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

Belnap West #4822

I. Introduction

The Belnap West 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 Appendices for a list of members on both teams). The RRT may provide informal advice to the BLM Field Manager 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 RRTs primary role is to assist BLM managers in assuring the S&Gs 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 October 22, 2003, and a field visit on November 12, 2003. At the conclusion of the field visit, the group determined the standards for rangeland health are being met.

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

II. Grazing Use

A. Total grazing privileges

Livestock Numbers	Season of Use	% Federal	Active AUMs
30 Cattle	10/16-05/20	95	204

B. Season(s) of use

30 cattle from October 16 to May 20

C. Kind and class of livestock

Cow/Calf Operation

D. Percent federal range

The Belnap West allotment is 95% federal range. The private lands within the allotment boundaries are grazed in conjunction with the federal lands.

III. Allotment Profile

A. Description

The Belnap West Allotment is located approximately 60 miles south of St. George, Utah, on the Arizona Strip. The allotment is within the boundaries of T. 34N., R.10 W. southwest of Bundyville. Elevations range from 5320' in the sagebrush draws to 5520' on the pinyon-juniper ridges. The allotment contains two major range sites. The limestone ridges and slopes are classified as a Shallow Loamy Upland 9-13" precipitation zone (pz). The draws and bottoms are Loamy Uplands 9-13" pz.

B. Acreage

The allotment contains:

- 4,317 acres of federal land
- 129 acres of private land

C. Objectives

Program guidance decisions for the Belnap West Allotment are found in the Arizona Strip Resource Management Plan (RMP, 1992), and the Shivwits Resource Area RMP Implementation Plan (SRAIP).

1. Land Use Plan Objectives

Shivwits Resource Area Implementation Plan for the Arizona Strip Resource Management Plan

GZ17 Allowable use on key forage species is 50 percent of current years growth on allotments with rotational grazing systems.

RR-08 Manage the majority of the resource area for extensive recreation while maintaining its naturalness/remoteness. The exception to this is the Cedar Pockets campground.

RR-09 Commercial recreation permits would be issued to the extent that their cumulative impacts are consistent with the overall objectives of this plan and in the public interest.

WS01 Manage vegetation cover towards ecological stability and sound long-term protective soil cover.

WS16 Develop management prescriptions or improvement practices to achieve desired plant community objectives.

WS21 Manage watershed areas according to watershed categorizations to achieve identified objectives.

TE01 Carry out management consistent with multiple use for conservation of candidate species and their habitats and ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered. Adverse impacts to listed species will be avoided.

WL02 Maintain productive wildlife habitat and ensure wildlife needs and considerations are incorporated into land use planning, National Environmental Policy Act documents, and management decisions.

WL07 Manage wildlife habitat through the Habitat Management Plan process to achieve desired plant community objectives.

WL16 Complete ecological site inventories in key areas to determine site potentials and present ecological conditions; establish desired plant community objectives for various areas and include these objectives in Allotment Management Plans, Habitat Management

Plans, watershed plans, and other plans in order to prescribe management or improvement practices to achieve these objectives.

1. Specific Resource Objectives

Desired Plant Community (DPC) Objectives

DPC objectives were developed during this evaluation process by an interdisciplinary team of resource specialists. These objectives focus on the ecological sites and their potentials, which reflect the vegetative diversity of the area. DPC objectives are expressed in figures of Composition by Weight (CBW). Composition data is collected using the Dry Weight Rank sampling method.

Belnap West Key Area (Loamy Upland 10-14" p.z.)

Maintain perennial grass composition between 50-70% through 2030 by,
- Maintaining Hija CBW between 10 to 15%
- Maintaining Spcr CBW between 1 to 10%
- Maintaining Orhy CBW between 1 to 5%
- Maintaining Sihy CBW between 5 to 10%

Maintain shrub CBW between 15-40% through 2030.
Maintain forb CBW between 2-10% through 2030.
Maintain tree CBW between 0 to 5% through 2030.

Rational: The ecological site for this key area is a Loamy Upland 10-14" pz for the most part. The key area location also has influences from the Shallow Upland 10-14" and may be in a transition area. This ecological site is within the Great Basin Ecological zone identified in the Grand Canyon-Parashant National Monument Environmental Impact Statement/Land Use Plan (GCPNM EIS/LUP) currently being drafted. This ecological zone is to be managed for a mosaic of early and mid seral vegetation communities as drafted in the LUP.

This area was mechanically treated in the late1950's. Present vegetation diversity is well within the range of natural variability and established DPC objectives. However, this diversity may be at risk for loss of herbaceous understory in the future. Future treatment of woody species is recommended to maintain the area in approximately the current condition. Current monitoring data suggests achievement of the DPC objectives is attainable and is within the potential of the site.

The species listed individually are components of the ecological site and are recognized as key species. The site guide allows from 5 to 15 % CBW for Hija, 1 to 3% for Spcr, 5 to 20% for Orhy, and 5 to 10% for Sihy.

California Condor Recovery Plan Objectives (April, 1996)

CC-1 Provide foraging habitat for California condors.

Parashaunt Habitat Management Plan

MD-9 Maintain adequate mule deer cover conditions to support 2,200 deer by 1995.

NG-4 Ensure that all the components needed to sustain certain populations of nongame species are conserved.

