each key area. The potential composition is determined by the applicable soil type and precipitation zone. These potentials are described in the Ecological Site Guides.

Ecological (successional) status is the present state of the vegetation at an ecological site in relation to the potential natural community (PNC). PNC may include "acclimatized or naturalized nonnative species" (*Interpreting Indicators of Rangeland Health*, BLM, 2005 and *Ecological Site Inventory*, BLM, 2001). PNC differs from "historic climax plant community" in that an historic climax plant community is "the plant community that existed before European immigration and settlement" (*Ecological Site Inventory*, BLM, 2001). The BLM uses "potential natural community" terminology rather than "historic climax plant community" because PNC recognizes past influences by man. It is an expression of the relative degree to which the kinds, proportions, and amount of plants in a plant community resemble that of the PNC for the site.

Table 5 compares the most recent key species composition data with the base year at key areas in relation to allowable percent composition from the site-guide and the DPC objectives. (See Appendix D for specific ecological site information.)

Table 5

Plant Species	Site-Guide Allowable Percent Composition	Composition			Desired Percent Composition Objective
Key Area 2		2004			
Indian ricegrass	5-20%	0%			1-5%
Bottlebrush squirreltail	5-10%	0%			1-5%
Western wheatgrass	20-30%	0%			1-5%
Galleta	5-15%	32%			25-35%
Mormon tea	1-10%	0%			1-5%
Sagebrush	5-15%	50%			1-15%
Key Area 6		1988	2004	2009	
Indian ricegrass	PPGG	11%	3%	3%	1-5%
Bottlebrush squirreltail	1-10%	2%	4%	2%	1-5%
Galleta	1-10%	35%	33%	31%	25-35%
Cliffrose	10-25%	1%	1%	2%	1-5%
Antelope bitterbrush	Group with Cliffrose				
Sagebrush	10-25%	7%	4%	8%	1-5%
other perennial grass (PPGG)	1-5%				
Key Area 10		1988			
Western wheatgrass	20-30%	57%			45-60%
Indian ricegrass	5-20%	13%			5-15%
Bottlebrush squirreltail	5-10%	4%			1-5%
Cliffrose	SSSS	4%			1-5%
Antelope bitterbrush	SSSS				
Mormon tea	1-10%	1%			1-5%
other shrubs (SSSS)	1-5%	0%			
Sagebrush	5-15%	6%			1-15%

Key Area 13		2004	2009	
Indian ricegrass	5-20%	0%	0%	5-20%
needlegrass	5-10%	0%	1%	
Bottlebrush squirreltail	5-10%	1%	4%	5-10%
Galleta	5-15%	60%	60%	50-70%
Sand dropseed	1-3%	0%	8%	1-10%
Sagebrush	5-15%	27%	17%	1-15%
Key Area 15		1988	2004	
Indian ricegrass	5-20%	5%	3%	3-7%
Bottlebrush squirreltail	5-10%	10%	10%	5-10%
Needlegrass	5-10%	0%	1%	1-5%
Galleta	5-15%	24%	42%	35-45%

6. Special Status Species

California Condor: The California condor was listed as endangered in 1967. In 1996, California condors were re-introduced into Arizona in the Vermilion Cliffs under the ESA's 10(j) rule (non-essential experimental). Subsequent condor releases have occurred annually, with additional releases in 1998 and 1999 of 16 condors from the Hurricane Cliffs northeast of Diamond Butte.

As of April 2, 2009, there were 72 condors in the wild in northern Arizona. The reintroduced population as a whole appears to be stable and is increasing. The reintroduction continues annually as captive-reared birds are released along the Vermilion Cliffs. Each released condor is equipped with radio telemetry or GPS satellite transmitters and numbered wing tags to allow observers to track their movements.

Condors range widely, easily covering over 100 miles in a day. Their current range includes the entire Arizona Strip, throughout the Grand Canyon, into adjacent Utah and Nevada, and south of the Grand Canyon in Arizona. Condors are most commonly observed near the release site on the Vermilion Cliffs, at Navajo Bridge near Marble Canyon, on the Kaibab Plateau, and near the South Rim of the Grand Canyon. They have also been seen flying over Fredonia. Condors are strictly scavengers and prefer to eat large, dead mammals such as mule deer, elk, pronghorn, bighorn sheep, cattle, and horses. While the condors now find much of their food on their own, carcasses of dairy calves are provided near the Vermilion Cliffs release site in order to provide carrion which is contaminant free, as the birds are especially vulnerable to lead poisoning.

BLM Sensitive Species, Wildlife Species of Concern, and Migratory Birds

Bald eagles may occur on this allotment. The bald eagle was delisted from the Federal ESA on August 9, 2007. This species is not known to nest anywhere on

the BLM's Arizona Strip District. The bald eagle is a seasonal (winter) migrant that forages in and around the Kaibab Plateau. Bald eagles are both scavengers and predators.

The American peregrine falcon was delisted from the Federal ESA in October 1999. There are monitoring requirements developed by the USFWS to assess the status of the species regionally. Historic and active nests are monitored annually on the Arizona Strip District. Optimum peregrine falcon habitat is considered to be steep cliffs overlooking woodlands, riparian habitats or other areas supporting abundant avian prey species. Peregrines return to breeding areas in Arizona from mid-February to mid-March. Egg laying occurs from mid-March through mid-May, and the young can fledge from May through August. There is little, if any, suitable nesting habitat for peregrine falcons on this allotment. However, they may fly over and forage on this allotment.

Goshawks are found in ponderosa pine and mixed conifer forests; they nest in tall trees, frequently 40 feet above the ground. Inventories were conducted in 1993, 1994, and 2000 for northern goshawks in suitable nesting habitat on Black Rock Mountain, which is located approximately eight miles north and west of the Whiterock-Soapstone Allotment. No nesting goshawks were detected. Suitable nesting habitat for goshawks does not occur on this allotment. However, they may fly over the allotment as they travel between suitable sites elsewhere on the Arizona Strip.

The ferruginous hawk is known from the BLM's Arizona Strip District. Although suitable habitat exists on this allotment, none of these hawks have been detected in this area.

A variety of sensitive bat species have been captured on neighboring allotments including the spotted bat, small-footed myotis, fringed myotis, and big free-tailed bats. There is high potential for these bats to use this allotment for foraging.

No sensitive reptiles or amphibians are known or suspected to occur on this allotment.

7. Wildlife Habitat

The majority of the Whiterock-Soapstone Allotment provides yearlong habitat for mule deer (*Odocoileus hemionus*). The northern end of the allotment contains summer habitat for this species. Deer population data are not collected specifically for this allotment, but collected for Game Management Unit (GMU) 13B as a whole.

GMU 13B is famous for producing large antlered "trophy" class mule deer bucks. Despite low deer densities throughout the unit, good numbers of deer can typically be found in the higher elevations, generally over 4,000 feet. In the southern portion of the unit, from approximately Hidden Canyon south, hunters can find deer in the area of Mount Dellenbaugh and Snap Point and all points in between. Other areas include Grassy Mountain, the Hidden Rim and Whitmore Point.

The mule deer population in GMU 13B, while remaining at a low density throughout the unit, appears to be showing signs of growth. See Appendix E for mule deer survey data from GMU 13B.

The AGFD has categorized habitat for pronghorn based on a variety of factors, most notably terrain. Approximately 50 percent of this allotment contains poor quality habitat for pronghorn, as defined by AGFD, with approximately 7 percent consisting of low quality habitat for pronghorn. The remaining portions of the allotment do not contain suitable habitat for pronghorn.

8. Riparian/Fisheries Habitat

No riparian or fisheries habitat occurs on this allotment.

9. Wild Horse and Burro Habitat

No wild horse and burro habitat occurs on this allotment.

10. Soils and Lithology

a. Lithology

The Whiterock-Soapstone Allotment consists of scattered limestone and shale hills surrounded by alluvial fans and flood plains. The highest point, Mustang Knoll in the northwest, is Moenkopi shale capped by basalt.

b. Soils

ECOSITE AND SOIL MAP UNIT INDEX (623).

08 Barx fine sandy loam, 1 to 5 percent slopes, (fan terraces), mixed; Loamy Upland, 9" to 13"

20 Dermala fam-Guy fam-Rock Outcrop complex, 10 to 40 percent slopes (mesa scarp) basalt; Basalt Slopes, 13" to 17"

21 Disterheff-Natank-Yumtheska complex, 2 to 15 percent slopes (hills) Virgin/lower red; Disterheff and Natank=Clay Loam Upland (Gravelly), 13" to 17"; Yumtheska=Limestone Slopes, 13' to 17"

25 Goesling loam, 1 to 5 percent slopes (stream terrace), Moenkopi; Loamy Upland (Gravelly), 13" to 17"

45 Mellenthin-Rock outcrop-Torriorthents complex, 10 to 70 percent slopes (hills) Kiabab; Mellenthin=Shallow Loamy, 9" to 13"; Torriorthents=Breaks, 9" to 13"

59 Padilla silt loam, 1 to 5 percent slopes, (fan terrace), mixed sedimentary; Clay Loam Upland, 9" to 13" ppt

63 Radnik loam, 1 to 5 percent slopes (floodplain) mixed; Loamy Bottom, 9" to 13" ppt

73 Strych very gravelly loam, 2 to 10 percent slopes (fan) mixed; Loamy Upland, 9" to 13"

93 Yumtheska-Katzine-Rock Outcrop complex, 2 to 30 percent slopes (hills) limestone; Yumtheska=Limestone Slopes (PJ-Woodland), 13" to 17"; Katzine=Loamy Upland (gravelly) PJ-Woodland, 13" to 17"

c. Soil Condition Assessment:

The Goesling soil near Section 10 stockpond has some barren or very sparsely vegetated areas which are eroding. The area was chained in the late 1960s and slash was pushed into gullies to control erosion. Much of the loamy A horizon has been removed, exposing the silty clay loam Bt horizon, which is a poor seedbed. Slick, platy, physical surface crusts have reduced the infiltration rates and increased runoff. The physical properties of the Goesling soil make it susceptible to compaction. Soil samples were taken from the structurally altered (subangular blocky to platy or massive), compacted, near surface layers on these areas and tested for texture and bulk density (Db). Percent change from normal bulk density for that texture and the decrease in porosity were noted (see Table 6).

Table 6

Soil Sample	Location	Texture	Normal Bulk Density (Db) g/cc	Root restricting Db g/cc*	Sample Db g/cc	% Increase in Db	% Decrease in Porosity
WR-1- Goesling-mu25, (3"-7")	T38NR13W sec. 10 NWSW barren spot	Silty clay loam	1.15	1.5	1.38	16.7	15.4
WR-2 (4"-7")	" Under bush stems	Silt loam	1.15	1.5	1.33	15.7	12.0
WR-3 (3"-7")	" Deep moist hoofprint	Silty clay loam -	1.15	1.5	1.67	45.2	34.6
WR-4 (3"-7")	SWNE Eroding grassy area	Silt loam +	1.15	1.5	1.45	26.1	20.0
WR-5(3"-7")	Sec. 11 SWSW Big sagebrush	Silty clay loam -	1.15	1.5	1.59	38.3	30.0

*NRCS soil quality information sheet "Rangeland Soil Quality – Compaction", May 2001. Most root systems are greatly affected at these Db levels, especially young grasses. The initiation of root restriction for many plants will usually start well below these Db levels.

Compaction is greatest at the 3 to 7 inch depth where surface weathering and powdering are not effective in reversing the problem. The bulk density data shows

that this soil, in the average 3 to 7 inch depth, has an increase of 15.7 to 45.2 percent in density over what would be expected for these textures. A rule of thumb is that a Db increase of 15 percent results in a decreased infiltration/permeability rate of about 50 percent. Since the larger pores are the first to be reduced by compressive forces, the effect is to reduce the infiltration rate and to increase runoff. This soil receives runoff and fine sediments from the surrounding uplands and has a high potential to gully when disturbed. The infiltration rate and near surface permeability has been greatly reduced by compaction resulting in increased runoff. It no longer is a depositional site of soil formation, but a site of accelerated soil erosion. This is evident by the visibly active sheet, rill, and gully erosion.

Reduced porosity also means a loss in root space, productive potential, available water holding capacity, and aeration. The porosity loss in these soil layers ranges from 12.0 to 34.6 percent. Sprouts would find it hard to penetrate compacted layers or to break through a clayey surface crust. Thus, the soils are drier now than prior to compaction and gully formation, given the same amount of precipitation. Achieving the potential plant community of the ecological site guide, under these degraded soil conditions, may not be possible unless a treatment to "break up" the soil (such as plow and seed) occurs.

Nearing or exceeding the root restricting Db helps to explain why there are barren interspaces between old bushes and the lack of young seedlings. These soils have been subject to over 100 years of trampling. Most compaction likely occurred during the late 1800s and early 1900s (when livestock numbers were much higher than at present); compaction may be continued by winter and early spring use when the soils are wettest and are most vulnerable to compaction. As stated above, a treatment such as plow and seed would likely be required to reduce soil compaction.

C. Information and/or Data Pertaining to Issues (from III.G.1.)

1. Issues relating to Rangeland Health and Guidelines for Grazing

a. Concern about the invasion of woody species in the northeastern corner of the allotment.

In the late 1960s, large areas of pinyon-juniper woodland in the allotment were chained to remove the trees and allow understory vegetation to increase. The pinyon, juniper, and sagebrush have reinvaded these communities to the extent that much of the understory browse and grass species are being crowded out.

b. Why was the season of use changed?

As indicated in the "Grazing Use" section on page 2 of this report, the season of use for the Whiterock-Soapstone Allotment is August 1 through May 31. The season of use was changed to allow one of the permittees to operate this allotment in conjunction with several other allotments by moving his herd into this allotment during the summer, staying two months, and then moving onto his other allotments. This necessitates one of the permittees to use the Hole Pasture and one of the permittees to use the Whiterock Reservoir Pasture and both permittees to share the Corral Pasture.

