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

Link Springs -- #4819

I. Introduction

The Link Springs Grazing 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). The RAC is 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 January 29, 2002, and a field visit on November 20, 2002. 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 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

Permittee: William H. & Jill Bundy

Active Grazing Use: 1,094 AUMs
Suspended Non-use: 685 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

3/1 to 2/28

C. Kind and class of livestock

93 Cows & Calves
2 Horses

D. Percent federal range

96%

III. Allotment Profile

A. Description

The Link Springs Grazing Allotment is located in northwest Arizona approximately 40 miles south of St. George, Utah. Tweeds Point, Hidden Rim, Hidden Canyon, and Upper Grand Wash Cliffs are a few of the topographical features found within the allotment. It is found within the Grand Canyon-Parashant National Monument. A good variety and diversity of vegetation exist in the allotment ranging from pinyon-juniper in the higher elevations to desert shrub and annual grasses in the lower elevations.

B. Acreage

The allotment contains:

27,689 acres of federal land
320 acres of state land
0 acres of private land

C. Objectives

Program guidance decisions, as well as specific resource objectives for this allotment, are found in the Arizona Strip Resource Management Plan (RMP, 1992); the Desert Tortoise RMP Amendments to the RMP; the Desert Tortoise Recovery Plan; the Shivwits Resource Area RMP Implementation Plan (SRAIP); BLM's Interim Management Policy for BLM Monuments and National Conservation Areas (Oct. 4, 2001); the Arizona Strip Desert Bighorn Sheep Management Plan as amended (May 2001); the Black Rock Habitat Management Plan (HMP); and the Grand Wash Cliffs Wilderness Management Plan.

1. Land Use Plan Objectives

Shivwits Resource Area Implementation Plan (SRAIP)

GZ12 Complete ecological site inventories to determine site potentials and current ecological conditions.

GZ13 Establish desired plant community objectives and include them in the allotment management plan.

GZ14 Continue a systematic cycle of monitoring data evaluation on all allotments, involving a thorough review of consolidated utilization, condition, trend, actual use, and precipitation data to determine whether objectives are being met or changes in management are necessary.

GZ17 Allow 50% utilization on key forage species in allotments with rotational grazing systems. On allotments in tortoise habitat, utilization is set at 45%.

RR06 Implement actions to restore and/or maintain natural conditions or appearance in all areas.

RR08 Manage the majority of the resource area for extensive recreation while maintaining its naturalness/remoteness. The exception to this is the Cedar Pockets Campground.

RR09 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.

WD01 Continue managing the Grand Wash Cliffs wilderness areas in accordance with its activity management plan.

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

WS22 Manage watershed areas according to watershed categorizations to achieve identified objectives.

The allotment was classified in the RMP as category IV. This means that the watershed units currently are in unsatisfactory erosion condition, but the soils would be responsive to treatment.

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.

2. Specific Resource Objectives

Link Spring Allotment Management Plan. Objectives

The overall resource goals from the AMP are to improve vegetative conditions, increase the available amount of forage for livestock and wildlife, and improve the watershed conditions.

Key species specific objectives were not developed in the AMP process. See following section below for DPC objectives that were developed during this evaluation process.

Desired Plant Community Objectives.

Desired Plant Community[1] Objectives (DPC's) were developed during this evaluation process by an interdisciplinary team of specialists. DPC's include species Composition by Weight (CBW) and percent basal vegetative cover. Species composition is monitored using the Dry Weight Ranking method. Percent basal vegetative cover is monitored using

[1]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 landowner's or manager's objective 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.

the "Step-Point" method. The species composition objectives were developed using the Ecological Site Guides, developed by Natural Resource Conservation Service, and site specific information of the potential of the site to produce vegetation.

Key Area No. 1, located in the Middle Bench pasture
Maintain Bocu (side-oats grama) to between 1 and 2% CBW
Increase Spcr (sand dropseed) to between 1 and 2% CBW
Increase Sihy (bottlebrush squirreltail) to between 1 and 3% CBW
Increasing Come (cliffrose) to between 1 and 3% CBW
Increasing Ephedra (Mormon tea) to between 1 and 3% CBW
Maintaining the forb CBW to between 1 to 5 percent
Maintain Live Vegetation (Basal Cover) to between 3% and 8%.

Key Area No. 2, located in the Tweedie pasture
Increasing Bocu (side-oats grama) to between 2 and 5% CBW
Increasing Spcr (sand dropseed) to between 1 and 5% CBW
Maintain Hija (galleta) to between 5-15% CBW
Increase Sihy (bottlebrush squirreltail) to between 2 and 5% CBW
Increasing Come (cliffrose) to between 2 and 5% CBW
Increasing Ephedra (Mormon tea) to between 1 and 5% CBW
Maintaining the forb CBW between 1 to 5 percent
Maintain Live Vegetation (Basal Cover) to between 3 and 8%.

Rationale: Wildfires burned through middle bench (Key Area #1) on/or about 1980. In both areas, seasonal variations in precipitation and the current drought (near record for last 100 years[1]) have affected, particularly, the density[2] of grass plants. Because of these natural disturbances, these key areas are in the early stages of seral succession. Though in itself this is not a problem, the sites need to continue to be monitored to insure that livestock does not have a negative impact on successional processes.