D. Key Species

Plant Category	Common Name	Scientific Name
Cool Season Grasses	Squirrel tail	Sitanion hystrix
	Indian rice grass	Oryzopsis hymenoides
Warm Season Grasses	Sand dropseed	Sporobolus cryptandrus
	Galleta grass	Hilaria jamseii

E. Grazing System

The Belnap West allotment does not have an official Allotment Management Plan (AMP). The allotment was once a part of the Belnap West/Mule Canyon AMP grazing system. At that time, Belnap West received summer grazing use with 30 head of livestock. An ownership split (1986) in the two allotments removed it from the AMPs grazing system. The season of use was also changed at that time from summer use to winter use, however livestock numbers remained at 30 cattle. The allotment has operated as a winter use allotment since that time. Livestock from the allotment are taken to private pasture for summer (May 20 to October 15).

The allotment is grazed as one winter unit with no interior pasture fences. Allotment size, season of use, and topography lend itself to self-regulated livestock distribution.

F. Other uses

1. Special Status Species

Plants - None

Animals -

The following federally listed, proposed, candidate, State, or BLM sensitive species may occur within or adjacent to this Allotment.

- Bald eagle (*Haliaeetus leucocephalus)* (Threatened - proposed for de-listing)
- California condor (*Gymnogyps californianus)* (Endangered – experimental, non-essential population)
- Peregrine falcon (*Falco peregrinus*) (delisted, monitoring is ongoing)

Bald eagles are only found on the Arizona Strip during the winter months. They do nest in this area. In winter, they may fly over and forage for food in this allotment. They are infrequently seen along the slopes of the Kaibab Plateau and in canyons near the Grand Canyon during the colder months.

California condor: An experimental non-essential population of California condors was established on the Vermilion Cliffs in 1996. Condors may fly over or forage within this allotment at any time of the year. These birds may forage on carrion within the allotment, though none have been observed here to date.

Peregrine falcons range across the Arizona Strip and nest on cliff faces. Peregrines were removed from federal listing in 1999, and a monitoring plan is in place. Peregrine falcons are an Arizona Species of Concern.

BLM Sensitive and State Species of Concern

Sensitive species are usually rare within at least a portion of their range. Listed below are the sensitive animal species that may occur within or adjacent to the Belnap West Allotment.

- Ferruginous hawks (*Buteo regalis*)
- Western burrowing owls (*Athene cunicularia hypugea*)
- Spotted bat *(Euderma maculatum)*
- Western small-footed myotis *(Myotis ciliolabrum)*
- Fringed myotis (*Myotis thysanodes*)
- Allen's lappet-browed bat (*Idionycteris phyllotis*)
- Townsend's big-eared bat *(Corynorhinus townsendii)*
- Big free-tailed bats (*Nyctinomops macrotis*)

Ferruginous hawks and western burrowing owls are known to use habitat similar to that found on this allotment, though specific sightings have not been recorded for any of these species.

Herpetological inventories have not been done for this allotment. No sensitive reptiles or amphibians are known or suspected to occur on this allotment.

2. Other Wildlife Species

The primary big game species found in the Belnap West Allotment is mule deer, particularly in the canyon area. This allotment lies on the edge of the pronghorn distribution and while pronghorn are not common, they may be found in this allotment. The allotment contains two wildlife water catchments which are frequently used by deer.

Non-game wildlife found on the allotment is typical of the area, including a variety of small mammals, grassland birds, raptors, and reptiles.

Predators including coyotes, bobcats, and mountain lions can be found in this allotment. Coyotes, in particular, are usually common and are opportunistic hunters. This allotment provides some very good coyote habitat and is frequently used by coyote hunters from the St. George area.

3. Recreation

This Allotment is located within the Grand Canyon Parashant National Monument and is considered to have recreation values for its geology, scenic view sheds, and remoteness. General recreation activities could include sightseeing, horseback riding, hiking, camping, hunting, photography, bird watching and nature study.

Off Highway Vehicle Management: OHV classification: Limited to existing roads and trails.

Planning: Arizona Strip District Resource Management Plan (RMP): No specific objectives for recreation/wilderness planning were proposed for this area.

Recreational Opportunity Spectrum (ROS): The ROS classes found in this allotment are Semi-Primitive Motorized and Semi-Primitive Non-Motorized.

Visual Resource Management: Two VRM Classes are found on this allotment: Classes 2 and 4.

Trails: No developed recreation trail or formal designation for any road/trail is known in this allotment.

4. Wilderness

No Wilderness or Wild & Scenic River resources are located on this allotment.

G. Issues brought out in scoping.

1. Issues relating to Rangeland Health

a. Maintenance of the 900 acre chaining treatment
b. Bromus techtorum (Brte) cheat grass at various locations

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

The allotments west boundary fence needs maintenance.

IV. Management Evaluation

A. Purpose of Evaluation

The purpose of this assessment is to determine if the rangeland resources in the Belnap West allotment are healthy, as evidenced by whether or not soil and vegetation are meeting or making progress toward meeting standards one and three respectively. If the current permitted livestock grazing practices are determined to be causing non-attainment of standards, then 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.

B. Summary of Studies Data

1. Livestock Actual Use

Actual use was determined from past years licensed use. Total active preference for the allotment is 204 AUMs.

Grazing Year	AUMs Used	Percent of Authorized AUMs Used
1987	204	100%
1988	204	100%
1989	204	100%
1990-1996	Non-use	0%
1997	204	100%
1998	204	100%
1999	204	100%
2000	204	100%
2001	204	100%
2002	204	100%
2003	Non-use	0%

2. Precipitation

Average annual precipitation on the Belnap West Allotment is 9-13". There is no rain gauge within the allotment boundaries. Therefore, the two nearest gauges at Alcorn and Bundyville are references for Belnap West's annual precipitation data. The Alcorn rain gauge is located in T35N, R10W, Sec. 30, approximately one mile north of the allotment boundary. Average precipitation is ~13.00" annually. Approximately 12% (1.58") comes in the fall, 30% (3.94") in the winter, 19% (2.44") in the spring and 39% (5.05") in the summer.