The permittee using the Hole Pasture and sharing the Corral Pasture uses a Switchback System (winter or spring) with up to 88 cattle between October 16 to May 31. The other permittee uses the Whiterock Reservoir Pasture with 265 cattle for one and a half months each year and the Corral Pasture for two weeks, using again a Switchback System. The two pastures are used at different times each year, between August 1 and September 30. As a result, none of the pastures in the allotment would be grazed the same time every year.

The former system favored warm season grasses (no use at all during the summer) at the expense of cool season grasses; however, it is the cool season grasses and shrubs that need improvement (see DPC objectives). The current season of use provides additional spring rest for all pastures. Under the current grazing system, late fall/winter/spring use is 50% less on two pastures and 100% less on the other pasture, which is the pasture where most of the cool season plant objectives are not currently being met.

Allowing additional spring rest every other year on two pastures and complete spring deferment on the other pasture should maintain and improve vigor and range condition by allowing longer rest periods for plants to recover and build root reserves.

c. Concern as to whether livestock grazing is causing soil erosion on the west side of the allotment.

This particular part of the allotment, known as "the Hole," drains the west central portion of the allotment. When severe thunderstorms hit this area, sheet and gully erosion occur. The issue discussed here was whether livestock grazing has reduced the ground cover in the area sufficiently to exacerbate the naturally occurring geological erosion. North of the stockpond in Section 10 is a small intra-montane fan terrace that has poor cover and has regullied after the reservoir was built and gully plugs were removed. At this site, there is continuing lateral erosion, head-cutting, and poor cover around old deep gully systems. In the same soil polygon, MU

25, Goesling loam, on larger fan and stream terraces to the north and to the southeast of the stockpond into Section 11, there are about 119 acres (.64% of the allotment) that have been affected by compaction resulting in accelerated erosion, decreased infiltration rate, and increased runoff. (See section IV. B. 10., Lithology and Soils.)

d. Concern about the invasion of woody species west of Larson Tank.

This is the same issue as (a), on page 33, just in a different location.

e. Concern that vegetative diversity was lacking on the allotment.

The question was raised as to the diversity of vegetation existing on the allotment and whether there should be a greater variety of plants. A comparison of plant species at three different locations both inside and outside exclosures that were installed between 1969 and 1972 noted little difference in the diversity. In addition, after analyzing data that was collected at Key Area #2, it was noted that there were 26 species listed on the report, and the ecological site guide lists 26. At Key Area #6 there were 34 species listed on the report, while the site guide lists 24. At Key Area #15 there were 38 species listed on the report, while the site guide lists 26. At exclosure #1 (unchained), there were 7 species listed in the report; the site guide lists 26. In the chained portion of that same exclosure #1, there were 31 species listed on the report, while the site guide lists 26. Within 300 yards of the exclosure (at Key Area #10) there were 32 species listed on the report, while the site guide lists 26. At exclosure #2 there were 16 species listed on the report, while the site guide lists 26. Within 120 yards of this exclosure (at Key Area #13) there were 25 species listed on the report, while the site guide lists 26.

It is interesting to note that plant diversity inside the exclosures was less that outside; this difference is believed to be the result of land treatment activities surrounding the exclosures. In addition, exclosure #1 is within pinyon-juniper vegetation site. As the woody species increased in numbers and matured in age, understory plant species such as grasses, forbs, and shrubs decreased. At exclosure #2 much of the issue is directed at the over-abundance of sagebrush. As is the case with other areas, there is a direct correlation with sagebrush dominated sites and the lack of an understory component. However, the area that exclosure #2 is located within was treated with herbicide to reduce the composition of sagebrush, which has increased plant diversity.

The study data sheets do not list the plants that were not within the plot frame, or the seasonal plants that may not have been present when study

data was collected. It should be noted that most plants listed in the site guide are present in the plant communities surrounding the key areas, but they may not be within the monitoring plots. Thus, if all plants in the vicinity of the key area would have been recorded, then several more species could have been noted.

f. Concern that dirt tanks result in headcutting as in the northeastern corner of the allotment.

The issue was raised that when dirt tanks or reservoirs are constructed on drainages, digging down into the bottom of the drainage to form the reservoir will cause the stream gradient to change, thus causing headcutting upstream from the reservoir. While this issue of headcutting could hold true in certain situations it was not observed on any reservoirs on the Whiterock-Soapstone Allotment.

V. Conclusions

A. Pertaining to Objectives

1. Land Use Plan Objectives

Arizona Strip Field Office RMP[c] and Grand Canyon – Parashant National Monument Management Plan[d]

Watershed / Soil Stability

DFC-VM-03 and ***DFC-VM-04***
Vegetative communities will provide sufficient plant cover and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity, even during drought years.

DFC-WS-06
The natural hydrologic functions of all watersheds will be intact.

DFC-WS-07
Soils will exhibit infiltration, permeability, and erosion rates appropriate for the soil type, climate, and landform.

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[c] Similar RMP objectives have been grouped together with one conclusion per grouping.
[d] Text in **BOLD** type is the differences in the Grand Canyon-Parashant National Management Plan objectives from those in the Arizona Strip Field Office RMP.

DFC-WS-08
Physical soil crusts will show an increase in organic cover including cryptobiotic colonies, moving them towards being organic crusts.

These objectives been accomplished over the majority of the soils of the allotment. Management has been successful in increasing or maintaining vegetative cover away from stock waters, thus minimizing erosion over most of the allotment. Overall, the allotment meets Standard 1 as evidenced from the studies at key areas where plants, litter, and rock are present in pattern, kind, and amount sufficient to prevent accelerated erosion and on site observations. However, a small intra-montane fan terrace to the north of Section 10 stockpond has poor cover and has regullied after the reservoir was built and gully plugs were removed. There is continuing lateral erosion, head-cutting, and poor cover around old deep gully systems in the same soil polygon, MU 25, Goesling loam, on larger fan and stream terraces to the north and to the southeast of the stockpond into Section 11. About 119 acres in this area (.64% of the allotment) have been affected by compaction and accelerated erosion and thus fail to meet Standard 1 (although the allotment overall meets Standard 1). This area is recommended for a treatment such as plow and seed.

Ecological Processes

DFC-VM-04 and ***DFC-VM-05***
Ecological processes and functions will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Standards for Rangeland ***Health and NPS Vital Signs and enhance Monument values.***

DFC-WF-01
Ecological conditions will be within the range of natural variability and will be functional for dependant animal species.

DFC-WF-11 and ***DFC-WF-12***
The natural biological diversity of fish, wildlife, and plant species will be maintained or, where necessary and feasible, restored throughout the Arizona Strip FO ***(Monument)****. Habitats will be managed on an ecosystem basis, ensuring that all parts of the ecosystem and natural processes are functional.*

These objectives are being met. Ecological processes, function, and condition as well as wildlife habitat needs were considered in developing the DPC objectives for this allotment. Site visits determined that in most areas of the allotment ecological sites are within normal parameters and functioning properly. Plant communities include native shrubs, perennial grasses, and annual forbs.

Invasive Plants

DFC-VM-05 and ***DFC-VM-06***
Invasive plant species will be contained, controlled, or eliminated and native species restored to meet desired plant community (DPC) objectives.

This objective is being met. Noxious plants are monitored and treated to the extent feasible. Cheatgrass is usually not a problem where native vegetation exists (except in pinyon-juniper areas), but becomes a problem when the native vegetation is burned due to wildfires. There are proposals to test methods to control some invasive species such as red brome. The DPC objectives focus on enhancing the current species present, which helps native species compete with invasives.

No Net Loss

DFC-VM-12 and ***DFC-VM-15***
There will be no net loss of total acres within sagebrush communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

This objective is being met. Effects to native plant communities are evaluated in all project-level NEPA analyses and mitigated to the extent feasible. It should be noted that although sagebrush treatments are recommended in this assessment, the objective of these treatments is to reduce the density of sagebrush, not to eliminate sagebrush, thus ensuring no net loss of this vegetative community.

Livestock Grazing

DFC-GM-02
Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed, public rangeland ecosystems will be improved to meet objectives.

DFC-GM-04.
Monument values will be maintained, protected, and improved.

These objectives are being met. Livestock grazing (i.e., season of use, utilization levels, etc.) is managed to maintain or improve the ecological condition of the allotment and protect monument objects. DPC objectives have been developed to maintain and/or improve the health of rangeland resources. These actions would

ensure that these resources, including Monument values (i.e. special status species, wildlife habitat, native vegetation, watershed function, and soil productivity) are preserved or improved.

Desired Plant Community

DFC-GM-01
Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Arizona's Standards for Rangeland Health, and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.

DFC-VM-02 and ***DFC-VM-03***
Native vegetative communities will be protected. A mosaic of native perennial and non-invasive annual vegetative communities will be present across the landscape with diversity of species, canopy, density, and age class reflecting its local ecological site potential and naturally occurring habitat conditions.

DFC-VM-11 and ***DFC-VM-14***
Sagebrush (primarily Artemisia tridentata) communities will consist of a healthy, diverse mosaic of different height and age structures with a thriving community of native grasses and forbs. Mosaics may include stands of young and old sagebrush, openings (ranging from bare ground to short or sparse vegetation to high-density grasslands), wet meadows, seeps, healthy streamside (riparian) vegetation, and other interspersed shrub and woodland habitats.

DFC-VM-13 and ***DFC-VM-16***
Treatment objectives in sagebrush communities will focus on restoring natural disturbance processes, such as by using fire, increasing vegetative ground cover of native grasses and forbs, and removing invasive non-native plants.

DFC-VM-14 and ***DFC-VM-18***
Existing stands of sagebrush will have a balance between shrub and perennial grass cover, for open to moderate shrub canopy cover (5 to 25%), and multiple height classes. This mosaic will include young, sparse stands to support Vesper sparrows and lark sparrows, and older, dense stands to benefit Brewer's sparrows, sage sparrows, black-throated sparrows, gray flycatchers, and sage thrashers.

DFC-VM-15 and ***DFC-VM-19***
Sagebrush communities will include small, grassy openings to support long-billed curlews and burrowing owls.

DFC-VM-16 and ***DFC-VM-20***

Sagebrush communities will include large, continuous blocks (≥300 acres) of unfragmented sagebrush habitat, including mosaics of open to moderate shrub canopy cover (5 to 25%) and multiple age and height classes to benefit sage-dependent species.

DFC-VM-17 and ***DFC-VM-21***

Sagebrush communities will include openings of short vegetation surrounded by sagebrush for ground foraging by sage thrashers, loggerhead shrikes, Brewer's sparrows, and sage sparrows.

DFC-VM-18 and ***DFC-VM-22***

Sagebrush communities will include openings of short vegetation (2 to 8 in.) with wide visibility to provide breeding habitat for long-billed curlews, and burrowing owls.

DFC-VM-19 and ***DFC-VM-23***

Sagebrush communities will include native grass and forb cover in balance with open to moderate (5 to 25%) shrub canopy cover and within ecological site potential. Perennial grass components will be at or above 10%. Native forb composition will be at or above 5%.

DFC-VM-20 and ***DFC-VM-24***

Fragmentation of sagebrush habitat will be less than 50% of the treatment area.

DFC-VM-21 and ***DFC-VM-25***

Healthy, diverse woodland communities will consist of a mosaic of trees, shrubs, grasses, and forbs. Mosaic patches can include stands of young and old pinyon-juniper, openings, wet meadows, seeps, and other interspersed shrub habitats. The communities will be composed of a variety of different height structures and age classes, with a thriving understory community of native grasses, forbs, and shrubs.

DFC-VM-24 ***and DFC-VM-28***

Stands of pinyon-juniper will include a balance between tree, shrub, and perennial grass cover to support pinyon jay and mule deer. This mosaic will include stands of old growth pinyon-juniper to support juniper titmouse; large openings of grasses, forbs and shrubs to support mule deer and provide foraging habitat for raptors such as sharp-shinned hawk, northern goshawk, Coopers hawk, American kestrel, and red-tailed hawk; and areas of sparse to dense tree canopy cover to support pinyon jay.

DFC-VM-25 and ***DFC-VM-29***

Individual old growth trees will be present and will be protected during treatment implementation.

DFC-VM-23
Treatment objectives in the pinyon-juniper vegetation communities will focus on restoring the natural disturbance regime; increasing vegetative ground cover of native grasses, forbs, and shrubs; and removing non-native invasive species.

DFC-WF-16 and ***DFC-WF-17***
Mule deer habitat in pinyon-juniper woodland sites will include a healthy diverse mosaic of trees, shrubs, grasses, and forbs.

These objectives are mostly being met. The allotment supports a diversity of wildlife (including avian species, reptiles, and large and small mammals), provides forage for livestock, provides recreation opportunities, and provides functional watersheds across the majority of the allotment. The DPC objectives that have been developed for this allotment consider these public values. Communities of healthy diverse habitat, including vertical and horizontal structures, vegetative age classes, and endemic species are present throughout the allotment. However, there are some areas on the allotment in which pinyon/juniper and sagebrush are too dense and are lacking in overall understory plant cover and diversity. As a result, vegetation treatments are recommended in portions of the allotment to increase the composition of grasses and forbs.

Wildlife Habitat

DFC-WF-02
Native wildlife communities, ***as Monument objects,*** *will be protected. A complete range of diverse, healthy, and self-sustaining populations of native animal species will occupy all available suitable habitats.*

This objective is being met. DPC objectives consider the needs of endemic wildlife species and their habitat. Objectives for this allotment have been developed that incorporate wildlife needs.