The ecological site for Key Area #1 is a shallow upland (Cal) 9-13 inch precipitation zone (pz). The ecological site for Key Area #2 is a shallow loamy 9-13 inch precipitation zone (pz). The long range climatic tends for these areas favor the cool season plants; that is, most of the moisture (60-70%) comes between November-April. However, seasonal variations do occur where climatic conditions favor the warm season plants for a short period of time. As a result, the mix of cool and warm season plants varies from season to

[1] Conditions were exceptionally extreme during the summer of 2002, when the Palmer Drought Severity Index reached near-record severity based on the last 100 years of instrumental data. From the internet NCDC at: http://www.ncdc.noaa.gov/oa/climate/research/2003/jun/st042dv00pcp200306.html#top "Climate of 2003 - June Utah Drought National Climatic Data Center, 15 July 2003 Paleoclimatic Perspective".

[2] In climate manipulations, where water availability is a limiting factor, additional water had a significant positive effect on plant cover density and species richness. Sternberg1, Marcelo, Brown, Valerie K, Masters, Gregory J., & Clarke, Ian P. Plant community dynamics in a calcareous grassland under climate change manipulations. *Plant Ecology,* 143: 29–37, 1999. or http://www.tau.ac.il/lifesci/botany/USR/marcelos/PE_1999.pdf#search='climate%20change%20plant%20density'.

"The cover of 11 perennial grass species was tested for correlation with the five climatic variables. Of the 11 grass species, six grass species exhibited significantly positive ($p < 0.05$) correlations with precipitation at one or more seasons. . . ". Crimmins, Michael A., and Crimmins, Theresa M. Climate Variability and Plant Response at the Santa Rita Experimental Range, Arizona, USDA Forest Service Proceedings RMRS-P-30. 2003.

season as seasonal precipitation varies. In addition, and occurring frequently, are the long periods when little or no effective moisture is received.

Key Area #1 is a shrub plant community, dominated by blackbrush and other desert shrubs (cliffrose, Ephedra, and yucca). Trees are scattered but increase with elevation and cool aspect. Perennial grasses are very scattered, and are primarily cool season. Forbs are also infrequent.

Key Area #2 is primarily made up of mid and short grasses, palatable shrubs, and sagebrush. In the original plant community there is a mixture of both cool and warm season grasses.

During the early seral stages the plant communities, at both key areas, produce predominately annual and perennial forbs and grasses with scattered perennial grasses and shrubs. Recovery after fire may be in excess of 100 years.

The desired plant community for both key areas includes bottlebrush squirreltail, sand dropseed, side-oats grama, cliffrose, and Mormon tea. The team has looked at the site and determined that potential exists to allow achievement of these objectives both in site capability and through management of the various uses BLM authorizes. The DPC objectives established are felt to be attainable and will promote attainment of the GCPNM EIS/LUP (currently being drafted) Desired Ecological Condition (DEC).

Attainment of the DPC will ensure soil stability by providing cover and protection from accelerated erosion, supply the needed level of livestock forage, and maintain an aesthetically diverse viewshed. These "key species" were selected because they represent the cool and warm season grasses as well as shrub species which, though they may not be a significant component of the ecological site, they are important in the plant species diversity.

For the key grass species, the ecological site guide allows from 1-3% CBW for bottlebrush squirreltail (cool season grass), 1-2% CBW for sand dropseed (warm season grass) and other perennial grasses 1-2% CBW, which includes side-oats grama (another warm season grass). For the key shrub component species the site guide allows 1-3% CBW for cliffrose, and 3-5% CBW for Mormon tea.

At Key Area #2 the ecological site guide allows from 5-10% CBW for bottlebrush squirreltail, 1-5% CBW for sand dropseed, 5-15% CBW galleta, and 2-10% CBW for side-oats Grama. For the key shrub component species the site guide didn't allow any CBW for cliffrose, but did allow 1-5% CBW for Mormon tea.

Arizona Strip Desert Bighorn Sheep Management Plan, as amended (May 2001)

BS2 Increase populations of bighorn sheep to fully occupy …suitable habitat on the Arizona Strip at an average density of no more than four bighorn per square mile by the year 2010. Maximum populations for the … Grand Wash Cliffs (area) would be 700.

California Condor Recovery Plan

CC-1 Provide foraging habitat for California condors.

CC-2 Maintain a healthy, self-sustaining population of California condors with a positive growth rate of at least 150 individuals with at least 15 breeding pairs.

Specific objectives from the Black Rock Habitat Management Plan

MD1 Identify factors suppressing mule deer population recovery and, if possible, the cause(s) of the decline in the HMP area by 1998. Where possible, eliminate or reduce the impacts of limiting factors to initiate herd recovery.

MD2a1 Enhance and maintain forage, water, and cover conditions on 365,000 acres of mule deer habitat to support 2,200 deer yearlong in the HMP area by the year 2010.

MD2a1 Identify and manage for key forage and cover species in mule deer habitat, particularly crucial summer range, based on DPC and establish key areas by 2000.

MD3a Increase the number of mule deer in the HMP area by at least 100 percent over the 1993 estimated population of 400 head by 2010.

MD3b Increase mule deer production and maintain an average fawn survival within AGFD species management guidelines for mule deer.

MD3c Increase and maintain post harvest buck to doe ratios within AGFD species management guidelines for mule deer.