The Bundyville gauge is located in T35N, R9W, Sec. 19 approximately three miles northeast of the allotment. Average annual precipitation for this guage is ~11.00". Approximately 13% (1.42") comes in the fall, 24% (2.63") in the winter, 24% (2.56") in the spring, and 39% (4.27%) in the summer.

	Annual Precipitation 1988-1995							
Rain Guage	1988	1989	1990	1991	1992	1993	1994	1995
Alcorn	12.51"	6.55"	10.57"	11.15"	15.05"	17.00"	10.50"	16.50"
Bndyvlle	15.01"	6.75"	9.93"	8.36"	8.59"	12.28"	10.99"	13.02"

	Annual Precipitation 1996-2003							
Rain Guage	1996	1997	1998	1999	2000	2001	2002	2003
Alcorn	7.50"	14.88"	17.25"	11.95"	6.25"	12.75"	4.50"	9.50"
Bndyvlle	9.57"	13.80"	15.30"	13.30"	3.14"	10.35"	6.22"	12.93"

3. Utilization

Utilization is the portion or amount of a key plant species current year's growth that is consumed or destroyed by animals. Utilization data from 1987-2003 has been compiled for this evaluation. The Key Species Grazed Class method was used to collect the data. Utilization is read at or around the designated key area on the allotment. The table below illustrates utilization percentages of each key species by year. NU = Non-use, meaning livestock did not grazing the allotment.

	1987	1988	1989	1990-1996	1997	1998	1999	2000	2001	2002	2003
Hija	34	22	24	NU	32	45	43	40	28	33	NU
Spcr	53	35	32	NU	32	40	39	31	22	18	NU
Sihy	39	34	38	NU	34	38	40	41	29	37	NU
Orhy	51	44	66	NU	41	47	46	46	33	41	NU
Atca	30	62	80	NU	38	49	48	44	38	42	NU

Overall utilization levels on the allotment averaged 41% for all key species over the evaluation period. In 1987 and 1989 grazing use on Orhy exceeded the 50% allowable at 51% and 66% respectively. In 1988 and 1989, use levels on Atca also exceeded the 50% level at 62% and 80%. All other years of the evaluation period, utilization was below 50%. Overall utilization on cool season grasses for the evaluation period is 41%. Overall utilization on warm season grasses for the evaluation period is 34%. The overall utilization on browse species is 47%.

4. Trend

Trend monitoring was conducted at one key area on the allotment. The key area was established in 1982. Because Belnap West is relatively small, the entire allotment is used as one pasture. Data was collected using the Pace-Frequency method. This method of monitoring measures bare ground, litter, rock and live vegetation/basal cover. In addition, it measures the occurrence or frequency of individual plant species.

The trend index, which combines percent forage species, percent litter, and percent live vegetation into one numerical value, shows the key area is in an upward trend.

Belnap West Key Area, Loamy Upland 10-14" precipitation zone (pz), 5,473' elevation. Apparent trend Static, Live vegetation cover 11%. Frequency data from 2003 compared back to the first data year or base year of 1982 are shown in the following tables:

Belnap West Allotment Key Area #1					
Plant Species (Pace Frequency)	**Included in the EcoSite Guide**	**Present at the Key Area**	**% Frequency in 1982**	**% Frequency in 2003**	**TREND**
Grasses					
Bogr	Y	Y	14	17	
Boer	N	Y	2	5	
Hija*	Y	Y	33	40	Static
Arist	Y	Y	12	3	
Orhy*	Y	Y	7	2	Static
Sihy*	Y	Y	10	18	Static
Spcr*	Y	Y	0	3	Static
Spco4	N	Y	0	1	
Forbs					
Astrag	Y	Y	0	0	
Lupine	Y	N	0	0	
Other PPFF	Y	Y	0	6	
Other AAFF	Y	Y	4	5	
Sphae	Y	Y	1	12	
Psco	N	Y	5	3	
Shrubs					
Artr	Y	Y	29	18	
Juos	Y	Y	6	2	
Gusa	Y	Y	6	7	
Atca*	Y	Y	0.5	1	Static
Cela	N	Y	0.5	0	
Epvi	Y	Y	0.5	0.5	
Yucca	Y	Y	0	0	
Lycium	Y	Y	0	1	
Befr	Y	Y	0	0	
Cover (Step Point)	**EcoSite potential Basal Cover**	**Reading in 1982**	**Reading in 2003**	**AMP objective for cover**	**TREND**
Live Basal Veg.	NA	1% cover	11% cover	NA	Upward

5. Ecological Status Information

The "Dry Weight Rank" vegetative sampling method is used to determine species composition. The present composition and the potential for each key specie is used to set composition objectives. The potential composition is determined by the applicable soil type and precipitation zone. These potentials are described in Ecological Site Guides provided by the Natural Resources Conservation Service.