Habitat Connectivity

DFC-WF-06
Habitat connectivity and wildlife movement between ecological zones will be maintained.

This objective is being met through continued wildlife population and habitat monitoring. Habitat connectivity and wildlife movement are taken into

consideration for all project level planning, including travel management, to minimize impacts from proposed activities.

Fences

DFC-WF-05
Fences will be the minimum necessary for effective livestock control or other administrative purposes. Fences will be wildlife passable, consistent with the species found in the area.

DFC-WF-19 and ***DFC-WF-20***
All fences in mule deer habitat will be deer passable.

Progress toward meeting these objectives is occurring and is ongoing. Water lots across the Arizona Strip District (including this allotment) will be prioritized for inspection and modification (to make them deer passable) as needed. Additionally, a mule deer management plan is being jointly developed by the BLM and AGFD. This plan will outline objectives to better manage this species.

Healthy Wildlife Populations

DFC-WF-03
Forage, water, cover, and space will be available to wildlife of sufficient quantity and quality to support productive and diverse wildlife populations.

DFC-WF-12 and ***DFC-WF-13***
Mule deer habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-34 and ***DFC-WF-35***
Desert cottontail habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-36 and ***DFC-WF-37***
Migratory bird habitats will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-44 and ***DFC-WF-45***

Carnivore habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

These objectives are all being met. Sustainability needs (such as forage, cover, and shelter) for wildlife including mule deer, migratory birds, and carnivores were taken into consideration when the DPC objectives for this allotment were developed. Wildlife waters are inspected by the BLM and AGFD and maintained/repaired as funding allows. A mule deer management plan is being jointly developed between the BLM and AGFD. This plan will outline objectives to better manage this species. Wildlife population and habitat monitoring will continue. Impacts to wildlife (including mule deer, migratory birds, and carnivores) and their sustainability needs are taken into consideration and analyzed during all project-level planning in order to minimize impacts from proposed activities.

Wildlife Population Numbers

DFC-WF-13 and ***DFC-WF-14***

On BLM administered lands, *mule deer populations will be at or near maximum levels sustainable for the habitat.*

DFC-WF-35 and ***DFC-WF-36***

Desert cottontail rabbits will be present in sufficient quantity to provide an adequate prey base for raptors, carnivores, and other predatory species, as well as ample recreational opportunities for hunting and wildlife viewing.

DFC-WF-37 and ***DFC-WF-38***

Migratory birds that nest in the Monument and in the Arizona Strip FO will have resources of sufficient quantity and quality to provide for nesting sites and to fledge young successfully.

The BLM is progressing towards meeting these objectives. Sustainability needs such as forage, cover, shelter, and nesting sites, for mule deer, desert cottontail rabbits, and migratory birds have been taken into consideration when developing DPC objectives for this allotment. Providing the sustainability needs for these species ensures optimum population levels. A mule deer management plan, which will outline objectives to better manage this species, is being jointly developed by the BLM and AGFD. The plan will outline adaptive management actions for mule deer to assist in providing a sustainable healthy population within this GMU. Annual mule deer population surveys will continue and the results will provide data to assist in management of this and other species.

Wildlife Waters

DFC-WF-04
All waters will be safely accessible to wildlife.

DFC-WF-17 and ***DFC-WF-18***
Water sources within mule deer habitat will be safely accessible to deer and other wildlife.

DFC-WF-18 and ***DFC-WF-19***
On BLM administered lands, *water sources within mule deer habitat will be spaced no more than 3 miles apart.*

DFC-WF-42 and ***DFC-WF-43***
Water sources within game bird habitats will be safely accessible by all wildlife.

DFC-RP-09
A sufficient quantity of water with safe access for wildlife will be available, where appropriate.

Progress toward meeting these objectives is occurring and is ongoing. Wildlife and livestock water catchments are inspected and repaired/maintained as funding allows; those found to be hazardous to wildlife are modified. This includes replacing existing wire fences with pipe fences designed by AGFD to allow deer and other wildlife free access but preclude livestock. A mule deer management plan, which will outline objectives to better manage this species, is being jointly developed by the BLM and AGFD.

Threatened and Endangered Species Habitat

DFC-TE-03
*The Arizona Strip/****the Monument*** *will provide a block of remote, contiguous habitat that will serve as refugia for populations of special status species.*

DFC-TE-25 and ***DFC-TE-21***
Habitat areas for special status raptors will provide sufficient forage and cover attributes to support thriving populations of the species.

DFC-TE-27 and ***DFC-TE-23***
Potential roosting and nesting sites (for special status raptors) will be abundant.

These objectives are all being met. Quantity and quality of habitat for special status species are taken into consideration for all project-level planning, including

applications for new trails, roads, or projects that bisect contiguous habitat and/or may affect the habitat needs for these species in order to minimize impacts from those proposed activities. Sustainability needs such as prey items, forage, cover, roosting and nesting sites, and quantity of suitable habitat for special status species have also been taken into consideration when developing the DPC objectives for this allotment.

Healthy Threatened and Endangered Populations

DFC-TE-24 and ***DFC-TE-20***
Special status raptor populations will be healthy and self-sustaining throughout their range.

DFC-TE-29 and ***DFC-TE-25***
Rodent populations, as a prey base (for special status raptors), within the Arizona Strip FO ***and the Monument*** *will be abundant.*

These objectives are both being met. Sustainability needs such as prey items, forage, cover, roosting and nesting sites, and quantity of suitable habitat for special status species have been taken into consideration when developing the DPC objectives for this allotment. Providing optimum sustainability needs for those species ensures optimum population levels.

No Net Loss of Threatened and Endangered Species Habitat

DFC-TE-04 and DFC-TE-08
There will be no net loss in the quality or quantity of special status species habitat throughout the Arizona Strip FO.

DFC-TE-26 and ***DFC-TE-22***
No net loss will occur in the quality and quantity of suitable habitat for special status raptors within the Arizona Strip FO and ***Monument****.*

These objectives are all being met. Quantity and quality of habitat for special status species are taken into consideration for all project-level planning, including applications for new trails, roads, or projects that bisect contiguous habitat and/or may affect the habitat needs for these species in order to minimize impacts from those proposed activities and ensure no net loss of suitable threatened and endangered species habitat. Sustainability needs such as prey items, forage, cover, roosting and nesting sites, and quantity of suitable habitat for special status species have also been taken into consideration when developing the DPC objectives for this allotment.

Condors

DFC-TE-31 and ***DFC-TE-27***
The experimental non-essential population of California condor will be at or above 150 individuals, viable, and stable to increasing in number.

Progress toward meeting this objective is ongoing. The BLM works cooperatively with the USFWS, AGFD, and the Peregrine Fund to continue the highly successful California condor reintroduction program on the Arizona Strip. The BLM provides financial and in-kind assistance to this program. Sustainability needs such as forage and cover for the California condor were taken into consideration when the DPC objectives for this allotment were developed.

Recreation and Visitor Services

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of both:

1. Structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings and/or,
2. Dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues (extensive recreation management areas (ERMAs).

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings.

DFC-RR-04 and ***DFC-RR-05***
The excellent opportunities that exist to enjoy remote, rustic settings that provide moderate challenge and solitude in the Specialized TMAs will be maintained/enhanced.

DFC-RR-05 and ***DFC-RR-06***
In Backways and Specialized TMAs, recreation opportunities associated with somewhat remote settings, such as exploring backcountry roads, vehicle camping, hunting, sightseeing, recreation aviation, and picnicking will be maintained/enhanced on existing roads, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

DFC-RR-06 and ***DFC-RR-07***
In the Primitive TMA, high quality recreation opportunities associated more with primitive recreation experience opportunities and non-motorized uses such as

camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

These objectives are being met because a wide variety of recreation experiences are available to local and regional community members within the SRMA and ERMA in this allotment.

Visual Resources

DFC-VR-01
Public lands will be managed in a manner, which will protect the quality of the scenic (visual) values of these lands. (43 U.S. Code [USC] 1701, Section 102 (a) (8)).

DFC-VR-03
The region's scenic beauty, open space landscapes, and other high-quality visual resources will be maintained within the Arizona Strip FO and ***the Monument****.*

The objectives for management of visual resources in this allotment are being met. Visual resources are taken into consideration for all project-level planning in order to minimize impacts from proposed activities.

2. Specific Resource Objectives

Whiterock-Soapstone Allotment Management Plan objectives (1968, revised in 1973)

a. *Increase the grazing capacity for livestock from 1,120 AUMs to 1,728 AUMs*
b. *Increase the number of mule deer by 300%.*
c. *Increase quail and dove populations by locating multiple-use waters.*
d. *Increase distribution of livestock on the allotment to cover 90% of the area. The other 10% is unusable.*
e. *Improve the natural beauty of the area by changing sagebrush areas to grassy covered valleys, creating grassy parks in otherwise solid pinyon-juniper woodlands, increasing the density of native grasses, reducing erosion and healing gullies.*

Met overall. The AUMs on the allotment were increased to 1320 in 1981. However, there is no way to measure increases in quail and dove populations, and deer populations numbers are not determined on an allotment-by-allotment basis, but rather across entire GMUs. Livestock distribution has increased considerably throughout the allotment, both through the chaining and seeding that was done in the 1960s, more recent sagebrush treatments, and improved water distribution

done in the last few years. Many old gullies throughout the allotment have healed in response to the past chaining and seeding that was done, and through detention dikes that were built to control flooding, with one exception. North of the stockpond in Section 10, a small intra-montane fan terrace that has poor cover has regullied after the reservoir was built and gully plugs were removed. At this site, there is continuing lateral erosion, head-cutting, and poor cover around old deep gully systems. In the same soil polygon, MU 25, Goesling loam, on larger fan and stream terraces to the north and to the southeast of the stockpond into Section 11, there are about 119 acres (.64% of the allotment) that have been affected by compaction resulting in accelerated erosion, decreased infiltration rate, and increased runoff. As discussed on page 33 of this assessment, it is recommended that these acres be treated to reduce the soil compaction.

These objectives have been replaced with new DPC objectives (see below).

Desired Plant Community Objectives:

Key Area #2: Whiterock Reservoir Pasture

- *Maintain galleta grass composition by dry weight of 25-35%*

Met. Currently it is at 32%.

- *Increase squirreltail composition by dry weight to 1%-5%*

Not met. Currently it is at 0%.

- *Increase western wheatgrass composition by dry weight to 1-5%*

Not met. Currently it is at 0%.

- *Increase Indian ricegrass composition by dry weight to 1-5%*

Not met. Currently it is at 0%.

- *Increase Mormon tea composition by dry weight to 1-5%*

Not met. Currently it is at 0%.

- *Decrease Sagebrush composition by dry weight to 1-15%*

Not met. Currently it is at 50%

These DPC objectives are not met due to the amount of sagebrush present (50% CBW) on the site. It is recommended that a vegetative treatment to reduce the amount of sagebrush (thereby reducing competition for available soil moisture and space by grasses and forbs) be implemented in order to allow the attainment of all DPC objectives at this key area.

Key Area #6: Hole Pasture

- *Maintain galleta grass composition by dry weight of 25-35%*

Met. Currently it is at 31%.

- *Maintain squirreltail composition by dry weight of 1-5%*

Met. Currently it is at 2%.

- *Maintain Indian rice grass composition by dry weight of 1-5%*

Met. Currently it is at 3%.

- *Maintain cliffrose/antelope bitterbrush composition by dry weight of 1-5%*

Met. Currently it is at 2%.

- *Decrease sagebrush composition by dry weight to 1-5%*

Not met. Currently it is at 8%

The DPC objective of decreasing sagebrush composition by dry weight to 1-5% can only be met through implementing some form of vegetation treatment in the area. (See discussions concerning the need for reducing sagebrush to increase ground cover, etc., on pages 33, 51, and 53 of this assessment.)

Key Area #10: Hole Pasture (Loamy Upland 10"-14" pz)

- *Maintain western wheatgrass composition by dry weight of 45-60%*

Met. Currently it is at 57%.

- *Maintain Indian ricegrass composition by dry weight of 5-15%*

Met. Currently it is at 13%.

- *Maintain bottlebrush squirreltail composition by dry weight of 1-5%*

Met. Currently it is at 4%.

- *Maintain cliffrose/antelope bitterbrush composition by dry weight of 1-5%*

Met. Currently it is at 4%.

- *Maintain Mormon tea composition by dry weight of 1-5%*

Met. Currently it is at 1%.

- *Maintain sagebrush composition by dry weight of 1-15%*

Met. Currently it is at 6%.

Key Area #13: Corral Pasture

- *Maintain galleta grass composition by dry weight of 50-70%*

Met. Currently it is at 60%.

- *Maintain sand dropseed composition by dry weight of 1-10%*

Met. Currently it is at 8%.

- *Increase squirreltail composition by dry weight to 5-10%*

Not met. Currently it is at 4%.

- *Increase Indian ricegrass/needlegrass composition by dry weight to 5-20%*

Not met. Currently it is at 1%.

- *Decrease sagebrush composition by dry weight to 1-15%*

Not met. Currently it is at 17%

The DPC objectives for Indian ricegrass/needlegrass and squirreltail are not met due to the amount of sagebrush present (17% CBW) on the site. The ecological site guide allows up to 15% CBW for sagebrush. This key area was treated in 2008 to reduce the amount of sagebrush on site, thereby reducing competition for available soil moisture and space by grasses and forbs. As such, in 2008, an herbicide was applied to the sagebrush in this area and it is believed that this will allow the DPC objectives to be attained.

Key Area #15: Whiterock Reservoir Pasture (Loamy Upland 10"-14" pz)

- *Maintain galleta grass composition by dry weight of 35-45%*

Met. Currently it is at 42%.

- *Maintain squirreltail composition by dry weight of 5-10%*

Met. Currently it is at 10%.