D. Key Species

Plant Category	Common Name	Scientific Name	Abbreviation
Cool season Grasses	Bottlebrush squirreltail	Sitanion hystrix	Sihy
Warm Season Grasses	Sand dropseed	Sporobolus spp.	Sporo
	Galleta	Hilaria jamesii	Hija
	Side-oats grama	Bouteloua curtipendula	Bocu
Browse	Mormon tea	Ephedra nevadensis	Epne
	Cliffrose	Cowania mexicana	Come

E. Grazing System

Livestock are grazed yearlong on the BLM permit. Bulls remain with the cows yearlong with most calves being born in the spring. Livestock breeds are mainly Brahma and Brahma Cross with other breeds. The permittee has a cow/calf operation and selectively keeps a few replacement heifer calves each year.

During the winter (October 1st to May 31st) the livestock can graze two pastures, the Canyons and the Wilderness. Livestock grazing starts in one pasture one year and the other the next year allowing for the rotation of the two pastures.

Summer system is a three pasture deferred rotation system with most of the use occurring between June 1st to October 31st.

F. Other uses

1. Special Status Species

Two federally listed avian species would also be expected to occasionally occur in the Link Springs Allotment, but neither would nest there.

California Condor - The California condor, federally listed as endangered, occurs yearlong on the Arizona Strip and may fly over and forage for food in this allotment. There are currently (as of Feb. 2, 2004) 51 condors in northern Arizona. They comprise the southwest population, which is also designated as experimental, non-essential.

Bald Eagle - The bald eagle, listed as threatened, may also fly over and forage for food in the Link Springs Allotment. Bald eagles are winter migrants to this area.

Desert Tortoise Critical Habitat – According to BLM maps, approximately 2500 acres (<9% of the allotment) along the western edge of this allotment was designated as critical habitat on March 10, 1994, for the Mojave population of desert tortoise by the U.S. Fish and Wildlife Service. The critical habitat was designated along section lines, not topographic features such as steep cliffs, and therefore included land which is not actually tortoise habitat. Tortoise habitat exists at the base of the Grand Wash Cliffs, actual desert tortoise habitat does not exist in the Link Spring Allotment and no desert tortoises have been located in the allotment. This allotment was not included in the programmatic consultation on grazing with the FWS in 1998.

There are no known special status plant species in the Link Springs Allotment.

2. Other Wildlife Species

Desert bighorn sheep and mule deer are the primary big game species.

Bighorn sheep seem to have received more recent management attention in this allotment,

which is in AGFDs Game Management Unit 13B. This habitat is historic bighorn habitat, but the original sheep were extirpated in the early 1900's. Cooperative BLM/AGFD releases of bighorn sheep have occurred since 1983 in this allotment, and there are now two existing sheep water catchments in the area.

Mule deer also occur in this allotment. Unit 13B in general is highly regarded for producing trophy mule deer.

Nongame wildlife found on the allotment is typical of the area, including a variety of small mammals, birds including raptors, and reptiles. Predators include coyotes, bobcats, and mountain lions.

3. Recreation

The Link Spring Allotment is considered to have high recreation value for its geology, scenic view sheds, remoteness, and solitude. General recreation activities include: recreational OHV use, driving for pleasure, horseback riding, hiking, backpacking, camping, hunting, rock collecting, photography, bird watching, and nature study.

This allotment contains areas in both the Paiute and the Grand Wash Cliffs Wilderness boundaries, which have been designated as closed (Wilderness) to OHV use. Two other OHV classifications are found in this allotment: Limited to Existing Roads and Trails, and Limited to Designated Roads and Trails.
The area within this allotment have been classified utilizing the Recreation Opportunity Spectrum as "Primitive," "Semi-Primitive Non-Motorized," 'Semi-Primitive Motorized, and Roaded Natural.

The allotment contains Class 1, 2, and 4 Visual Resource Management classifications.

4. Wilderness

A portion of the Grand Wash Cliffs Wilderness area is included within the Link Spring Allotment. This Wilderness area is wild and very remote. Many rugged canyons, scenic escarpments, miles of cliffs, and sandstone buttes mark the transition between the Colorado Plateau and Basin and Range provinces.

G. Issues brought out in scoping.

1. Issues relating to Rangeland Health

a. Noxious weeds, scotch thistle
b. Buildup of woody species
c. Lack a modified suppression plan to mimic fire cycles

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

a. Fences cut during fire suppression – every effort will be made in future fire seasons, to repair all fences where cutting was necessary for suppression activities.
b. Lack of maintenance at wildlife facilities – There are two desert bighorn sheep catchments (Nax and Olaf) which are currently in disrepair. They are both located in the Grand Wash Cliffs Wilderness and AGFD has finalized plans to reconstruct both catchments by June 2004. Such reconstruction is in compliance with NEPA requirements and will require helicopter access.
c. When roads are maintained the side roads are blocked by the berm created from grading – every effort will be made to eliminate side road blockage when grazing main roads.
d. Gates are left open – extra efforts will be made to educate public land users of the policy to leave gates as they are found.

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. These resources are managed according to resource management plans, Allotment Management Plans, and other activity plans, which identify terms and conditions for management on public lands within the Link Spring Allotment. If the current 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 consistently at about 99% of the use allowed (1,094 AUMs) through the year 1994. Thereafter it varied from as low as 39% to 88% of the use allowed.