Key Area #1 Plant Spp	Site Guide Allowable Composition	1988 Composition	Present Composition	Desired Composition Objective
Grasses				
Hija*	5-15%	6%	29%	10-15%
Spcr*	1-3%	8%	1%	1-10%
Spco4		0	T	
Orhy*	5-20%	T	T	1-5%
Sihy*	5-10%	T	13%	5-10%
Bogr	15-30%	10%	10%	10-20%
Boer		T	3%	
Arist	0-5%	10%	1%	
Forbs				
PPFF	5-10%	2%	2%	2-10%
AAFF	5-10%	2%	11%	2-10%
Sphae	5-10%	2%	6%	5-10%
Shrubs				
Artr	5-15%	37%	20%	5-20%
Juos	0-5%	5%	1%	0-5%
Gusa	0-5%	15%	3%	
Atca*	5-15%	T	T	1-5%
Cela		T	T	
Epvi	1-10%	T	T	
Yucca	0-10%	0	0	
Lycium	0-10%	3%	T	
Befr	0-3%	0	0	

6. Special Status Species

Plants: None

Animals:

Bald eagles are only found on the Arizona Strip during the winter months. They do nest in this area. In winter, may fly over and forage for food in this allotment. They are infrequently seen along the slopes of the Kaibab Plateau and in canyons near the Grand Canyon during the colder months.

California condor: An experimental non-essential population of California condors was established on the Vermilion Cliffs in 1996. Condors may fly over or forage within this allotment at any time of the year. These birds may forage on carrion within the allotment, though none have been observed here to date.

Peregrine falcons range across the Arizona Strip and nest on cliff faces. Peregrines were removed from federal listing in 1999, and a monitoring plan is in place. Peregrine falcons are an Arizona Species of Concern.

7. Other Wildlife Species

Mule deer and all big game species populations are monitored annually by the Arizona Game and Fish Department. Mule deer survey data for the Game Management Unit 13B, which includes the Belnap West Allotment, includes direct counts by sex and age class. The number of mule deer counted in this area varied considerably over the 18 year period from 1985 to 2003, from a low of 31 in 1992 to a high of 275 in 2001. (see appendices). There is no estimate of mule deer numbers available specifically for this allotment. The number of mule deer counted may not accurately reflect population trends due to variations and other inherent biases in survey techniques.

Unit 13B is considered by Arizona Game and Fish Department to be low productivity habitat for mule deer. Summer range is limited to a few small areas on Black Rock (30 miles north) and Poverty Mountains (4 miles west), Mt. Dellenbaugh (20 miles southwest) and Whitmore Canyon (10 miles east). Much of the remainder of the area is covered by pinyon-juniper woodlands with variable understory. Areas that have been chemically or mechanically treated, such as at Twin Points and Low Mountain, have seen dramatic increases in mule deer populations. Cliffrose is a favored browse species for mule deer in this area and appears to be readily available. Mule deer also rely on forbs which can be plentiful in years with adequate precipitation or nearly absent in dry years.

While this allotment does not provide optimum conditions for mule deer, the reasons are likely related to lack of precipitation on limited summer range habitat and encroachment of pinyon-juniper woodlands. Despite this, mule deer populations continue to increase slowly and are stable. Mule deer would benefit from increased treatments in decadent pinyon-juniper habitat. At present, habitat conditions are conducive to continued, though slow, expansion of the mule deer herd and are appropriate relative to site potential.

8. Riparian/Fisheries Habitat - None

9. Wild Horse and Burro Habitat - None

10. Soils and Lithology

The Belnap West Allotment primarily consists of four to seventy percent slopes and shallow loamy soils, with some limestone ridges and fan terraces. The allotment is classified in the RMP as Watershed Category IV. This means that the watershed units currently are in satisfactory erosion condition, but are susceptible to wind and water erosion following disturbance.

Soils:

ECOSITE AND SOIL MAP UNIT INDEX (623)

33 avasupai very gravelly loam, 1 to 5 percent slopes, (fan terrace), mixed alluvium; Limey Upland, 9" to 13" ppt

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

45 Mellenthin-Strych Complex, 4 to 25 percent slopes, cool, (plateaus, mesas), limestone; Mellenthin-Shallow Loamy, 9" to 13"; Strych-Loamy Upland, 9" to 13"

51 Meriwhitica-Rock outcrop-Strych complex, 35 to 70 percent slopes, (cliffs, canyons) Callville & Redwall limestones; Meriwhitica-Breaks, 9" to 13"; Strych-Loamy Upland, 9" to 13"

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

1. Issues relating to Rangeland Health

a. Maintenance of the 900 acre chaining treatment.

This treatment is similar to many other treatment areas across the Arizona Strip which will require follow up maintenance to ensure a diverse mix of herbaceous understory vegetation. As previously stated, current vegetation diversity is well within the range of natural variability and established DPC objectives. To ensure long term vegetation diversity and achievement of DPC objectives, future maintenance treatments of the persistent woody species will be required.

b. Bromus techtorum (Brte) cheat grass at various locations.

Cheat grass has been observed at various locations on the allotment. The exotic annual grass is most common on a private parcel located on the north end of the allotment, but is also associated with a healthy mix of perennial vegetation.

V. Conclusions

1. Land Use Plan Objectives

Shivwits Resource Area Implementation Plan for the Arizona Strip Resource Management Plan

GZ17 *Allowable use on key forage species is 50% of current years growth.*

This objective has been met. Utilization individual key species has exceeded the 50% allowable level only five times. The overall use for all key species is 41%, which is below the 50% allowable.

RR-08 *Manage the majority of the resource area for extensive recreation while maintaining its naturalness/remoteness. The exception to this is the Cedar Pockets campground.*

This objective is being met. Visitors to the allotment engage in hunting, camping, sightseeing, and indulge in a variety of legitimate recreation activities and are monitored to see that the area's values are not degraded by overuse.

RR-09 *Commercial recreation permits would be issued to the extent that their cumulative impacts are consistent with the overall objectives of this plan and in the public interest.*

This objective is being met. As new requests for commercial special recreation use permits are received, they are evaluated and reviewed for consistency with this objective and processed accordingly.