- *Maintain Indian ricegrass composition by dry weight of 3-7%*

Met. Currently it is at 3%.

- *Maintain needle and thread grass composition by dry weight of 1-5%*

Met. Currently it is at 1%.

B. Response to Issues

1. Issues relating to Rangeland Health and Guidelines for Grazing Administration

a. Concern about the invasion of woody species in the northeastern corner of the allotment.

After visiting the above site and other sites throughout the allotment in similar condition, it was concluded that due to the reinvasion of the pinyon, juniper, and sagebrush, some form of vegetation treatment would be desirable. Methods for controlling pinyon-juniper and/or sagebrush range from prescribed fire and herbicides to mechanical treatments such as brush hogs, depending on the location and types of vegetation involved.

b. Why was the season of use changed?

Consensus from the IAT was that the current season of use incorporating a deferred rotation grazing system that includes summer use provides the additional spring deferment that the plants did not get under the former grazing system. The current season of use on this allotment provides for the physiological needs of the key species – the scheduled graze and rest periods benefit key species and other vegetation by increasing plant vigor, aiding in seed dissemination, and providing rest during critical growing periods.

c. Concern as to whether livestock grazing is causing soil erosion on the west side of the allotment.

The number of livestock grazing this area was significantly higher in the late 1800s and early 1900s than the current level. Soil compaction and reduced composition of grasses likely occurred many decades before the present, which initiated accelerated erosion. Bulk density data shows the Goesling soils (approximately 119 acres or 0.64% of the allotment) to be compacted enough to fail Standard 1 criteria in this isolated area of the allotment (although the allotment as a whole meets Standard 1). A conclusion was to treat the area with the herbicide Spike to reduce the brush and allow more grasses the opportunity to establish and increase. Another recommendation is to do a plow and seed treatment to break-up the compaction, enabling better grass root growth. This area must be then monitored closely to prevent a reduction of effective ground cover. An exclosure on the stream terrace soil in Section 11 would provide good data on stabilization of this sensitive soil and to monitor site recovery.

The portion of the east drainage that flows into the Section 10 stockpond, that had gully plugs removed in 1983, has regullied up to where the old slash piles were left in place. Gully plugs could to be placed in this new gully to stabilize it, trap sediments, and prevent further headcutting. Vegetation cover should be increased on all the fan and stream terraces, especially more grasses. Additional slash could be pushed into all the active gully systems in the rest of this soil polygon, MU 25, to the north and the southeast of the stockpond, the area in Sections 10 and 11. To reduce compaction, the MU 25 soil should not be grazed until this soil is dry to a depth of at least 6 inches, which is usually late spring or summer. This could be accomplished by resting the whole pasture, as mentioned, or by fencing those areas separate that need treatment to improve soil conditions. Fencing the area separate from the rest of the pasture would give better control of management of the treated area and allowing grazing system rotation to continue on remaining portion of the pasture with the other pasture. Any land treatment should receive rest from livestock grazing for a minimum of two years.

d. Concern about the invasion of woody species west of Larson Tank.

This is the same issue as (a) above (page 52), just in a different location and would be handled the same as (a).

e. Concern that vegetative diversity was lacking on the allotment and that there should be a greater variety.

When comparing lists of plant species from monitoring study summaries at each key area with listed plants in the ecological site guides, it was determined that in most cases there were more plants listed on the study summaries than were listed on the ecological site guide for the key area.

In addition, after comparing vegetation at three different exclosures (reference areas) at different locations both inside and outside of the exclosures that were installed between 1969 and 1972, it was noted that there was little difference in the vegetative diversity. Thus, in order to fully realize the projected benefits to ecological diversity, watershed function, and wildlife habitat restoration, vegetative treatments in pinyon-juniper and sagebrush dominated sites should be carried forward as viable projects for future consideration. These treatments would improve the diversity of perennial vegetation at these areas of dense pinyon-juniper and sagebrush stands that currently have little if any understory vegetation.

f. Concern that dirt tanks result in headcutting as in the northeastern corner of the allotment.

The issue of headcutting was not observed on any reservoirs on the Whiterock-Soapstone Allotment.

C. SUMMARY (Meeting Arizona Standards for Rangeland Health)

1. Standard 1. Upland Sites.

All key areas suffered from the drought as evidenced by analyses and supporting documentation referenced herein where the data shows that drought has played a major role in vegetation changes, particularly between 1998 and 2004 data.

Ground cover was measured at 5 key areas and inside 2 exclosures (reference areas). Ground cover remained static on 4, and trended downward on 3 key areas. Two study areas showing a downward trend were inside the two exclosures, the other is Key Area #13, which is a sagebrush community that was treated with herbicide in 2008 to release grasses and forbs which would have a positive effect on improving the percent ground cover. This key area (#13) consists of approximately 146 acres (0.78% of total allotment acres) that do not show any signs of accelerated erosion. The most recent data lists ground cover at 27%; however, data from the past 5 studies reflects percent ground cover ranging from 52-57%. Regardless of the cause of lower percent ground cover, this key area is listed as not meeting Standard 1; however, it is believed ground cover would improve over the next few years due exclusively to the vegetative treatment. As discussed previously in this assessment, the causal factor in DPC objectives not meeting is due primarily to the effects of drought or the high densities of pinyon/juniper and sagebrush which out compete other plant species for soil moisture and nutrients.

On the 4 key areas plants, litter, and rock are present in pattern, kind, and amount sufficient to prevent accelerated erosion and were considered to be functioning properly and meet Standard 1.

North of the stockpond in Section 10 is a small intra-montane fan terrace that has poor cover and has regullied after the reservoir was built and gully plugs were removed. At this site, there is continuing lateral erosion, headcutting, and poor cover around old deep gully systems. In the same soil polygon, MU 25, Goesling loam, on larger fan and stream terraces to the north and to the southeast of the stockpond into section 11, there is

about 119 acres (0.64% of the allotment) that have been affected by compaction. This compaction is resulting in accelerated erosion, decreased infiltration rate, increased runoff, and thus fails to pass Standard 1 in this small portion of the allotment. Compaction most likely occurred during the first decades of heavy livestock use in the late 1800s and early 1900s. This compaction may be maintained by winter and early spring use when the soils are wettest to depth and are most vulnerable to compaction.

In conclusion, treating this area (portions of section 10 and 11) with some type of land treatment would reduce the brush, release grasses allowing them to reestablish, increase in density, and reduce erosion. This area should continue to be monitored closely to document change and prevent a reduction of effective ground cover. Key Area #6 is close to this area and it shows improving ground cover; using this area during the drier months (fall through early winter or late spring and summer) could help reduce the compaction issue. Another option would be to fence off the reservoir and not allow use during the wettest time of the year. In addition, adding an exclosure on the stream terrace soil in section 11 would provide good data on stabilization of this sensitive soil and monitor site recovery.

2. Standard 2. Riparian-Wetland sites

a. There are no riparian areas in the Whiterock Soapstone Allotment.

3. Standard 3. Desired Resource Conditions.

Monitoring data indicates that 65% of the DPC objectives are currently being met. DPC objectives for some plant species were not met during this assessment process. As discussed previously in this assessment, this was due primarily to the effects of the drought or the high densities of pinyon/juniper and sagebrush which reduced the composition of key species. The DPC objectives for sagebrush, which call for a reduction in sagebrush composition, were also not met. Most of the DPC objectives for Key Area #2 are also not being met, again due to the amount of sagebrush (50% CBW) currently in the area. As such, Key Area #2 is not meeting Standard 3 (approximately 359 acres). As discussed previously in this assessment, the causal factor in DPC objectives not meeting is due primarily to the effects of drought or the high densities of pinyon/juniper and sagebrush which out compete other plant species for soil moisture and nutrients, and progression toward meeting the DPC objectives is contingent on the reduction of sagebrush CBW down to 1-15%.

The other DPC objectives not meeting are also dependent on reducing sagebrush composition; these species should respond and objectives would be met when sagebrush is reduced. However, it is believed that some of the species would recover even with current management because the species showing a downward trend readily respond when more normal precipitation occurs; barring no major drought, these DPC objectives should be attainable.

An assessment of key area data relative to criteria for meeting standards, and indicators of rangeland health, resulted in a determination that key areas, except for Key Area #2, are meeting or progressing towards meeting standard #3. However, the effects of drought have slowed this process. In spite of the drought, the IAT determined, based upon supporting documentation and on site observation, that native species are present and re-sprouting was occurring, which is moving the community in the desired direction. In addition, vegetation treatments to reduce sagebrush should further move these areas toward the identified desired plant communities.

In conclusion, the amount and timing of precipitation has affected the frequency of plant species and other vegetation attributes. Monitoring data indicates that it was drought rather than livestock grazing that was the primary causal factor influencing vegetation attributes. As such, it is expected that current livestock grazing would not be a limiting factor in the area achieving DPC objectives. Between 1970 and 1990, utilization levels were occasionally above 50% allowable; however, since then utilization has been below the 50% allowable on key species.

With the exception of the 119 acres not meeting Standard 1 and the 359 acres not meeting Standard 3, the IAT determined, based on supporting documentation and on-site observation, that desired resource conditions on the majority of the allotment (97%) are being met, as evidenced by re-sprouting that is occurring moving the community in the desired direction, and thus progressing towards meeting Standards #1 and 3.

The following is added for conclusions relative to implementation of the Standards for Rangeland Health and Guidelines for Grazing Administration

Based on the analyses and supporting documentation referenced herein, resource conditions on the allotment:

[ ] Meet all applicable standards for rangeland health

[X] Are making significant progress toward meeting the applicable standards for rangeland health

Do not meet the standards for rangeland health for:
[ ] No. 1: Upland sites
[ ] No. 2: Riparian-Wetland sites
[ ] No. 3: Desired Resource Conditions

[ ] Have not been sufficiently documented to make a specific determination, but there is no reason to believe that current management would preclude meeting the standards for rangeland health.

VI. Recommendations

A. Treat areas: 1) where brush (pinyon-juniper and sagebrush communities) is reinvading portions of the allotment in order to make them more productive and protect the watershed by increasing understory plant cover; 2) where necessary to meet DPC objectives.

B. Renew the Ten Year Grazing permit of the Whiterock-Soapstone Allotment with current terms and conditions, and update allotment management plan to address DPC objectives and season of use.

C. Treat the eroding sagebrush dominated alluvial fans and stream terraces in sections 10 and 11 with "Spike" to increase the grass cover.

D. At least one large (10 acre or more) livestock exclosure should be established in the portion of this allotment which is within Grand Canyon-Parashant National Monument in order to better document the effects of livestock management from the effects of weather. The eroding stream terrace in section 11 would be ideal for this.

E. In the Hole Pasture, fence off portions of section 10 and 11 to restrict grazing and to allow for land treatment to aid in controlling the lateral erosion, head-cutting, and poor cover as well as addressing the compaction issue. If this is not feasible, schedule livestock grazing to coincide with drier seasons of the year, such as fall, late spring and summer or fence reservoir and to preclude access during the wettest season.

AUTHORIZED OFFICER CONCURRENCE:

✓ We concur with the conclusions and recommendations as written.

_____ We do not concur.

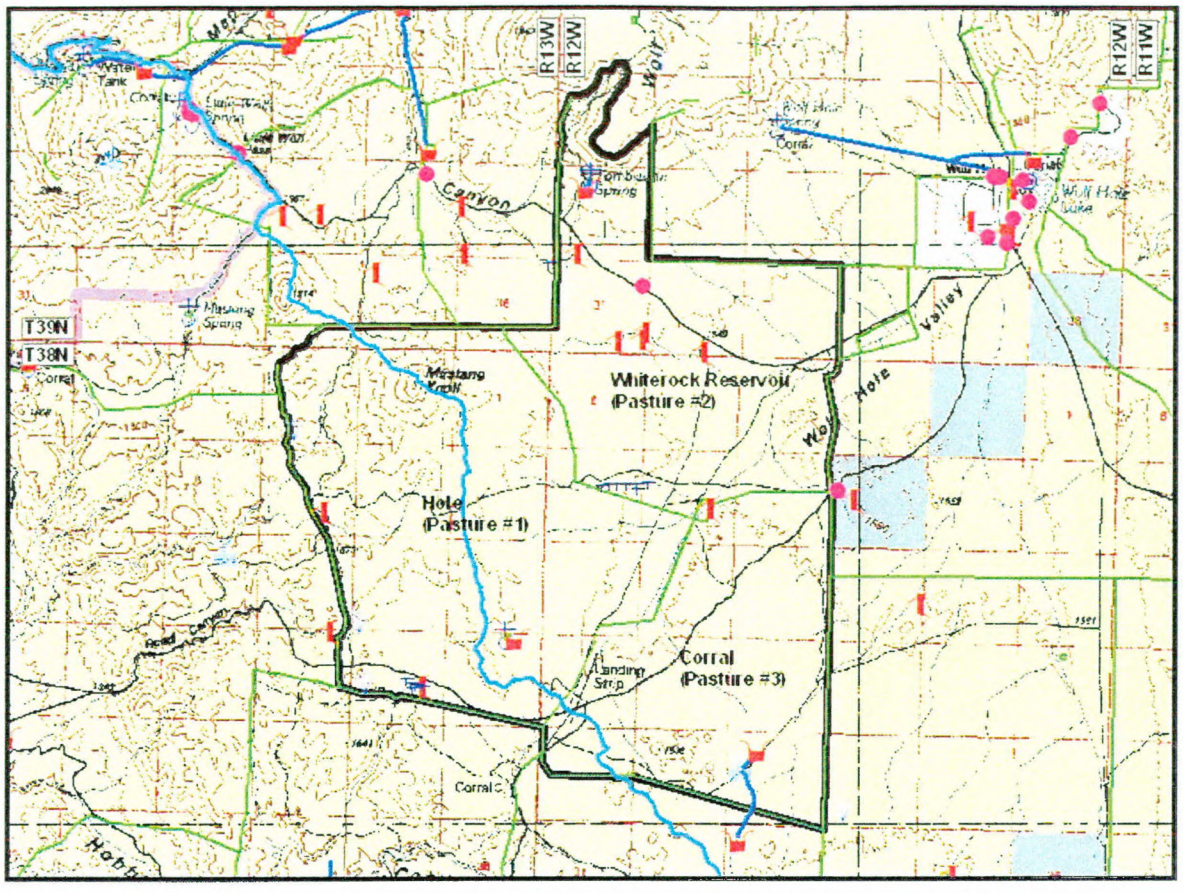
_____ We concur, with the following modifications:

Lorraine M. Christian
Field Manager
Arizona Strip Field Office

Oct. 2, 2009
Date

Thomas R. Edgerton
Monument Manager
Grand Canyon-Parashant National Monument

10/5/09
Date



Whiterock - Soapstone Allotment

Bureau of Land Management
Arizona Strip District

1 0.5 0 1 Miles

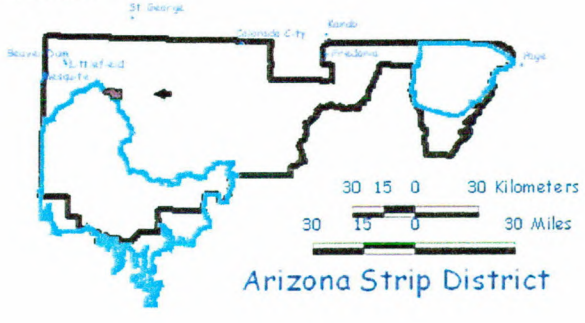
1 0.5 0 1 Kilometers

1:100,000

- Noxious Weeds
- Livestock Catchment
- Key Area
- Fence
- Pipeline
- Monument Boundary
- Allotment Boundary
- Wilderness Boundary

Ownership
- BLM
- Forest Service
- Indian Reservation
- National Park
- Private
- Recreation Area
- State

- Fenced Reservoir
- Trough
- Undeveloped Spring
- Unfenced Reservoir
- Water Storage Tank
- Well
- Wildlife Catchment
- Wildlife Drinker
- Windmill
- Cattleguard
- Corral
- Developed Spring



This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.

Produced by
Linda Price
September 22, 2008

The determination represents an administrative process and is not a decision document.

DETERMINATION

Achieving Standards for Rangeland Health
and
Conforming with Guidelines for Grazing Administration

Office: Arizona Strip District, Arizona Strip Field Office/Grand Canyon-Parashant NM

Grazing Allotment Name/Number: Whiterock Soapstone Grazing Allotment #4804

Public Land (acres):

Upland:	18,614
Riparian/Wetland:	0
Total:	18,614

Streams on Public Land (miles): N/A

Name of Permittee(s): Leon Brinkerhoff and William M. Gubler

Assessment Participants:

Name	Discipline	Interest
Bill Gubler,	Commodity Interests	Grazing
Kent McComb	Commodity Interests	Grazing
Scott Hansen	Non-Commodity Interests	Environmental Conservation
Spence Esplin	Non-Commodity Interests	Historical
Phil Squire	Non-Commodity Interests	Dispersed
Recreation/Wildlife		
Frank Malan	Local Area Interests	Public-at-Large
Roger McPeek	Local Area Interests	Public-at-Large
Dennis Becenti	Local Area Interests	Native American Interests
Alternates:		
Maggie Sacher	Commercial	Recreation/Tourism
Paul Weaver	Non-Commodity	

Interdisciplinary Assessment Team:

Name	Title	Agency
Linda Price	Project Coordinator	BLM
Karen Jensen	Wildlife Biologist, Team Lead	BLM

Diana Hawks	Recreation, Wilderness, and Cultural Resources Team Lead (BLM)	
Phil Seegmiller	Vegetation/Grazing Administration	BLM
Robert Smith	Soil Scientist	BLM
Brian Bock	Soils and Watershed	BLM
Luke Thompson	Wildlife Manager	Arizona Game and Fish Department
Kyle Spencer	Soils and Vegetation	Natural Resource Conservation Service
Rob Grumbles	Vegetation and Social Economics	Mohave County Extension Service

Standard 1 (Upland Sites)

X Meet all applicable standards for rangeland health at 4 key areas.

X Not Meeting the Standard, Livestock Grazing Management Practices are Significant Factors on 119 acres affected by historical compaction.

X Not Meeting the Standard, but making significant progress toward meeting the applicable standards for rangeland health at Key Area #13 (146 acres). Livestock Grazing Management Practices are not a Significant Factor. Corrective measures are already in place.

___ Not Meeting the Standard, Livestock Grazing Management Practices is a Significant Factor.

Rationale/Information Sources:

All key areas suffered from the drought as evidenced by analyses and supporting documentation referenced herein where the data shows that drought has played a major role in vegetation changes, particularly between 1998 and 2004 data.

Ground cover was measured at 5 key areas and inside 2 exclosures (reference areas). Ground cover remained static on 4, and trended downward on 3 key areas. Two study areas showing a downward trend were inside the two exclosures, the other is Key Area #13, which is a sagebrush community that was treated with herbicide in 2008 to release grasses and forbs which would have a positive effect on improving the percent ground cover. This key area (#13) consists of approximately 146 acres (0.78% of total allotment acres) that do not show any signs of accelerated erosion. The most recent data lists ground cover at 27%; however, data from the past 5 studies reflects percent ground cover ranging from 52-57%. Regardless of the cause of lower percent ground cover, this key area is listed as not meeting Standard 1; however, it is believed ground cover would improve over the next few years due exclusively to the vegetative treatment. As discussed previously in this assessment, the causal factor in DPC objectives not meeting is due primarily to the effects of drought or the high densities of pinyon/juniper and sagebrush which out compete other plant species for soil moisture and nutrients.

On the 4 key areas plants, litter, and rock are present in pattern, kind, and amount sufficient to prevent accelerated erosion and were considered to be functioning properly and meet Standard 1.

Rationale/Information Sources:

Monitoring data indicates that 65% of the DPC objectives are currently being met. DPC objectives for some plant species were not met during this assessment process. As discussed previously in this assessment, this was due primarily to the effects of the drought or the high densities of pinyon/juniper and sagebrush which reduced the composition of key species. The DPC objectives for sagebrush, which call for a reduction in sagebrush composition, were also not met. Most of the DPC objectives for Key Area #2 are also not being met, again due to the amount of sagebrush (50% CBW) currently in the area. As such, Key Area #2 is not meeting Standard 3 (approximately 359 acres). As discussed previously in this assessment, the causal factor in DPC objectives not meeting is due primarily to the effects of drought or the high densities of pinyon/juniper and sagebrush which out compete other plant species for soil moisture and nutrients, and progression toward meeting the DPC objectives is contingent on the reduction of sagebrush CBW down to 1-15%.

The other DPC objectives not meeting are also dependent on reducing sagebrush composition; these species should respond and objectives would be met when sagebrush is reduced. However, it is believed that some of the species would recover even with current management because the species showing a downward trend readily respond when more normal precipitation occurs; barring no major drought, these DPC objectives should be attainable.

An assessment of key area data relative to criteria for meeting standards, and indicators of rangeland health, resulted in a determination that key areas, except for Key Area #2, are meeting or progressing towards meeting standard #3. However, the effects of drought have slowed this process. In spite of the drought, the IAT determined, based upon supporting documentation and on site observation, that native species are present and re-sprouting was occurring, which is moving the community in the desired direction. In addition, vegetation treatments to reduce sagebrush should further move these areas toward the identified desired plant communities.

In conclusion, the amount and timing of precipitation has affected the frequency of plant species and other vegetation attributes. Monitoring data indicates that it was drought rather than livestock grazing that was the primary causal factor influencing vegetation attributes. As such, it is expected that current livestock grazing would not be a limiting factor in the area achieving DPC objectives. Between 1970 and 1990, utilization levels were occasionally above 50% allowable; however, since then utilization has been below the 50% allowable on key species.

With the exception of the 119 acres not meeting Standard 1 and the 359 acres not meeting Standard 3, the IAT determined, based on supporting documentation and on-site observation, that desired resource conditions on the majority of the allotment (97%) are being met, as evidenced by re-sprouting that is occurring moving the community in the desired direction, and thus progressing towards meeting Standards #1 and 3.

North of the stockpond in Section 10 is a small intra-montane fan terrace that has poor cover and has regullied after the reservoir was built and gully plugs were removed. At this site, there is continuing lateral erosion, headcutting, and poor cover around old deep gully systems. In the same soil polygon, MU 25, Goesling loam, on larger fan and stream terraces to the north and to the southeast of the stockpond into section 11, there is about 119 acres (0.64% of the allotment) that have been affected by compaction. This compaction is resulting in accelerated erosion, decreased infiltration rate, increased runoff, and thus fails to pass Standard 1 in this small portion of the allotment. Compaction most likely occurred during the first decades of heavy livestock use in the late 1800s and early 1900s. This compaction may be maintained by winter and early spring use when the soils are wettest to depth and are most vulnerable to compaction.

In conclusion, treating this area (portions of section 10 and 11) with some type of land treatment would reduce the brush, release grasses allowing them to reestablish, increase in density, and reduce erosion. This area should continue to be monitored closely to document change and prevent a reduction of effective ground cover. Key Area #6 is close to this area and it shows improving ground cover; using this area during the drier months (fall through early winter or late spring and summer) could help reduce the compaction issue. Another option would be to fence off the reservoir and not allow use during the wettest time of the year. In addition, adding an exclosure on the stream terrace soil in section 11 would provide good data on stabilization of this sensitive soil and monitor site recovery.

Standard 2 (Riparian-Wetland Sites)

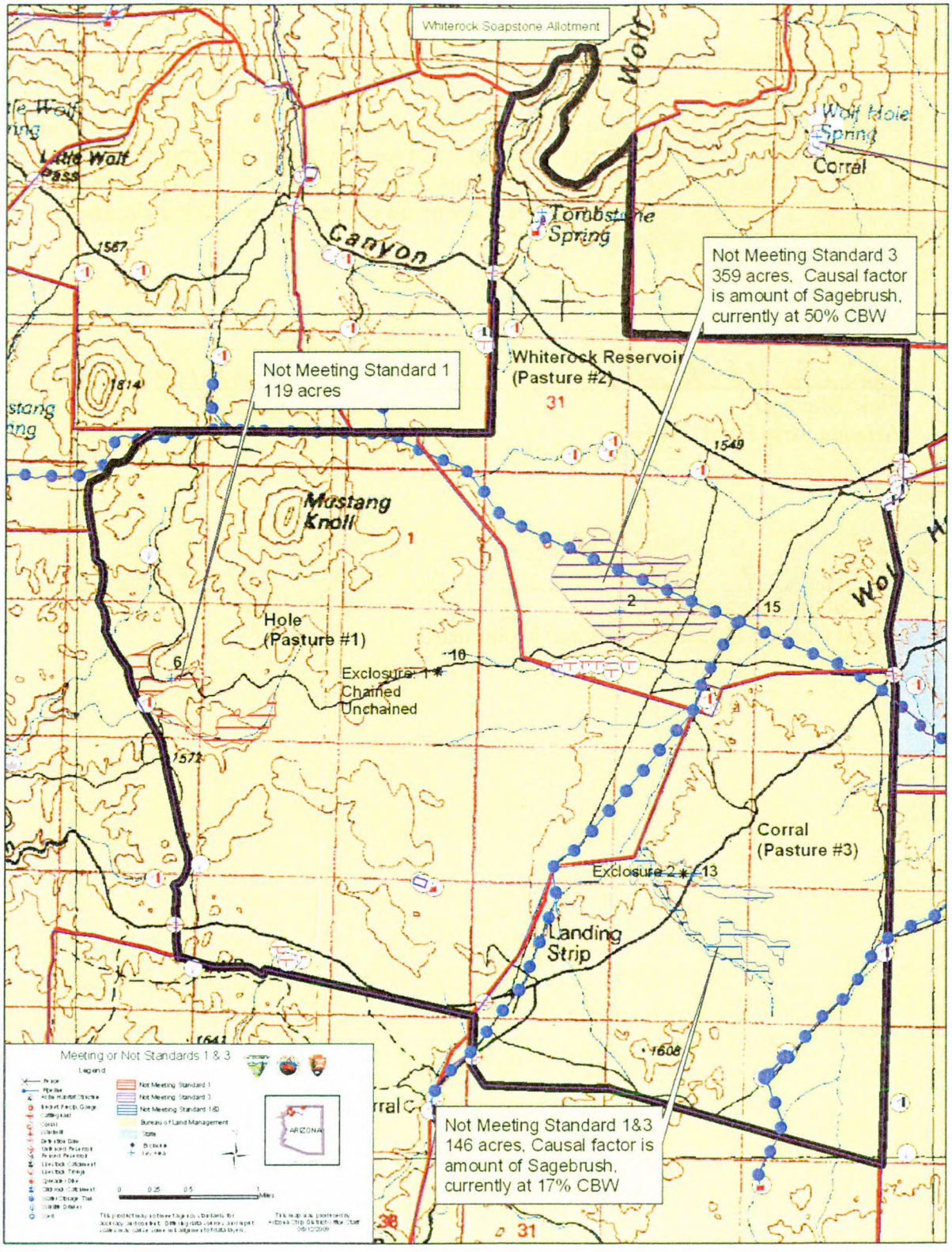
__ Meeting the Standard.
__ Not Meeting the Standard, Livestock Grazing Management Practices are Significant Factors
__ Not Meeting the Standard, but Making Significant Progress towards the standard..
__ Not Meeting the Standard, Livestock Grazing Management Practices are not Significant Factors

Rationale/Information Source.