Year	AUMs Used	Under Stocked by
1985	1,094	0%
1986	1,094	0%
1987	1,094	0%
1988	1,094	0%
1989	1,083	1%
1990	1,083	1%
1990	1,083	1%

Year	AUMs Used	Under Stocked by
1991	1,086	1%
1992	1,083	1%
1992	1,083	1%
1993	1,083	1%
1994	1,083	1%
1995	783	28%
1996	968	12%
1997	883	19%
1998	926	15%
1999	953	13%
2000	926	15%
2001	792	28%
2002	430	61%
2003	531	51%
2004	606	45%

2. Precipitation

Olaf Knolls and Sullivan Tank precipitation gauges will be used in this evaluation. Precipitation amounts are varied due to extremes in elevations found in the allotment. Yearly moisture accumulations range from a maximum of 13-inches on the higher elevations to a minimum average of eight inches in the middle and southern portions of the allotment. Most of the allotment falls in a 12-inch precipitation zone, with most occurring either during the summer or winter months.

Recent drought has and still is playing a major role in modifying the vegetative community. For example, the Olaf Knolls rain gauge precipitation for the year 2000 was 65% of normal (0% for fall, 85% winter, 49% spring, and 82% for summer). The 2001 precipitation year was above normal for fall, winter, and spring, but summer again was below normal at 65%. That was followed by another year (2002) of below normal conditions with no effective precipitation received, (fall 12%, winter 33%, spring 5%, summer 15%). As a result, the 2002 annual precipitation was only 19% of normal.

September 22, 2005	Sullivan Tank Precipitation Rain Gauge Number: 25														
Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Fall % Avg	75	86	78	63	48	122	129	85	148	107	191	49	31	49	111
Winter % Avg	206	198	206	47	99	82	35	134	31	97	40	90	43	94	84
Spring % Avg	167	89	72	165	136	148	31	83	135	168	158	54	66	55	193
Summer % Avg	48	116	119	113	163	145	181	78	85	85	82	75	163	72	99
Annual % Avg	133	138	138	90	118	119	92	101	82	108	95	73	82	74	112
Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		
Fall % Avg	127	125	86	132	152	76	142		104	69	111	28	277		
Winter % Avg	234	72	189	96	77	124	30	74	95	41	93	75	113		
Spring % Avg	116	87	82	81	77	80	110	11	127	5	110	60	132		
Summer % Avg	37	32	106	35	167	231	90	70	19	20	115	154			
Annual % Avg	138	70	130	80	115	142	78	51	79	32	105	90	105		

September 22, 2005						Olaf Knolls Precipitation Rain Gauge Number: 08									
Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fall % Avg		38	23	69	47	152	132	56	37	158	65	202		279	10
Winter % Avg	50	55	62	50	119	282	67	136	82	104	119	32	77	106	30
Spring % Avg	128	38	73	145	190	75	73	258	26	28	124	72	50	180	5
Summer % Avg	142	142	167	50	79	23	32	80	77	136	218	245	85	68	16
Annual % Avg	81	69	83	74	114	156	70	137	62	103	135	117	61	140	18
Year	2003	2004	2005												
Fall % Avg	23	41	467												
Winter % Avg	76	95	255												
Spring % Avg	177	30	126												
Summer % Avg	63	83	108												
Annual % Avg	87	70	225												

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 1985-2000 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 for each pasture.

Utilization levels during the analysis period have been well below or at, in some cases, the 50 percent allowable level except for one year on Sihy and Ephedra.

Key Area #1

	1985	1986	1987	1990	1991	1993	1994	1995	1997	1998	1999	2000
Bocu	28	36	32	35	--	25	34	27	--	14	18	10
Sihy	--	--	--	--	--	--	--	--	--	--	--	--
Spcr	20	27	22	33	--	17	12	28	--	16	19	20
Come	10	18	26	9	--	3	39	40	--	21	34	40
Ephedra	--	--	--	25	--	--	--	--	--	--	--	--

Key Area #2

	1985	1986	1987	1990	1991	1993	1994	1995	1997	1998	1999	2000
Bocu	--	--	--	--	--	--	--	--	--	--	--	--
Sihy	10	53	--	--	22	--	34	34	29	29	38	31
Spcr	12	50	--	--	40	--	25	42	32	34	42	41
Come	--	--	--	--	2	--	50	42	26	36	41	40
Ephedra	--	77	--	--	2	--	50	50	39	39	50	41

4. Trend

The vegetation monitoring data is collected at different points in time on the same site (key area), reading and recording these studies every few years and then comparing these back to the original baseline data to detect any change (trend). (Analysis assumes the use of a binomial confidence limits table to evaluate significant differences between frequency readings between different years.)

Trend monitoring was conducted at two key areas over the allotment. Trend data was collected using the pace-frequency method. Cover data is collected to determine the percent of bare ground, litter, rock, composition and live basal vegetation. In addition, the occurrence frequency of all plant species is collected. A trend up, down, or static refers to the direction of change to the forage plant frequency at the key area which is toward or away from the stated.