WS01 *Manage vegetation cover towards ecological stability and sound long-term protective soil cover.*

The objective has been met. Departure from soil and hydrologic site descriptions/function (rills, flow patterns, pedestals, bare ground, gullies, wind scour, litter movement and amount, resistance to erosion, soil loss, compaction and infiltration) are none to slight.

WS16 *Develop management prescriptions or improvement practices to achieve desired plant community objectives.*

The objective has been met. Departure from soil and hydrologic site descriptions/function (rills, flow patterns, pedestals, bare ground, gullies, wind scour, litter movement and amount, resistance to erosion, soil loss, compaction and infiltration) are none to slight.

WS21 *Manage watershed areas according to watershed categorizations to achieve identified objectives.*

The objective has been met. Departure from soil and hydrologic site descriptions/function (rills, flow patterns, pedestals, bare ground, gullies, wind scour, litter movement and amount, resistance to erosion, soil loss, compaction and infiltration) are none to slight.

The allotment is classified in the RMP as Watershed Category II. This means that the watershed units currently are in satisfactory erosion condition, but are susceptible to wind and water erosion following disturbance. This allotment will remain in this category.

TE01 *Manage areas consistent with multiple uses to conserve candidate species and their habitats and ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered. Adverse impacts to listed species will be avoided.*

This objective is being met. No actions which might contribute to the need to list candidate species are known. No adverse impacts to listed species are known.

WL02 *Maintain productive wildlife habitat and ensure wildlife needs and considerations are incorporated into land use planning, National Environmental Policy Act documents, and management decisions.*

This on-going objective is being met through the NEPA process when site specific actions are proposed.

WL07 *Manage wildlife habitat through the Habitat Management Plan process to achieve desired plant community objectives.*

This objective is being met. Wildlife species and habitats are managed through the Black Rock HMP. Desired plant community objectives consider the needs of wildlife and their habitat. Objectives for this allotment have been developed that incorporate wildlife needs, and all objective are being met.

WL16 *Complete ecological site inventories in key areas to determine site potentials and present ecological conditions; establish desired plant community objectives for various areas and include these objectives in Allotment Management Plans, Habitat Management Plans, watershed plans, and other plans in order to prescribe management or improvement practices to achieve these objectives.*

This objective is being met. Ecological site inventories have been conducted in the key area to determine site potentials.

2. Specific Resource Objectives

Desired Plant Community (DPC) Objectives developed during this evaluation process

Belnap West Key Area:

Maintain perennial grass composition between 50-70% through 2030 by,
Maintaining Hija CBW between 10 to 15%
Maintaining Spcr CBW between 1 to 10%
Maintaining Orhy CBW between 1 to 5%
Maintaining Sihy CBW between 5 to 10%
Maintain shrub CBW between 15-40% through 2030.
Maintain forb CBW between 2-10% through 2030.
Maintain tree CBW between 0 to 5% through 2030.

These objectives have been met. The ecological condition is 72 percent, similar to PNC, which is Late Seral. Present CBW for the key species is as follows: Hija is 29%, Spcr 1%, Orhy 1%, and Sihy 13%.

By functional group, CBW for tree species is at one percent, CBW for shrubs is at 23 percent, CBW for grasses is at 57 percent, and the CBW for forbs are at 19 percent.

California Condor Recovery Plan (April, 1996)

CC-1 *Provide foraging habitat for California condors.*

Foraging habitat is available for condors. Due to recent concerns raised about the condors eating contaminated food, leaving dead livestock on the range for the condors is not being encouraged. Condors are especially vulnerable to lead poisoning and carcasses possibly containing lead should be removed from the range. There is no evidence that the habitat is limiting or restricting condor population growth.

Parashaunt Habitat Management Plan

MD-9 *Maintain adequate mule deer cover conditions to support 2,200 deer by 1995.*

This objective is not being met. Summer range has not been increased. This could only be accomplished through increased precipitation or large scale treatment projects in pinyon-juniper habitat. While fawn survival has approached or exceeded 50 fawns per 100 does in unit 13B, typical fawn to doe ratios are closer to 35. This unit is considered to a low productivity area for mule deer, primarily due to dry conditions and encroachment by pinyon and juniper communities. It is doubtful that the area could ever support 2,200 mule without long term intensive and costly manipulation of the habitat.

NG-4 *Ensure that all the components needed to sustain certain populations of nongame species are conserved.*

This objective is being met through the Standards and Guidelines assessment process, through development of new desired plant community objectives and interdisciplinary activity plans for wildlife habitat management.

B. Pertaining to Issues

1. Issues relating to Rangeland Health

a. Maintenance of the 900 acre chaining treatment

To ensure long-term vegetation diversity and achievement of DPC objectives, future maintenance treatments of the persistent woody species (i.e. juniper, pinyon and sagebrush) will be required. Maintenance methods could include prescribed fire, herbicide, or a selective mechanical method.

b. Bromus techtorum (Brte) cheat grass at various locations.

Upon further evaluation by the RRT, it was concluded that cheat grass was a non-issue. Although cheat grass is present on the allotment, it is associated with a healthy mix of perennial native vegetation and poses no immanent threat to overall rangeland health. Monitoring data at the key area shows no increase in composition or frequency of cheat grass.

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:

[XX] Meet all applicable standards for rangeland health

[ ] 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. Initiate planning for a maintenance treatment of the 900 acre chaining. Given the existing herbaceous understory, it was recommended by the field team to consider herbicide "Spike 20P" as the preferred method of treatment, followed by prescribed fire as an alternative.
B. Renew the ten year grazing permit with current terms and conditions.
C. Maintain the west boundary fence.

AUTHORIZED OFFICER CONCURRENCE:

X I concur with the conclusions and recommendations as written.