There are no riparian areas within the allotment boundaries.

Standard 3 (Desired Resource Conditions)

X Meeting the Standard at 3 Key Areas (#6, #10, and #15).
___ Not Meeting the Standard, Livestock Grazing Management Practices are significant factors.
X Not Meeting the Standard, but Making Significant Progress towards meeting the standard at key area #13 (146 acres). Corrective measures are already in place.
X Not Meeting the Standard, Livestock Grazing Management Practices are not Significant Factors at Key Area #2 (359 acres). This area will require a vegetative treatment reducing sagebrush composition to allow key area to met standard 3.


Whiterock Soapstone Allotment
Wolf
Wolf Hole Spring
Corral
Little Wolf Pass
Canyon
Tombstone Spring
Not Meeting Standard 3
359 acres, Causal factor is amount of Sagebrush, currently at 50% CBW
Not Meeting Standard 1
119 acres
Whiterock Reservoir
(Pasture #2)
31
1549
1614
Mustang Knoll
1
2
15
Hole
(Pasture #1)
6
10
Exclosure 1 *
Chained
Unchained
1572
Corral
(Pasture #3)
Exclosure 2 * 13
Landing Strip
1608
Not Meeting Standard 1&3
146 acres, Causal factor is amount of Sagebrush, currently at 17% CBW
38
31
Meeting or Not Standards 1 & 3
Legend
Not Meeting Standard 1
Not Meeting Standard 3
Not Meeting Standard 1&3
Bureau of Land Management
State
ARIZONA
Miles

Determination:

We have determined that 4 of the 5 key areas are meeting Standard 1 and significant progress is being made towards meeting Standard 1 at key area #13. Standard 3 is being met at 3 key areas and significant progress is being made towards meeting Standard 3 at key area #13. Key area #2 will require vegetation treatment reducing the sagebrush composition releasing the key species to allowing them to compete for moisture and nutrients before that area can make progress toward meeting standard 1. Approximately 97% of the allotment is meeting or making significant progress toward meeting Standard 1.

Lorraine M. Christian — 10/2/09

Field Manager
Arizona Strip Field Office

Date

Thomas R. Edgerton — 10/5/09

Monument Manager
Grand Canyon-Parashant National Monument

Date

Appendix A

ARIZONA STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR GRAZING ADMINISTRATION

ARIZONA STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR GRAZING ADMINISTRATION

INTRODUCTION

The Department of the Interior's final rule for Grazing Administration, issued on February 22, 1995, and effective August 21, 1995, requires that Bureau of Land Management (BLM) State Directors develop State or regional standards and guidelines for grazing administration in consultation with BLM Resource Advisory Councils (RAC), other agencies and the public. The final rule provides that fallback standards and guidelines be implemented, if State standards and guidelines are not developed by February 12, 1997. Arizona Standards and Guidelines and the final rule apply to grazing administration on public lands as indicated by the following quotation from the Federal Register, Volume 60, Number 35, page 9955.

> "The fundamentals of rangeland health, guiding principles for standards and the fallback standards address ecological components that are affected by all uses of public rangelands, not just livestock grazing. However, the scope of this final rule, and therefore the fundamentals of rangeland health of §4180.1, and the standards and guidelines to be made effective under §4180.2, are limited to grazing administration."

Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing by livestock. Other contributing factors may include, but are not limited to, past land uses, land use restrictions, recreation, wildlife, rights-of-way, wild horses and burros, mining, fire, weather, and insects and disease.

With the commitment of BLM to ecosystem and interdisciplinary resource management, the standards for rangeland health as developed in this current process will be incorporated into management goals and objectives. The standards and guidelines for rangeland health for grazing administration, however, are not the only considerations in resolving resource issues.

The following quotations from the Federal Register, Vol. 60, No. 35, page 9956, February 22, 1995, describe the purpose of standards and guidelines and their implementation:

> "The guiding principles for standards and guidelines require that State or regional standards and guidelines address the basic components of healthy rangelands. The Department believes that by implementing grazing-related actions that are consistent with the fundamentals of §4180.1 and the guiding principles of §4180.2, the long-term health of public rangelands can be ensured.
>
> "Standards and guidelines will be implemented through terms and conditions of grazing permits, leases, and other authorizations, grazing-related portions of activity plans (including Allotment Management Plans), and through range improvement-related activities.
>
> "The Department anticipates that in most cases the standards and guidelines themselves will not be terms and conditions of various authorizations but that the terms and conditions will reflect the standards and guidelines.

"The Department intends that assessments and corrective actions will be undertaken in priority order as determined by BLM.

"The Department will use a variety of data including monitoring records, assessments, and knowledge of the locale to assist in making the "significant progress" determination. It is anticipated that in many cases it will take numerous grazing seasons to determine direction and magnitude of trend. However, actions will be taken to establish significant progress toward conformance as soon as sufficient data are available to make informed changes in grazing practices."

FUNDAMENTALS AND DEFINITION OF RANGELAND HEALTH

The Grazing Administration Regulations, at §4180.1 (43 Code of Federal Regulation [CFR] 4180.1), Federal Register Vol. 60, No. 35, pg. 9970, direct that the authorized officer ensures that the following conditions of rangeland health exist:

(a) Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and timing and duration of flow.

(b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

(c) Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.

(d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

These fundamentals focus on sustaining productivity of a rangeland rather than its uses. Emphasizing the physical and biological functioning of ecosystems to determine rangeland health is consistent with the definition of rangeland health as proposed by the Committee on Rangeland Classification, Board of Agriculture, National Research Council (Rangeland Health, 1994, pg. 4 and 5). This Committee defined Rangeland Health ". . .as the degree to which the integrity of the soil and the ecological processes of rangeland ecosystems are sustained." This committee emphasized ". . .the degree of integrity of the soil and ecological processes that are most important in sustaining the capacity of rangelands to satisfy values and produce commodities." The Committee also recommended that "The determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning mechanisms" (Rangeland Health, 1994, pg. 97-98).

Standards describe conditions necessary to encourage proper functioning of ecological processes on specific ecological sites. An ecological site is the logical and practical ecosystem unit upon which to base an interpretation of rangeland health. Ecological site is defined as:

". . . a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management" (Journal of Range Management, 48:279, 1995). Ecological sites result from the interaction of climate, soils, and landform (slope, topographic position). The importance of this concept is that the "health" of different kinds of rangeland must be judged by standards specific to the potential of the ecological site. Acceptable erosion rates, water quality, productivity of plants and animals, and other features are different on each ecological site.

Since there is wide variation of ecological sites in Arizona, standards and guidelines covering these sites must be general. To make standards and guidelines too specific would reduce the ability of BLM and interested publics to select specific objectives, monitoring strategies, and grazing permit terms and conditions appropriate to specific land forms.

Ecological sites have the potential to support several different plant communities. Existing communities are the result of the combination of historical and recent uses and natural events. Management actions may be used to modify plant communities on a site. The desired plant community for a site is defined as follows: "Of the several plant communities that may occupy a site, the one that has been identified through a management plan to best meet the plan's objectives for the site. It must protect the site as a minimum." (Journal of Range Management, 48:279, 1995.)

Fundamentals (a) and (b) define physical and biological components of rangeland health and are consistent with the definition of rangeland health as defined by the Committee on Rangeland Classification, Board on Agriculture, National Research Council, as discussed in the paragraph above. These fundamentals provide the basis for sustainable rangelands.

Fundamentals (c) and (d) emphasize compliance with existing laws and regulation and, therefore, define social and political components of rangeland health. Compliance with Fundamentals (c) and (d) is accomplished by managing to attain a specific plant community and associated wildlife species present on ecological sites. These desired plant communities are determined in the BLM planning process, or, where the desired plant community is not identified, a community may be selected that will meet the conditions of Fundamentals (a) and (b) and also adhere to laws and regulations. Arizona Standard 3 is written to comply with Fundamentals (c) and (d) and provide a logical combination of Standards and Guidelines for planning and management purposes.

STANDARD AND GUIDELINE DEFINITIONS

Standards are goals for the desired condition of the biological and physical components and characteristics of rangelands. Standards:

(1) are measurable and attainable; and

(2) comply with various Federal and State statutes, policies, and directives applicable to BLM Rangelands.

Guidelines are management approaches, methods, and practices that are intended to achieve a standard. Guidelines:

(1) typically identify and prescribe methods of influencing or controlling specific public land uses;

(2) are developed and applied consistent with the desired condition and within site capability; and
(3) may be adjusted over time.

IMPLEMENTING STANDARDS AND GUIDELINES

The authorized officer will review existing permitted livestock use, allotment management plans, or other activity plans which identify terms and conditions for management on public land. Existing management practices, and levels of use on grazing allotments will be reviewed and evaluated on a priority basis to determine if they meet, or are making significant progress toward meeting, the standards and are in conformance with the guidelines. The review will be interdisciplinary and conducted under existing rules which provide for cooperation, coordination, and consultation with affected individuals, federal, state, and local agencies, tribal governments, private landowners, and interested publics.

This review will use a variety of data, including monitoring records, assessments, and knowledge of the locale to assist in making the significant progress determination. Significance will be determined on a case by case basis, considering site potential, site condition, weather and financial commitment. It is anticipated there will be cases where numerous years will be needed to determine direction and magnitude of trend.

Upon completion of review, the authorized officer shall take appropriate action as soon as practicable but no later than the start of the next grazing year upon determining that the existing grazing management practices or level of use on public land are significant factors contributing to failure to achieve the standards and conform with the guidelines that are made effective under 43 CFR 4180.2. Appropriate action means implementing actions that will result in significant progress toward fulfillment of the standards and significant progress toward conformance with guidelines.

Livestock grazing will continue where significant progress toward meeting standards is being made. Additional activities and practices would not be needed on such allotments. Where new activities or practices are required to assure significant progress toward meeting standards, livestock grazing use can continue contingent upon determinations from monitoring data that the implemented actions are effective in making significant progress toward meeting the standards. In some cases, additional action may be needed as determined by monitoring data over time.

New plans will incorporate an interdisciplinary team approach (Arizona BLM Interdisciplinary Resource Management Handbook, April 1995). The terms and conditions for permitted grazing in these areas will be developed to comply with the goals and objectives of these plans which will be consistent with the standards and guidelines.

ARIZONA STANDARDS AND GUIDELINES

Arizona Standards and Guidelines (S&G) for grazing administration have been developed through a collaborative process involving the Bureau of Land Management State S&G Team and the Arizona Resource Advisory Council. Together, through meetings, conference calls, correspondence, and Open Houses with the public, the BLM State Team and RAC prepared Standards and Guidelines to address the minimum requirements outlined in the grazing regulations. The Standards and Guidelines, criteria for meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements of the regulations when taken as a whole.

Upland sites, riparian-wetland areas, and desired resource conditions are each addressed by a standard and associated guidelines.

Standard 1: Upland Sites

Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Criteria for meeting Standard 1:

Soil conditions support proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions, including appropriate amounts of vegetative cover, litter, and soil porosity and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

As indicated by such factors as:

Ground Cover
- litter
- live vegetation, amount and type (e.g., grass, shrubs, trees, etc.)
- rock

Signs of erosion
- flow pattern
- gullies
- rills
- plant pedestaling

Exceptions and exemptions (where applicable):

none

Guidelines:

1-1. Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites within management units. The ground cover should maintain soil organisms and plants and animals to support the hydrologic and nutrient cycles, and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles and energy flow.

1-2. When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.

Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

Criteria for meeting Standard 2:

Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737-11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas." These checklists are reprinted on the pages following the Guidelines for Standard 3.

As indicated by such factors as:

Gradient
Width/depth ratio
Channel roughness and sinuosity of stream channel
Bank stabilization
Reduced erosion
Captured sediment
Ground-water recharge
Dissipation of energy by vegetation

Exceptions and exemptions (where applicable):

Dirt tanks, wells, and other water facilities constructed or placed at a location for the purpose of providing water for livestock and/or wildlife and which have not been determined through local planning efforts to provide for riparian or wetland habitat are exempt.

Water impoundments permitted for construction, mining, or other similar activities are exempt.

Guidelines:

2-1. Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.
2-2. New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.

2-3. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.

Standard 3: Desired Resource Conditions

Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Criteria for meeting Standard 3:

Upland and riparian-wetland plant communities meet desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies.

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

Composition
Structure
Distribution

Exceptions and exemptions (where applicable):

Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

Guidelines:

3-1. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

3-2. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.

3-3. Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.

3-4. Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.

3-5. Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:

ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;

sufficient surface and subsurface soil moisture exists for continued plant growth;

serviceable waters are capable of providing for proper grazing distribution;

sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e., watershed, wildlife, wild horses and burros); and

monitoring is conducted during grazing to determine if objectives are being met.

3-6. Management practices will target those populations of noxious weeds which can be controlled or eliminated by approved methods.

3-7. Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples.