PACE FREQUENCY TREND ANALYSIS						
ALLOTMENT:	LINK SPRING					
PASTURE:	MIDDLE BENCH					
9/9/2005	KEY AREA # 1					
COVER CATEGORIES	**Listed in Eco-Site Guide**	years plots were read				
		1982	1986	1998	2003	Trend
Bare Ground		6	36	31	31	↓
Litter		89	44	40	51	↓
Rock		5	17	16	15	↑
Vegetation (basal cover)		1	4	13	4	→
% Ground Cover		95	64	69	69	↓
FREQUENCY OF GRASSES						
Stipa	Yes	1	1			
Spcr	Yes	1	76	12	1	→
Bogr	Yes	11				
Bocu	Yes		11	25		→
Arist	Yes		6	13	8	
Trpu	Yes			3		
FREQUENCY OF FORBS						
Sphae	Yes	1				
AAFF	Yes		1			
AAGG	Yes				95	
Eriog	No				1	
Plantago	No				6	
PPFF	Yes			1	1	
Aster	No			1		
FREQUENCY OF SHRUBS						
Come	Yes	2	1	2		→
Encela	No				1	
Prfa	No				2	
Gusa2	Yes	4	1	1		
Chvi8	Yes			45	52	
Cora	Yes		4	1	2	
Artr2	Yes	1				
Opunt	Yes	1		1	1	
Lyan	Yes	2	1	3		
Yucca	Yes		2		1	
Juos	No			T		
Pied	No			T	1	
Rhtr	No				1	
Qutu	No		1			
Epvi	Yes	1				
Berberis	No	1				
SSSS	Yes		1			

PACE FREQUENCY TREND ANALYSIS					
Allotment:	Link Spring				
Pasture:	Tweedie				
9/9/2005	Key Area # 2				
	Listed in Eco-Site Guide	years plots were read			
COVER CATEGORIES		1982	1997	2003	Trend
Bare Ground		76	71	16	↑
Litter		6	21	69	↑
Rock		18	7	10	↓
Vegetation (basal cover)			1	5	↑
% Ground Cover		24	29	84	↑
FREQUENCY OF GRASSES					
Sihy	Yes			4	↑
Agcr	No			1	
Poa	Yes			11	
Hija	Yes			22	↑
Spcr	Yes	62	55	1	↓
Bogr	Yes		1		
Bocu	Yes		1		→
Arist	Yes			6	
FREQUENCY OF FORBS					
Sphae	Yes			4	
AAFF	Yes		2	2	
AAGG	No			79	
PPFF	Yes	3			
Spurge	No			16	
FREQUENCY OF SHRUBS					
Come	No			T	→
Gusa2	Yes		2	1	
Cora	No	1	1		
Artr2	Yes			19	
Opunt	Yes	T	2	1	
Lycium	No	1	3	3	
Fapa	Yes			5	
Berberis	Yes			T	
Epne	Yes				→

Trends of the key forage species are mostly static as follows: 2 key forage species trends are up, 5 are static, and 1 is downward, which is not surprising considering the drought; i.e., precipitation for the year 2000 was 65% of normal (0% for fall, 85% winter, 49% spring, and 82% for summer). The 2001 precipitation year was above normal for fall, winter, and spring, but summer again was below normal at 65%. That was followed by another year (2002) of below normal with no effective precipitation received, (fall 12%, winter 33%, spring 5%, and summer 15%). As a result, the 2002 annual precipitation was

only 19% of normal. Livestock numbers were reduced during the drought to balance use with available forage. Livestock AUMs were below the authorized number of AUMs by 15% in 2000, 28% in 2001, 61% in 2002, 51% in 2003, and 45% in 2004.

Precipitation amounts prior to 2000 varied, as did the frequency of the key species as indicated by their overall upward trending from the base year of 1982 through 1998, suggesting that precipitation amount, and timing influence vegetative trends. As a result, the ID team determined that the current drought was having an impact on the trend of key species. However, even considering the recent fires and drought, the team still felt that livestock was not impeding improvement of the resources, and the significant progress toward meeting the applicable standard for rangeland health were being made under current management.

5. Ecological Status

The "Dry Weight Rank" vegetative sampling method is used to determine species composition. The present composition and the potential for each key species are 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.

Four additional studies, "Auxiliary", were completed in the blackbrush community to determine ecological status of that community. All of these areas were in late seral stage (see appendix).

Key Area # 1		Allotment:	Link Springs	
9/12/2005		Pasture:	Middle Bench	
		Range Site:	Shallow Upland (Cal) 9-13	
Plant Species	Site-Guide Allowable Percent Composition	First Reading Percent Composition 2003	Second Reading Percent Composition None completed	Desired Percent Composition Objective
Grasses	15-25%	2%		
Stipa	3-7%			
Sihy	1-3%			1-3%
Spcr	1-2%			1-2%
Bogr	2-4%			
Bocu	Group PPGG	1%		1-2%
Arist	Group PPGG	1%		
Trpu	Group PPGG			
PPGG	1-2%			
Forbs	3-5%	54%		1-5%
SPHAE	1-3%			
AAFF	1-3%			
AAGG	2-5%	1%		
Eriog	Group PPFF			
Plantago	Group PPFF			
Ppff	1-2%	1%		
Aster	Group PPFF			
Erci6,	Group AAFF	17%		
Brru1	Group AAGG	34%		
Shrubs/Trees	70-80/0-1%	44%		
Come	1-3%			1-3%
Encela	Group SSSS			
Prfa	Group SSSS			
Gusa2	1-2%			
Chvi8	1-2%	38%		
Cora	45-65%	3%		
Artr2	0-3%			
Opunt	1-2%			
Lyan	Group SSSS			
Yucca	2-5%	1%		
Juos	Group Trees			
Pied	Group Trees	1%		
Rhtr	Group SSSS	1%		
Qutu	Group SSSS			
Epvi	3-5%			1-3%
Berberis	Group SSSS			
SSSS	1-3%			
Trees	0-1%			
	Similarity Status	21% Early		