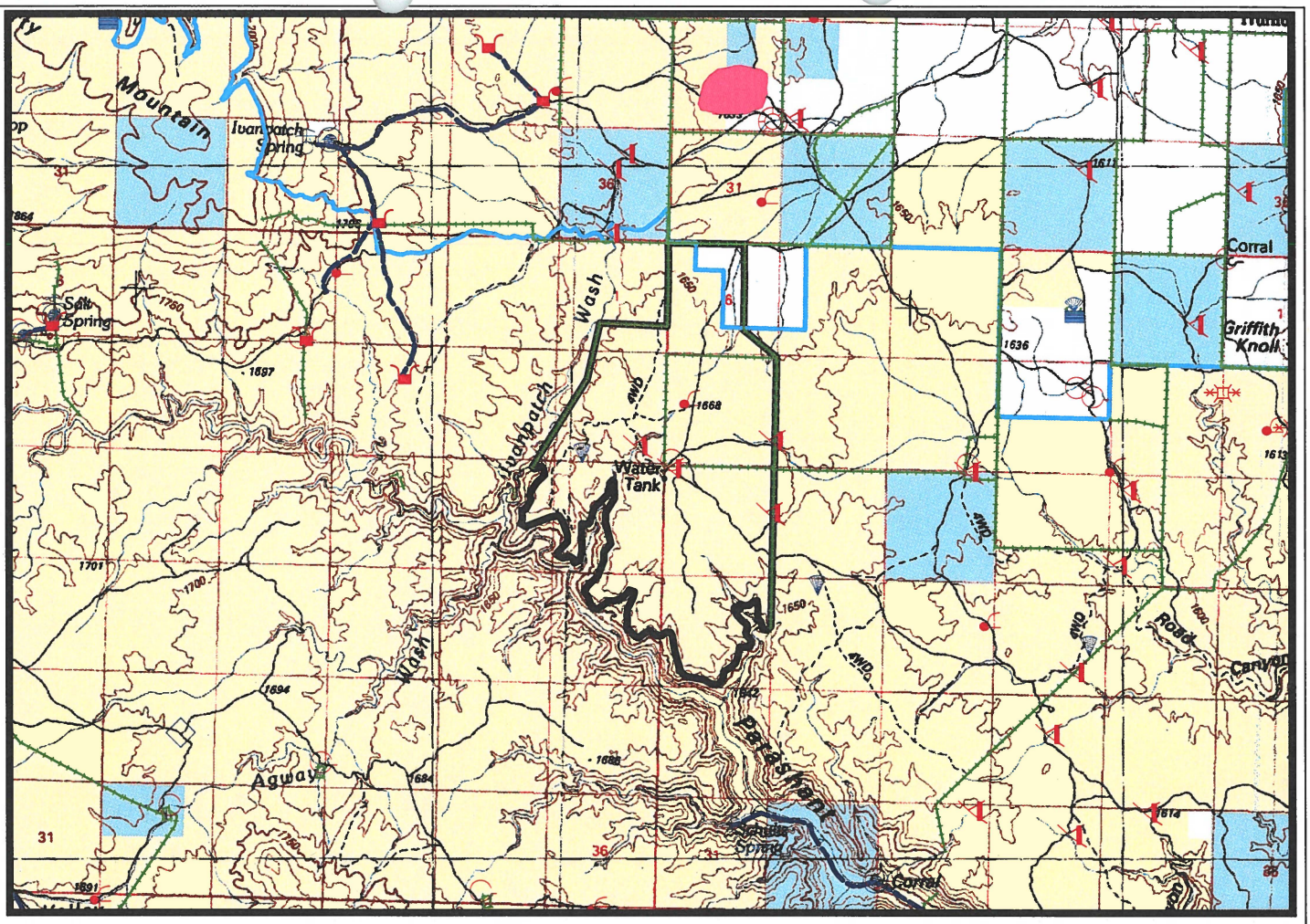
_____ I do not concur.

_____ I concur, with the following modifications:

Roger D Taylor — Sept 17, 2004

Field Manager
Arizona Strip Field Office

Date



Belnap West Allotment

Bureau of Land Management
Arizona Strip Field Office

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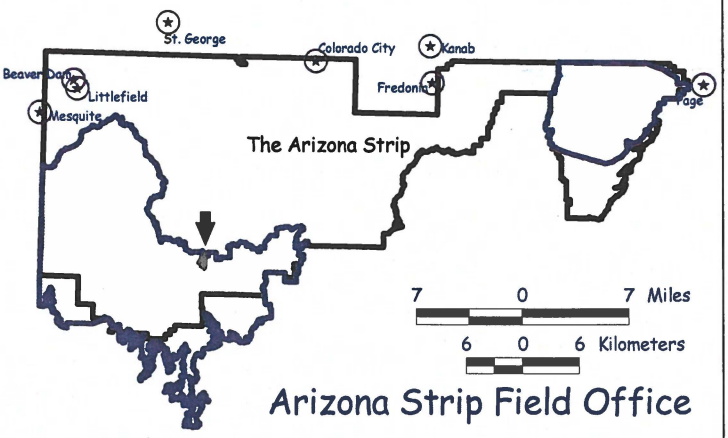
1 0 1 Miles

1 0 1 2 Kilometers

- 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



Arizona Strip Field Office

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
October 21st, 2003

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.