Interdisciplinary Assessment Team

Linda Price	Project Coordinator (BLM)
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Mike Small	Wildlife Biologist (BLM)
Larry Gearhart	Wilderness/Recreation Specialist (BLM)
Diana Hawks	Recreation, Wilderness, and Cultural Resources Team Lead (BLM)
Ken Beckstrom	Vegetation/Grazing Administration (BLM)
Phil Seegmiller	Vegetation/Grazing Administration (BLM)
Brian Bock	Soils and Watershed (BLM)
Robert Smith	Soil Scientist/Watershed Management (BLM)
Luke Thompson	Wildlife Manager (Arizona Game and Fish Department)
Kyle Spencer	Soils and Vegetation (Natural Resource Conservation Service)
Rob Grumbles	Vegetation and Social Economics (Mohave County Extension Service)

Rangeland Resource Team

Commodity Interests

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Non-Commodity Interests

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Dennis Becenti
Native American Interests
Hopi and Navajo Tribes

Alternates

Maggie Sacher,
Commodity Interests

Paul Weaver
Non-Commodity Interests

Appendix C:

Precipitation Data

Mustang PRECIPITATION RAIN GAUGE NUMBER: 21

Annual Average	2.23	5.90	2.83	4.16	15.11					
Year	Fall	Winter	Spring	Summer	Annual	Fall % Avg	Winter % Avg	Spring % Avg	Summer % Avg	Annual % Avg
1978	2.7	14.0	3.4	1.8	21.9	122	237	121	42	145
1979	4.6	7.0	4.6	4.1	20.3	205	119	163	99	134
1980	0.9	10.5	2.9	3.8	18.1	39	177	102	92	120
1981	1.4	2.4	5.4	5.0	14.3	65	41	192	120	95
1982	1.9	4.3	4.5	5.4	16.1	85	73	159	130	106
1983	5.1	5.7	4.0	4.9	19.7	230	97	141	117	130
1984	2.7	1.8	0.8	4.8	10.0	119	30	29	114	66
1985	1.9	7.4	1.8	3.2	14.3	83	125	65	77	94
1986	3.9	2.3	4.0	4.4	14.6	176	38	141	107	97
1987	2.2	5.0	4.5	4.0	15.8	100	85	159	97	104
1988	4.5	2.3	2.7	3.6	13.1	202	39	95	86	86
1989	0.9	4.0	1.3	2.9	9.1	40	68	47	70	60
1990	0.8	3.7	2.0	4.0	10.5	37	63	71	96	70
1991	1.5	4.7	1.9	4.3	12.3	67	80	65	102	82
1992	1.0	5.5	6.5	2.2	15.1	43	93	228	52	100
1993	2.5	15.8	3.5	3.8	25.5	112	267	124	90	169
1994	2.9	4.6	2.8	12.5	22.8	129	78	97	301	151
1995	2.7	12.3	5.3	3.5	23.8	120	209	186	84	157
1996	0.5	5.1	0.6	3.3	9.5	22	87	22	78	63
1997	3.1	5.6	1.4	10.4	20.5	140	95	49	250	136
1998	1.3	7.9	3.5	8.3	21.0	59	135	124	199	139
1999	3.1	1.6	3.0	2.0	9.8	140	27	106	48	65
2000		4.9	0.6	3.8	9.3		83	21	91	61
2001	2.7	6.6	1.4	3.0	13.6	120	111	49	72	90
2002	0.8	1.9	0.6	1.9	5.1	34	32	22	45	34
2003	1.9	4.9	2.8	3.0	12.5	84	83	97	72	83
2004	0.8	5.5	1.5	1.5	9.3	34	93	53	36	61
2005	8.0	12.8	4.0	2.3	27.0	359	216	141	54	179
2006	1.5	1.3	4.8	2.8	10.3	67	21	168	66	68
2007	1.4	1.9	0.9	4.6	8.8	62	32	31	111	58
2008	0.1	9.8	0.9	2.9	13.7	6	166	32	71	91
2009	2.1	5.5	0.8		8.3	93	93	27		

Mustang	Rain Gauge #	21	
Percent of Average by Season.			
Fall	Winter	Spring	Summer
15%	39%	19%	27%

Wolfhole PRECIPITATION RAIN GAUGE NUMBER: 31

Annual Average	1.68	3.83	1.53	3.56	10.60					
Year	Fall	Winter	Spring	Summer	Annual	Fall % Avg	Winter % Avg	Spring % Avg	Summer % Avg	Annual % Avg
1983	5.0	5.7	1.3	5.3	17.3	298	149	86	148	163
1984	2.2	1.2	0.7	6.5	10.6	129	32	46	184	100
1985	1.3	5.8	2.3	2.6	12.0	76	151	148	74	113
1986	2.3	1.4	2.1	5.2	11.0	135	37	140	147	104
1987	2.1	4.6	1.9	3.3	11.8	123	120	121	92	111
1988	3.8	1.5	2.8	2.5	10.6	228	39	182	71	100
1989	0.7	3.6	1.1	2.9	8.2	39	93	71	81	77
1990	0.7	2.2	1.8	5.8	10.4	42	56	118	162	98
1991	1.1	4.0	1.2	3.0	9.3	64	105	80	84	88
1992	1.0	4.0	4.9	2.6	12.5	57	104	321	74	118
1993	2.0	12.0	1.5	0.9	16.4	119	313	98	25	155
1994	1.8	2.7	1.5	7.0	13.0	108	70	98	197	123
1995	1.5	8.5	1.6	3.5	15.0	88	222	101	97	142
1996	0.5	3.0	1.5	2.8	7.8	30	78	98	77	73
1997	2.3	4.3	1.3	7.0	14.8	134	111	82	197	139
1998	0.9	5.1	1.5	6.5	14.0	52	134	98	183	132
1999	2.2	1.3	1.5	4.4	9.4	129	35	98	123	88
2000		3.3	0.5	1.9	5.6		85	33	52	53
2001	1.8	4.4	0.5	2.5	9.3	108	116	33	70	87
2002	1.5	1.3		1.8	4.5	89	33		49	42
2003	1.3	5.4	1.9	1.0	9.5	74	140	124	28	90
2004	0.5	3.3	1.1	3.0	7.9	30	85	73	84	74
2005	5.0	5.6	2.9	2.3	15.8	298	147	189	63	149
2006	1.3	0.5	1.8	1.8	5.3	74	13	114	49	50
2007	0.9	1.1	0.6	3.1	5.8	52	29	41	88	54
2008	0.4	4.0	0.1	1.6	6.1	22	105	9	46	58
2009	2.0	3.4	0.6		6.0	118	89	41		

Wolfhole	Rain Gauge #	31	
Percent of Average by Season.			
Fall	Winter	Spring	Summer
16%	36%	14%	34%

Appendix D:

Vegetation Data

Pace frequency

Allotment: Whiterock-Soapstone	Pasture: Whiterock Res.			Key Area:	2
Category	Years Plots were read				
	1985	1987	1990	1998	2004	Trend
% Ground Cover						
Bare Ground	48	53	56	50	48	
Litter				25		
Live Basal Veg.	5	2	3	5	3	
Litter - Non-Persistent	26	26	24	18	13	
Litter - Persistent	20	18	16		27	
Rock	3	1	2	3	9	
Woody Species						
Artemisia tridentata	33	43	50	53	46	
Chrysothamnus		1	2	2		
Chrysothamnus viscidiflorus	1				3	
Cowania mexicana	1		1	3	1	
Ephedra nevadensis				1		
Ephedra viridis		1	1			
Gutierrezia sarothrae	17	13	14	17	1	
Juniperus osteosperma	6	4	4	4	7	
Grasses - Perennial						
Agropyron cristatum	2					
Agropyron smithii		1	2	5		
Aristida longiseta	1	1	3	3		
Hilaria jamesii	55	47	61	63	34	
Oryzopsis hymenoides	4	1	2	3	2	
Sitanion hystrix	32	34	36	41		
Forbs - Perennial/Biennial						
Aster arenosus					5	
Eriogonum - perennial forb #1	9	7	12	13	2	
Gilia aggregata					4	
Penstemon palmeri					1	
Perennial forb(s)			5	6	1	
Psoralea mephitica					2	
Sphaeralcea		1	3	4	2	
Annuals						
Annual forb(s)		9			1	
Unclassified						
Aster					2	
Cryptantha					2	
Euphorbia					1	
Viguiera					1	

Allotment: Whiterock-Soapstone	Pasture: Hole					Key Area:		6
Category	Year plots were read							
	1981	1984	1988	1993	1998	2004	2009	Trend
% Ground Cover								
Bare Ground	63	55	48	53	49	49	61	
Live Basal Veg.	7	5	4	4	6	3	1	
Litter - Non-Persistent	20	15	17	13	20	11	36	
Litter - Persistent	10	22	21	21	23	31		
Rock	1	2	10	7	4	8	3	
Woody Species								
Artemisia tridentate	7	7	6	7	11	3	13	
Berberis fremontii							1	
Ceanothus greggii	1	2	8	5	5	3	T	
Chrysothamnus	9	8	2	3	5			
Chrysothamnus nauseosus						3	2	
Chrysothamnus viscidiflorus						22	30	
Cowania mexicana	1	2	4	9	10	3	3	
Ephedra viridis						1		
Eriogonum - shrub #1		6		5	6	1		
Eriogonum fasciculatum	2							
Eriogonum microthecum							1	
Eriogonum wrightii			3					
Gutierrezia sarothrae	24	35	29	27	28	16	33	
Haplopappus			1	2				
Juniperus osteosperma	2	2	2	1	2	3	7	
Pinus edulis	2	1						
Pinus monophylla						5	7	
Purshia tridentate		1					T	
Senecio	2							
shrub/half-shrub						1		
Grasses - Perennial								
Agropyron		3		2			1	
Agropyron Smithii	4		2		2			
Aristida longiseta						1		
Hllaria jamesii	46	41	16	43	41	38	45	
Oryzopsis hymenoides	9	15	11	15	14	7	6	
Scleropogon brevifolius	1							
Sitanion hystrix	24	23	3	25	29	3	7	
Stipa comate		2	2	2	2		1	
Forbs - Perennial/Biennial								
Calochortus							T	
Frasera albomarginata							1	
Lupinus							3	
Mirabilis multiflora						1		
Perennial forb(s)				2	3	5	1	
Phlox	3	1	2	1	2	2		
Phlox austromontana							2	
Phlox longiflia							4	
Sphaeralcea		1	2	3	5	1		
Annuals								
Annual forb(s)						4	4	

Annual grass(es)						1		
Bromus tectorum							4	
Eriogonum - annual forb #1						14	1	
Euphorbia								
Lepidum								
Unclassified							T	

Allotment: Whiterock-Soapstone	Pasture: Hole					Site: 10
	Years plots were read					
Category	1984	1988	1993	1998	2005	Trend
% Ground Cover						
Bare Ground	48	46	50	48	48	
Litter					49	
Rock	1	4	1	3	1	
Live Basal Veg.	5	5	6	7	3	
Litter - Non-Persistent	39	36	38	38		
Litter - Persistent	7	9	5	5		
Woody Species						
Amelanchier utahensis					1	
Artemisia tridentata	2	2	2	3		
Ceanothus greggii					3	
Chrysothamnus viscidiflorus					2	
Cowania mexicana	1		9	17	5	down
Encelia frutescens					1	
Ephedra nevadensis		1				
Eriogonum - shrub #1	2		3			
Gutierrezia sarothrae	8	11	16	12	29	up
Juniperus osteosperma	1	1	2	2	1	
Pinus edulis					1	
Purshia tridentata	6	10			17	up
Grasses - Perennial						
Agropyron			74	66		
Agropyron cristatum	4	10			9	
Agropyron intermedium					10	
Agropyron smithii	72	52				
Agropyron trichophorum					58	
Oryzopsis hymenoides	13	18	13	23	10	down
Sitanion hystrix	15	11	13	15	1	down
Stipa comata			1			
Forbs - Perennial/Biennial						
Penstemon	1	1	1	2		
Penstemon pachyphyllus					3	
Penstemon thompsoniae					1	
Perennial forb(s)			3		3	
Swertia albomarginata					2	
Viguiera multiflora					9	
Annuals						
Bromus rubens					1	
Bromus tectorum					21	
Eriogonum deflexum					78	
Unclassified						
Chenopodium					1	
Ephedra	1		1	2		
Eriogonum		4		6	2	
Euphorbia	1	2		2	5	
Phlox	2	2	2	2		

Allotment: Whiterock-Soapstone	Pasture: Corral					Site:	13
	Years plots were read						
Category	1985	1987	1991	1997	2004	2009	Trend
% Ground Cover							
Bare Ground	46	44	48	49	45	74	
Live Basal Veg.	9	3	9	6	4	3	
Litter - Non-Persistent	29	43	27	31	37		
Litter - Persistent	16	11	13	9	12	21	
Rock	1		3	6	3	3	
Woody Species							
Artemisia tridentata	5	4	5	4	30	11	
Chrysothamnus viscidiflorus	1		2	3		1	
Gutierrezia sarothrae	37	32	32	30	4		
Juniperus osteosperma	2	3	4	3	7	8	
Grasses - Perennial							
Agropyron				4			
Agropyron smithii		2	2				
Aristida longiseta	2	2	3	6	2	1	
Bouteloua gracilis	11	8	10	12	4	1	
Hilaria jamesii	60	72	68	62	59	64	
Oryzopsis hymenoides		4	4	3			
Sitanion hystrix	7	18	18	22	3	3	
Sporobolus cryptandrus	32	26	26	20		17	
Stipa comata	1	4	3			2	
Forbs - Perennial/Biennial							
Calochortus					1		
Eriogonum - perennial forb #1	3			4	2		
Penstemon palmeri					1		
Perennial forb(s)		2		2	2		
Phlox longiflia					3	T	
Sphaeralcea	18	17	12	11	3	10	
Annuals							
Annual forb(s)					50	24	
Annual grass(es)					3		
Bromus tectorum						2	
Stephanomeria exigua						1	
Unclassified							
Aster	1	3	3	5			
Borago					1		
Eriogonum			2				
Lepidium					2		
Mentzelia						2	