Key Area # 2		Allotment:	Link Springs	
9/12/2005		Pasture:	Tweedie Bench	
		Range Site:	Shallow Loamy 9-13" pz	
Plant Species	Site-Guide Allowable Percent Composition	First Reading Percent Composition 2003	Second Reading Percent Composition None completed	Desired Percent Composition Objective
Grasses	60-75%	20%		
Sihy	5-10%	1%		2-5%
Agcr	-			
Poa	5-10%	9%		
Hija	5-15%	6%		5-15%
Spcr	1-5%			1-5%
Bogr2	5-15%	1%		
Bocu	2-10%			2-5%
Arist	1-5%	3%		
Forbs	1-5%	52%		1-5%
Sphae	1-5%	2%		
AAFF	1-5%			
AAGG	-			
PPFF	1-5%			
Spurge	Group AAFF	3%		
Eric6	Group AAFF	39%		
Brru1	-	8%		
Allium	Group PPFF	T		
Shrubs/Trees	5-30/5-10%	28%		
Come	-	1%		2-5%
Gusa2	5-10%	1%		
Cora	-			
Artr2	5-30%	9%		
Opunt	1-5%	3%		
Lycium	-	3%		
Fapa	5-10%	11%		
Berberis	5-10%			
Ephedra	1-5%			1-5%
	Similarity	50%		
	Status	Mid		

6. Special Status Species

California condor: The re-introduction of condors to northern Arizona began with the release of six captive-reared birds on the Vermilion Cliffs in 1996. As of June 1, 2006, there were 56 condors in the wild in northern Arizona. The reintroduced population as a whole appears to be stable and is increasing.

California condors currently range across the entire Arizona Strip, throughout the Grand Canyon, into adjacent Utah and Nevada, and south of the Grand Canyon in Arizona. Condors range widely, easily covering over 100 miles in a day. 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. Condors occasionally fly over and may feed on carrion in this allotment.

Bald eagle: Bald eagles have not been known to nest anywhere on the Arizona Strip. Their typical habitat components include bodies of water with fish, which are not available in this allotment. There have not been studies or data collected on bald eagles on the Arizona Strip. To date, this species has not been observed roosting, foraging, or flying over this allotment.

6. Wildlife Habitat

Habitat for mule deer on this allotment is considered limited. Deer population data is not collected specifically for this allotment, but is collected for the Game Management Unit as a whole. Game Management Unit 13B covers Arizona Strip BLM managed lands west of the Hurricane Cliffs.

Unit 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 "Parashant" 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 13B, while remaining at a low density throughout the unit, appears to be showing signs of growth. 2003, 2004, and 2005 fawn productions are higher than average for the unit, with 2005 being one of the highest recorded ratios ever at 72 fawns per 100 does.

As previously stated, this allotment contains the northeastern third of the Grand Wash Cliffs Habitat Area for bighorn sheep, which supports approximately 90 bighorn. The allotment also coincides with the eastern and higher elevation half of the Grand Wash Cliffs Wilderness Area. This sheep habitat area contains approximately 113,360 acres, and while the population is generally stable, more than 87% of the suitable bighorn sheep habitat is unoccupied.

7. Riparian/Fisheries Habitat

There is no riparian or fisheries habitat in the Link Springs Allotment.

9. Wild Horse and Burro Habitat

There are no wild horses or burros in the Link Springs Allotment.

10. Soils and Lithology

a. Lithology

The allotment consists of sandstone and limestone hills and scarps and associated alluvial fans atop a structural bench.

b. Soil Map Units , SSA 623,(SCS,1993)

18 Childers-Rizno association, 4 to 15 percent slopes, (plateaus), limestone and sandstone; Childers-Shallow Upland (calcareous), 9" to 13"ppt

34 Hindu-RO-Gypill complex, 35 to 70 percent slopes, (cliffs, scarps, mtns), gyp, LS, SS, CG; Hindu-Limestone Hills, 6" to 9"; Gyphill-Gypsum Hills, 6" to 9"

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

52 Meriwhitica-RO-Strych complex, 35 to 70 percent slopes, warm, (scarps, cliffs, canyon walls), basalt, limestone, sandstone, gypsite, shale, conglomerates; Meriwhitica-Breaks (calcareous), 9" to 13"; Strych-Loamy Upland (calcareous), 9" to 13"

64 Riverwash-Torrifluvents complex, 1 to 3 percent slopes, (channel, floodplain), mixed; Torrifluvents-Sandy Wash, 9" to 12" ppt

65 Rizno-Bond_RO complex, 4 to 25 percent slopes, (plateau slopes), Navajo sandstone; Shallow Sandy Loam, 9" to 13" ppt

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

76 Tassi-Risno complex, 5 to 35 percent slopes, (benches), limestone, sandstone; Tassi-Shallow Upland (calcareous), 9" to 13" ppt

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"

95 Yumtheska- Natank complex, 10 to 45 percent slopes (plateau, mesa), limestone; Yumtheska-Limestone Slopes (PJ-Woodland), 13" to 17"; Natank-Clay Loam Upland (gravelly) PJ-Woodland, 13" to 17"

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

1. Issues relating to Rangeland Health

a. Noxious weeds, scotch thistle

A field check for the scotch thistle resulted in none being found; however, the field office has an aggressive weeds program and any occurrences of scotch thistle will be aggressively treated.

b. Buildup of Woody Species

The vegetation on the south end of Tweedie's consists of closed stands of pinyon-juniper and sagebrush making it both unproductive for wildlife and poor watershed cover and potential increase in erosion.

c. Lack a modified suppression plan to mimic fire cycles

A Statewide Fire Management Plan is being developed, which addresses this issue, and prescriptions will be incorporated into the Resource Management Plan for the Grand Canyon-Parashant National Monument.