Appendix B
Team Membership

Interdisciplinary Assessment Team

Linda Price	Project Coordinator (BLM)
Mike Small	Wildlife Biologist (BLM)
Larry Gearhart	Wilderness/Recreation Specialist (BLM)
Whit Bunting	Vegetation/Grazing Administration (BLM)
Robert Smith	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)

Rangeland Resource Team

Commodity Interests

Bill Gubler,
Grazing
Rancher, St. George, UT

Maggie Sacher,
Commercial Recreation/Tourism
Owner: Lee's Ferry Lodge,
Marble Canyon, AZ

Non-Commodity Interests

Scott Hansen,
Environmental Conservation
Retired, St. George, UT

Spence Esplin,
Historical
Retired, St. George, UT

Phil Squire,
Dispersed Recreation/Wildlife
Retired, St. George, UT

Local Area Interests

Kent McComb,
Public-at-Large
Retired, St. George, UT

Frank Malan,
Public-at-Large
Retired, St. George, UT

Appendix C:

Precipitation Data

Alcorn PRECIPITATION RAIN GAUGE NUMBER: 01 Page 1

Year	Fall	Winter	Spring	Summer	Annual	Fall Average	Winter Average	Spring Average	Summer Average	Annual Average	% Normal Fall	%Normal Winter	%Normal Spring	%Normal Summer	%Normal Annual
1978	1.8	10.0	2.4	2.7	16.8	1.57	3.79	2.27	4.77	12.39	112	264	106	56	136
1979	3.9	5.1	2.8	3.9	15.6	1.57	3.79	2.27	4.77	12.39	246	134	122	81	126
1980	0.4	5.9	2.6	5.5	14.3	1.57	3.79	2.27	4.77	12.39	22	156	115	114	116
1981	0.9	1.7	3.9	7.1	13.5	1.57	3.79	2.27	4.77	12.39	59	45	170	148	109
1982	1.1	4.0	1.9	8.8	15.8	1.57	3.79	2.27	4.77	12.39	72	105	85	185	128
1983	3.1	3.8	2.5	6.9	16.2	1.57	3.79	2.27	4.77	12.39	195	101	108	144	131
1986	2.6	1.1	3.1	6.1	12.9	1.57	3.79	2.27	4.77	12.39	167	29	137	127	104
1987	1.4	2.4	2.8	4.1	10.6	1.57	3.79	2.27	4.77	12.39	88	63	122	86	86
1988	4.1	2.1	3.8	2.6	12.5	1.57	3.79	2.27	4.77	12.39	259	56	167	54	101
1989	0.6	2.7	1.1	2.1	6.6	1.57	3.79	2.27	4.77	12.39	41	71	50	44	53
1990	0.3	1.9	2.0	6.4	10.6	1.57	3.79	2.27	4.77	12.39	19	49	88	135	85
1991	0.5	4.0	1.3	5.3	11.2	1.57	3.79	2.27	4.77	12.39	31	105	59	112	90
1992	0.9	4.8	6.3	3.1	15.1	1.57	3.79	2.27	4.77	12.39	58	125	278	65	121
1993	2.1	9.8	3.4	1.7	17.0	1.57	3.79	2.27	4.77	12.39	134	258	149	37	137
1994	1.8	2.9	2.5	3.3	10.5	1.57	3.79	2.27	4.77	12.39	116	78	110	68	85
1995	2.0	6.2	5.4	3.0	16.5	1.57	3.79	2.27	4.77	12.39	125	163	236	63	133
1996	0.1	3.9	0.9	2.6	7.5	1.57	3.79	2.27	4.77	12.39	8	102	38	55	61
1997	2.1	3.4	2.2	7.1	14.9	1.57	3.79	2.27	4.77	12.39	136	89	99	150	120
1998	1.6	4.3	1.3	10.0	17.3	1.57	3.79	2.27	4.77	12.39	104	114	57	210	139
1999	2.5	1.3	0.8	7.5	12.0	1.57	3.79	2.27	4.77	12.39	158	34	33	156	96
2000		2.8	0.3	3.3	6.3	1.57	3.79	2.27	4.77	12.39		73	11	68	50
2001	2.8	3.9	0.9	5.1	12.8	1.57	3.79	2.27	4.77	12.39	181	103	39	107	103
2002	0.4	1.4		2.8	4.5	1.57	3.79	2.27	4.77	12.39	24	36		58	36
2003	1.5	3.0	1.3	3.7	9.5	1.57	3.79	2.27	4.77	12.39	96	79	56	78	77
2004	0.8	2.6	1.5		4.9	1.57	3.79	2.27	4.77	12.39	52	67	66		39