Allotment: Whiterock-Soapstone		Pasture: Whiterock Res.				Site:	15
	Years plots were read.						
Category	1985	1988	1993	1998	2004	2006	Trend
% Ground Cover							
Bare Ground	55	49	53	47	63	55	
Litter						32	
Rock	1	2	3	3	3	7	
Live Basal Veg.	6	6	4	5	4	8	
Litter - Non-Persistent	23	27	25	31	16		
Litter - Persistent	16	16	16	15	15		
Woody Species							
Artemisia tridentata	62	63	63	68	12	27	
Eriogonum ovalifolium					1	2	
Gutierrezia sarothrae		2	3	5			
Juniperus osteosperma						1	
Opuntia					1		
Grasses - Perennial							
Agropyron						1	
Aristida longiseta	2	4	3	2		2	
Bouteloua gracilis	4	5	4	4	4	3	
Hilaria jamesii	32	35	33	37	36	37	
Oryzopsis hymenoides	17	19	22	31	8	12	
Perennial grass(es)	2			2			
Sitanion hystrix	41	29	43	43	15	62	
Stipa comata	1	1	2	2	1	1	
Forbs - Perennial/Biennial							
Aster arenosus					8	6	
Astragalus lentiginosus						1	
Chorispora tenella						1	
Lesquerella intermedia						4	
Perennial forb(s)						4	
Phlox longifolia					1	1	
Psoralea mephitica					2		
Senecio multilobatus					5	54	
Sphaeralcea					6	19	
Townsendia incana						2	
Viguiera multiflora						8	
Annuals							
Annual forb(s)					14		
Bromus tectorum						26	
Erigeron concinnus					31	69	
Festuca octoflora						1	
Ranunculus testiculatus						2	
Unclassified							
Aster	12	15	11		4		
Astragalus		1	2		1	2	
Cryptantha					2		
Erigeron					16		
Eriogonum						1	
Euphorbia					2		
Mentzelia					7		

Senecio					3		
Viguiera					2		

Allotment: Whiterock-Soapstone			Pasture: Hole	
Site:	Whiterock-Soapstone Exclosure #1 - Chained			
Category	1982	1987	2005	Trend
% Ground Cover				
Bare Ground	34	40	49	
Litter			46	
Rock			3	
Live Basal Veg.	13	2	2	
Litter - Non-Persistent	51	57		
Litter - Persistent	2			
Woody Species				
Artemisia tridentata	1	3	3	Static
Chrysothamnus viscidiflorus		13	6	
Ephedra nevadensis			1	Static
Eriogonum - shrub #1		1		
Gutierrezia sarothrae	3	1	3	
Juniperus osteosperma	3	7	11	
Pinus edulis			1	
Purshia tridentata	17	13	9	Down
Rhus trilobata	1			
Grasses – Perennial				
Agropyron	80	75		
Agropyron cristatum			5	
Agropyron intermedium			2	
Agropyron trichophorum			24	Down
Bromus inermis		1		
Oryzopsis hymenoides	3	3	4	Static
Sitanion hystrix	3	1	6	Static
Forbs - Perennial/Biennial				
Eriogonum - perennial forb #1	1			
Gilia aggregata			1	
Lepidium montanum			1	
Penstemon		1		
Perennial forb(s)			1	
Swertia albomarginata			1	
Viguiera multiflora			14	
Annuals				
Bromus rubens			1	
Bromus tectorum		1	7	
Cordylanthus parviflorus			4	
Eriogonum deflexum			75	
Unclassified				
Astragalus			1	
Ceanothus		1		
Eriogonum			1	
Euphorbia			5	

Allotment: Whiterock-Soapstone		Pasture: Hole
Whiterock-Soapstone Exclosure #1 – Unchained		
Category	1982	Trend
% Ground Cover		
Bare Ground	44	
Litter	56	
Woody Species		
Cowania mexicana	2	
Gutierrezia sarothrae	2	
Juniperus osteosperma	22	
Pinus edulis	10	
Purshia tridentata	23	
Forbs - Perennial/Biennial		
Eriogonum	3	
Penstemon	2	

Allotment: Whiterock-Soapstone		Pasture: Corral	
Whiterock-Soapstone Exclosure #2			
Category	1982	2004	Trend
% Ground Cover			
Bare Ground	30	50	
Live Basal Veg.	10	3	
Litter - Non-Persistent	60	28	
Litter - Persistent	1	19	
Rock		1	
Woody Species			
Artemisia tridentata	5	22	Upward
Gutierrezia sarothrae	2		
Juniperus osteosperma	1		
Grasses – Perennial			
Agropyron smithii	31	2	Down
Bouteloua gracilis		1	Static
Hilaria jamesii	51	54	Static
Oryzopsis hymenoides	3	5	Static
Sitanion hystrix	30	4	Down
Sporobolus cryptandrus	1		Static
Forbs - Perennial/Biennial			
Aster arenosus		1	
Perennial forb(s)		1	
Phlox longifolia		1	
Annuals			
Bromus tectorum		1	
Eriogonum - annual forb #1		1	
Unclassified			
Euphorbia		7	

Ecological Site Data

Key Area #2	Allotment: Whiterock-Soapstone Pasture: Whiterock Res		
Range Site:	Loamy Upland 10-14" pz		
Plant Species	Site-Guide Allowable Percent Composition	2004	Desired Percent Composition Objective
Grasses	70-80%	32%	
Oryzopsis hymenoides	5-20%	0%	1-5%
Sitanion hystrix	5-10%	0%	1-5%
Agropyron Smithii	20-30%	0%	1-5%
Galleta	5-15%	32%	25-35%
Aristida longiseta	0-5%	0%	
Forbs	5-10%	9%	
Sphaeralcea	5-10%	0%	
Annual forb(s)	5-10%	0%	
Eriogonum - annual forb #1		2%	
Perennial forb(s)	5-10%	0%	
Euphorbia	%	0%	
Aster arenosus		3%	
Cryptantha		1%	
Psoralea mephitica		3%	
Shrubs/Trees	15-25%	60%	
Ephedra nevadensis	1-10%	0%	1-5%
Cowania mexicana	SSSS	1%	
Gutierrezia sarothrae	0-5%	1%	
Chrysothamnus viscidiflorus	SSSS	1%	
Chrysothamnus	SSSS	0%	
Artemisia tridentata	5-15%	50%	1-15%
Juniperus osteosperma	0-5%	6%	
Ephedra viridis	1-10%	0%	
other shrubs (SSSS)	1-5%	0%	
Similarity		47%	
Status		Mid	

Key Area #6	Allotment: Whiterock-Soapstone Pasture: Hole				
Range Site:	Limestone Slopes 13-17" pz				
Plant Species	Site-Guide Allowable Percent Composition	1988	2004	2009	Desired Percent Composition Objective
Grasses	45%	48%	42%	36%	
Indian ricegrass	PPGG	11%	3%	3%	1-5%
Bottlebrush Squirreltail	1-10%	2%	4%	2%	1-5%
Stipa species	1-5%	1%			
Galleta	1-10%	35%	33%	31%	25-35%
Aristida longiseta	1-5%		2%		
Scleropogon brevifolius	PPGG				
other perennial grass (PPGG)	1-5%				
Agropy	PPGG			1%	
Forbs	5%			2%	
Sphaeralcea					
Eriogonum - annual forb #1					
perennial forb(s)	1-5%				
Calcohortus					
Frasera albomarginata					
Lupinus					
Phlox austromontana				1%	
Phlox longifolia				1%	
Shrubs	50%	52%	58%	62%	
Cowania mexicana	10-25%	1%	1%	2%	1-5%
Purshia tridentate					
Ceanothus greggii		7%	3%		
Gutierrezia sarothrae	1-5%	18%	15%	19%	
Chrysothamnus viscidiflorus	SSSS			19%	
Chrysothamnus	SSSS	5%	18%	1%	
Big sagebrush	10-25%	7%	4%	8%	1-5%
Chrysothamnus nauseosus	SSSS			1%	
Eriogonum - shrub #1	1-5%	1%		1%	
Senecio	SSSS				
Juniperus osteosperma	1-5%	7%	7%	6%	
Pinus edulis	1-5%		9%	5%	
Green Mormon tea	1-5%		1%		
other shrubs (SSSS)	1-5%				
Haplopappus	SSSS	7%			
Berberis fremontii				1%	
Eriogonum microthecum					
	Similarity	42%	43%	41%	
	Status	Mid	Mid	Mid	

Key Area #10	Allotment: Whiterock-Soapstone Pasture: Hole		
Range Site:	Loamy Upland 10-14		
Plant Species	Site-Guide Allowable Percent Composition	1988	Desired Percent Composition Objective
Grasses	70-80%	78%	
Agropyron cristatum		4%	
Agropyron smithii	20-30%	57%	45-60%
Indian ricegrass	5-20%	13%	5-15%
Bottlebrush Squirreltail	5-10%	4%	1-5%
Forbs	5-10%	1%	
Penstemon	PPFF	1%	
Phlox	PPFF	1%	
Euphorbia	AAFF	0%	
Annual forb (s) (AAFF)	5-10%	0%	
perennial forb(S) (PPFF)	5-10%	0%	
Shrubs	15-25%	21%	
Cliffrose	SSSS	4%	1-5%
Purshia tridentate	SSSS		
Gutierrezia sarothrae	0-5%	7%	
Eriogonum	-	1%	
Artemisia tridentata	5-15%	6%	1-15%
Juniperus osteosperma	0-5%	3%	
Ephedra nevadensis	1-10%	1%	1-5%
other shrubs (SSSS)	1-5%	0%	
Similarity		69%	
Status		Late	

Key Area #13	Allotment: Whiterock-Soapstone			
	Pasture: Corral			
Range Site:	Loamy Upland 10-14			
Plant Species	Site-Guide Allowable Percent Composition	2004	2009	Desired Percent Composition Objective
Grasses	70-80%	66%	74%	
Oryzopsis hymenoides	5-20%	0%	0%	5-20%
Stipa comata	5-10%	0%	1%	
Sitanion hystrix	5-10%	1%	4%	5-10%
Hilaria jamesii	5-15%	60%	60%	50-70%
Sporobolus cryptandrus	1-3%	0%	8%	1-10%
Bouteloua gracilis	15-30%	4%	0%	
Aristida longiseta	0-5%	1%	0%	
Forbs	5-10%	3%	8%	
Sphaeralcea	5-10%	2%	7%	
Annual forb(s)	5-10%	0%	0%	
Annual grass(es)		0%	0%	
Eriogonum - annual forb #1	AAFF	0%	0%	
perennial forb(s) (PPFF)	5-10%	1%	0%	
Aster	PPFF	0%	0%	
Borago		0%	0%	
Lepidium	PPFF	0%	0%	
Phlox longifloia			1%	
Shrubs	15-25%	31%	18%	
Gutierrezia sarothrae	0-5%	1%	0%	
Chrysothamnus viscidiflorus	SSSS	0%	0%	
Chrysothamnus	SSSS	0%	0%	
Big sagebrush	5-15%	27%	17%	1-15%
Juniperus osteosperma	0-5%	3%	1%	
other shrubs (SSSS)	1-5%	0%	0%	
	Similarity	42%	46%	
	Status	Mid	Mid	

Key Area #15	Allotment: Whiterock-Soapstone			
	Pasture: Whiterock Reservoir			
Range Site:	Loamy Upland 10-14" pz			
Plant Species	Site-Guide Allowable Percent Composition	1988	2004	Desired Percent Composition Objective
Grasses	70-80%	39%	59%	
Oryzopsis hymenoides	5-20%	5%	3%	3-7%
Sitanion hystrix	5-10%	10%	10%	5-10%
Stipa comata	5-10%	0%	1%	1-5%
Seeded		0%	0%	
Hilaria jamesii	5-15%	24%	42%	35-45%
Bouteloua gracilis	15-30%	0%	2%	
Aristida longiseta	0-5%	0%	0%	
Forbs	5-10%	10%	32%	
Aster arenosus		10%	1%	
Sphaeralcea	5-10%	0%	6%	
Annual forb(s)	5-10%	0%	0%	
Annual grass(es)		0%	0%	
Eriogonum - annual forb #1		0%	0%	
Erigeron		0%	0%	
Phlox longifolia		0%	0%	
perennial forb(s)	5-10%	0%	0%	
Senecio		0%	5%	
Euphorbia		0%	0%	
Mentzelia		0%	4%	
Phacelia		0%	1%	
Erigeron concinnus		0%	13%	
Cryptantha		0%	2%	
Psoralea mephitica		0%	1%	
Shrubs	15-25%	51%	9%	
Gutierrezia sarothrae	0-5%	5%	0%	
Artemisia tridentata	5-15%	46%	9%	
Opuntia	0-10%	0%	0%	
Eriogonum - shrub #1	SSSS	0%	0%	
Juniperus osteosperma	0-5%	0%	0%	
other shrubs (SSSS)	1-5%	0%	0%	
	Similarity	60%	57%	
	Status	Late	Late	

Appendix E:

Wildlife Data

Game Management Unit (GMU) 13B Mule Deer Data From AGFD (1985 to 2003)

Year	Number of Animals Surveyed	Bucks / 100 does	Fawns / 100 does	Population Estimate
1985	108	30	50	1,000 - 1,500
1986	41	29	18	1,000 - 1,500
1987	63	31	44	1163
1988	---	No Data	No Data	No Data
1989	112	71	31	900
1990	63	68	32	900
1991	85	27	37	900
1992	31	24	59	<1,000
1993	117	126	52	800-1,000
1994	143	69	52	No Estimate
1995	88	183	79	No Estimate
1996	154	87	33	No Estimate
1997	64	77	29	No Estimate
1998	156	43	45	No Estimate
1999	145	51	35	No Estimate
2000	155	49	36	No Estimate
2001	275	34	67	No Estimate
2002	118	46	20	No Estimate
2003	Unknown	29	46	No Estimate
2004	102	34	57	No Estimate
2005	128	65	72	No Estimate
2006	143	68	64	No Estimate
2007	152	79	41	No Estimate

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