V. Conclusions

A. Pertaining to Objectives

1. <u>Land Use Plan Objectives Shivwits Resource Area Implementation Plan (SRAIP)</u>

GZ12 *Complete ecological site inventories to determine site potentials and current ecological conditions.*

This objective has been met

GZ13 *Establish desired plant community objectives and include them in the allotment management plan.*

This objective will have been met by approval of this evaluation.

GZ14 *Continue a systematic cycle of monitoring data evaluation on all allotments, involving a thorough review of consolidated utilization, condition, trend, actual use, and precipitation data, to determine whether objectives are being met or changes in management are necessary.*

This objective is being met through this evaluation.

GZ17 *Allow 50% utilization on key forage species in allotments with rotational grazing systems. On allotments in tortoise habitat, utilization is set at 45%.*

This objective was met for all years on all species except for the 1986 year.

RR06 *Implement actions to restore and/or maintain natural conditions or appearance in all areas.*

This objective has not been met. No actions have been implemented to restore or maintain natural conditions or appearance within the allotment.

RR08 *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 has been met. The area within the allotment is managed for extensive recreation while maintaining its naturalness/remoteness.

RR09 *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 has been met. Commercial Recreation Permits are issued and analyzed for their cumulative impacts.

WD01 *Continue managing the Paiute-Beaver Dam Mountains and Grand Wash Cliffs wilderness areas in accordance with their activity management plans.*

This objective has been met. The areas are managed according to their plans.

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

This has been accomplished in most of the allotment by instituting a grazing system in the AMP. 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.

WS22 *Manage watershed areas according to watershed categorizations to achieve identified objectives.*

Management has been successful in minimizing erosion on this allotment. 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 too slight.

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 objective is being met. All proposed actions with potential to impact wildlife species are reviewed through the NEPA process. Actions which may affect candidate or sensitive species are reviewed on a case by case basis through the NEPA process. Biological evaluations would be prepared to document the effects of any proposed action on listed or proposed species. Maintaining the habitat and ensuring wildlife needs is entirely compatible with the current management of the GC-Parashant National Monument, which was designated on January 11, 2000. This allotment is entirely within the Monument.

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 using objectives developed in 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. However, existing BLM Monument management policy does not permit chaining and other vegetation manipulation methods that cause substantial surface disturbance.

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. ESI inventories have been completed and DPC objectives established.

2. Specific Resource Objectives

Management Objectives

The overall resource goals from the AMP were to improve vegetative conditions, increase the available amount of forage for livestock and wildlife, and improve the watershed conditions.

These goals are being met. Precipitation varies in amount and timing and as a result so does the vegetative community. Livestock stocking rates are adjusted to these changes, as indicated in this document, to allow the plants to recover from droughts etc.

Specific Vegetation Objectives from allotment management plan

The specific AMP vegetation objectives were never developed, but the DPC objectives that were developed during this process are as follows, though achievement is actually not expected until 2020.

Desired Plant Community Objectives

Key Area No. 1, located in the Middle Bench pasture.

Maintain Bocu to between 1 and 2% CBW, it is at 1%, objective met
Increase Spcr to between 1 and 2% CBW, it is currently at trace, objective not met.
Increase Sihy to between 1 and 3% CBW, it is currently at 0%, objective not met.
Increase Come to between 1 and 3% CBW, it is currently at 0%, objective not met.
Increase Ephedra to between 1 and 3% CBW, it is currently at 0%, objective not met.
Maintain the forbs to between 1 and 5% CBW, it is currently at 54%, objective met.
Maintain Live Vegetation (Basal Cover) from 3 to 8%, it is currently at 4%, objective met.

Key Area No. 2, located in the Tweedie pasture, the ecological site is a shallow loamy 9-13" precipitation zone (pz).

Increasing Bocu to between 2 and 5% CBW, it is currently at 0%, objective not met
Increasing Spcr to between 1 and 5% CBW, it is currently at 0%, objective not met
Maintain Hija to between 5 and 15% CBW, it is currently at 6%, objective met
Increase Sihy to between 2 and 5% CBW, it is currently at 1%, objective not met
Increasing Come to between 2 and 5% CBW, currently at 1%, objective not met
Increasing Ephedra to between 1 and 5% CBW, currently at 0%, objective not met
Maintaining the forb CBW between 1 to 5 percent, currently at 52%, objective met
Maintain Live Vegetation (Basal Cover) to between 3 and 8%, currently at 5%, objective met

Summary all key areas:

The original AMP vegetation frequency objectives have been replaced by the Desired Plant Community Objectives of species composition. These DPC objectives will be incorporated into the existing AMP for current and future management evaluations through 2020.