Bundyville PRECIPITATION RAIN GAUGE NUMBER: 01 Page 1

Year	Fall	Winter	Spring	Summer	Annual	Fall Average	Winter Average	Spring Average	Summer Average	Annual Average	% Normal Fall	%Normal Winter	%Normal Spring	%Normal Summer	%Normal Annual
1988	4.4	1.2	4.8	4.7	15.0	1.48	2.57	2.46	4.12	10.62	296	46	193	114	141
1989	0.3	1.8	1.2	3.4	6.8	1.48	2.57	2.46	4.12	10.62	20	70	50	83	64
1990	1.1	0.9	2.8	5.2	9.9	1.48	2.57	2.46	4.12	10.62	73	33	115	126	93
1991	0.5	3.7	0.4	3.8	8.4	1.48	2.57	2.46	4.12	10.62	30	144	18	92	79
1992	0.7	1.8	5.0	1.1	8.6	1.48	2.57	2.46	4.12	10.62	48	70	203	26	81
1993	1.1	4.7	2.0	4.5	12.3	1.48	2.57	2.46	4.12	10.62	73	183	81	109	116
1994	3.8	2.5	2.2	2.5	11.0	1.48	2.57	2.46	4.12	10.62	254	97	91	61	103
1995		4.0	4.8	4.2	13.0	1.48	2.57	2.46	4.12	10.62		156	196	102	123
1996	0.0	4.6	1.0	3.9	9.6	1.48	2.57	2.46	4.12	10.62	3	180	39	96	90
1997	1.6	2.4	2.2	7.6	13.8	1.48	2.57	2.46	4.12	10.62	108	93	90	185	130
1998	1.0	3.5	3.3	7.5	15.3	1.48	2.57	2.46	4.12	10.62	68	136	134	182	144
1999	2.7	1.4	2.2	7.1	13.3	1.48	2.57	2.46	4.12	10.62	183	53	87	172	125
2000		1.8	1.3		3.1	1.48	2.57	2.46	4.12	10.62		72	53		30
2001	4.3	1.3	3.8	0.9	10.4	1.48	2.57	2.46	4.12	10.62	292	52	153	22	97
2002	1.5	0.6	0.6	3.5	6.2	1.48	2.57	2.46	4.12	10.62	102	24	24	85	59
2003	1.0	3.6	2.3	6.0	12.9	1.48	2.57	2.46	4.12	10.62	70	140	94	146	122
2004	1.2	3.9	1.9		6.9	1.48	2.57	2.46	4.12	10.62	80	150	77		65

Appendix D:

Vegetation Data

Trend Frequency and Vegetation Composition Summary

Allotment: Belnap West
Key Area: #1
Pasture: Belnap West
Ecological Site: D35-3 Loamy Upland 10-14"
Precipitation Gauge: Alcorn

Frequency Data				Vegetation Composition Data			
Species	**%Freq. 1982 4/13/82**	**%Freq. 1985 9/26/85**	**%Freq. 1988 10/6/88**	**Species**	**% Comp 1988**	**% Comp 2003**	**% Comp Year**
Trees/Shrubs				**Trees/Shrubs**			
Juos	6	4	4	Juos	5	1	
Artr	29	22	25	Artr	37	20	
Gusa	6	47	32	Gusa	15	3	
Atca*	.5	1	.5	Atca	T	T	
Cela	.5	0	0	Cela	T	T	
Happlo.	.5	0	4	Happlo.	T	T	
Epvi	0	0	0	Epvi	T	T	
Lyan				Lyan	3	T	
Grasses				**Grasses**			
Bogr	14	44	44	Bogr	10	10	
Hija*	33	37	34	Hija	6	29	
Arlo	12	34	28	Arlo	10	1	
Sihy*	10	8	11	Sihy	T	13	
Boer	2	14	5	Boer	T	3	
Orhy*	7	1	4	Orhy	T	T	
Spcr*	0	3	7	Spcr	8	1	
Forbs/Annuals				**Forbs/Annuals**			
Cryptantha	4	0	2	Cryptantha	T	T	
Psco	5	4	16	Psco	2	2	
Spam	1	3	2	Spam/PPFF	2	6	
AAFF			27	AAFF	2	11	
Key Species	66	108	105.5				
Bare Ground	78	56	57				
Litter	21	26	36				
Rock	.5	2	0				
Basal Hits	1	16	7				
Ground Cover	22	42	42				
Annual Precipitation	1981 13.54"(109%)	1984 No Data	1987 10.62"(85%)	**% Simularity**	56	72	
Annual Precipitation	1982 15.52"(127%)	1985 No Data	1988 12.51"(100%)	**Ecological Condition**	Late Seral	Late Seral	

Trend Frequency and Vegetation Composition Summary

Allotment: Belnap West
Key Area: #1
Pasture: Belnap West
Ecological Site: D35-3 Loamy Upland 10-14"
Precipitation Gauge: Alcorn

Frequency Data				Vegetation Composition Data			
Species	**%Freq. 1992 8/19/92**	**%Freq. 1995 10/5/95**	**%Freq. 2003 9/3/03**	**Species**	**% Comp 1988**	**% Comp 2003**	**% Comp Year**
Trees/Shrubs				**Trees/Shrubs**			
Juos	1	1	1	Juos	5	1	
Artr	30	33	18	Artr	37	20	
Gusa	8	13	7	Gusa	15	3	
Atca*	.5	2	1	Atca	T	T	
Cela	0	0	0	Cela	T	T	
Happlo.	0	0	0	Happlo.	T	T	
Epvi	0	.5	.5	Epvi	T	T	
Lyan	.5	.5	1	Lyan	3	T	
Grasses				**Grasses**			
Bogr*	32	25	17	Bogr	10	10	
Hija*	44	42	40	Hija	6	29	
Arlo	17	13	3	Arlo	10	1	
Sihy*	4	10.5	18	Sihy	T	13	
Boer*	6	5.5	5	Boer*	T	3	
Orhy*	2	4	2	Orhy*	T	T	
Spcr*	8	8	3	Spcr	8	1	
Forbs/Annuals				**Forbs/Annuals**			
Cryptantha	3	3	0	Cryptantha	T	T	
Psco	2	7	3	Psco	2	2	
Spam	4	5	12	Spam/PPFF	2	6	
AAFF	16	11	42	AAFF	2	11	
Key Species	98.5	98	86				
Bare Ground	45	47	59				
Litter	41	47	24				
Rock	5	3	6				
Basal Hits	9	7	11				
Ground Cover	50	54	35				
Annual Precipitation	1991 11.15"(89%)	1994 10.50"(84%)	2002 4.50"(36%)	**% Simularity**	56	72	
Annual Precipitation	1992 15.05"(121%)	1995 16.50"(132%)	2003 9.50"(76%)	**Ecological Condition**	Late Seral	Late Seral	

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