Most of these key area objectives have not been met. Setting the DPC objectives higher was done intentionally based on the assumption that the key areas would improve after current drought. Considering the recent fires and drought, the team felt that the objectives were attainable and that livestock grazing was not impeding

achievement. This is further substantiated by key forage plant frequency changes at the key areas after the wildfires and prior to recent drought.

Along with fire, precipitation or climatic influences maybe the overriding factors influencing vegetation changes at the present grazing level. According to Hendrickson et al. "Rangeland ecosystems are event-driven, and water events are typically considered most important." Cook et al[3] (2005) stated that plant cover was closely related to weather cycles, and that basal area of perennial grasses decreased by as much as 65 percent during dry years. Herbel et al[4] (1996) indicated that droughts can change species composition, vegetation cover, and herbage production, and can drastically reduce range condition regardless of past grazing history.

Arizona Strip Desert Bighorn Sheep Management Plan, as amended (May 2001)

BS2 *Increase populations of bighorn sheep to fully occupy ...suitable habitat on the Arizona Strip at an average density of no more than four bighorn per square mile by the year 2010. Maximum populations for the ... Grand Wash Cliffs (area) would be 700.*

The sheep population is moving toward attainment of this objective, but it has not yet been reached.

California Condor Recovery Plan

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.

CC-2 *Maintain a healthy, self-sustaining population of California condors with a positive growth rate of at least 150 individuals with at least 15 breeding pairs.*

While this objective has not yet been met, the condor population appears to be stable and is increasing. Recent reports of at least two successful nests indicate that the birds are beginning to make progress towards self-sustaining populations. The condors at the Vermilion Cliffs are still very young birds, with many having just

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[3] Cook, C. Wayne, and Sims, Phillip L., Drought And Its Relationship To Dynamics Of Primary Productivity And Production Of Grazing Animals, http://www.fao.org/wairdocs/ilri/x5543b/x5543b0l.htm or http://www.cnr.colostate.edu/frws/research/cook/CookDrought/drought.htm. 2005

[4] Herbel, Charlton H. and Gibbens, Robert P., Post-Drought Vegetation Dynamics on Arid Rangelands of Southern New Mexico. Department of Animal and Range Sciences, New Mexico State University, Agricultural Experiment Station. Bulletin 776, June 1996.

recently reached sexual maturity. It may still be many years before the population objective reaches 150 individuals and at least 15 breeding pairs. There is no evidence that rangeland health on this allotment would inhibit the condor population from reaching this objective.

Specific objectives from the Black Rock Habitat Management Plan

MD1 Identify factors suppressing mule deer population recovery and, if possible, the cause(s) of the decline in the HMP area by 1998. Where possible, eliminate or reduce the impacts of limiting factors to initiate herd recovery.

MD2a Enhance and maintain forage, water, and cover conditions on 365,000 acres of mule deer habitat to support 2,200 deer yearlong in the HMP area by the year 2010.

MD3a Increase the number of mule deer in the HMP area by at least 100 percent over the 1993 estimated population of 400 head by 2010.

MD3b Increase mule deer production and maintain an average fawn survival within AGFD species management guidelines for mule deer.

MD3c Increase and maintain post harvest buck to doe ratios within AGFD species management guidelines for mule deer

These objectives are being met. Factors suppressing mule deer population recovery have been identified and include limited summer range, lack of precipitation, high predation, and unrealistic estimates of the carrying capacity of the area for deer. 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.

MD2b1 Identify and manage for key forage and cover species in muledeer habitat, particularly crucial summer range, based on DPC and establish key areas by 2000.

This objective is being met. With all monitoring data at or above DPC objectives for mule deer, and with mule deer populations slowly increasing, habitat condition (rangeland health) does not appear to be a limiting factor for mule deer at this time.

B. Pertaining to Issues

1. Issues relating to Rangeland Health

a. Noxious weeds, scotch thistle

Annual field checks for noxious weeds will be conducted and if found the field office has an aggressive weeds program and any occurrences of noxious weeds will be treated in an attempt to control.

b. Buildup of Woody Species

Contingent on funding and staffing, provide for vegetative treatment projects in pinyon-juniper habitat to benefit livestock and mule deer and other wildlife species using prescriptions developed in appropriate activity plans. Leave debris piles unburned for small mammals where practical. Leave as many snags as possible for raptor perches, cavity nesting birds, and bats.

c. Lack a modified suppression plan to mimic fire cycles

A Statewide Fire Management Plan is being developed which will address this issue, and prescriptions will be incorporated into the draft Resource Management Plan for the Grand Canyon-Parashant National Monument area.

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. Renew the 10-year grazing permit, with current terms and conditions.

B. Continue to implement the AMP for the Link Springs Grazing Allotment. Incorporate the new DPC's objectives into the existing AMP and continue to monitor the vegetative response to grazing management in relationship to attainment of DPC objectives.

C. Contingent on funding and staffing, encourage vegetative treatment projects in pinyon-juniper habitat where appropriate to maintain or enhance monument resources, including mule deer, using prescriptions developed in habitat management plans. Leave debris piles unburned for small mammals where practical. Leave as many snags as possible for raptor perches, cavity nesting birds, and bats.

D. A modified wildfire suppression plan should be implemented in order to allow wildfires, where appropriate, to DPC objectives.

AUTHORIZED OFFICER CONCURRENCE:

_____ I concur with the conclusions and recommendations as written.

_____ I do not concur.

_____ I concur, with the following modifications:

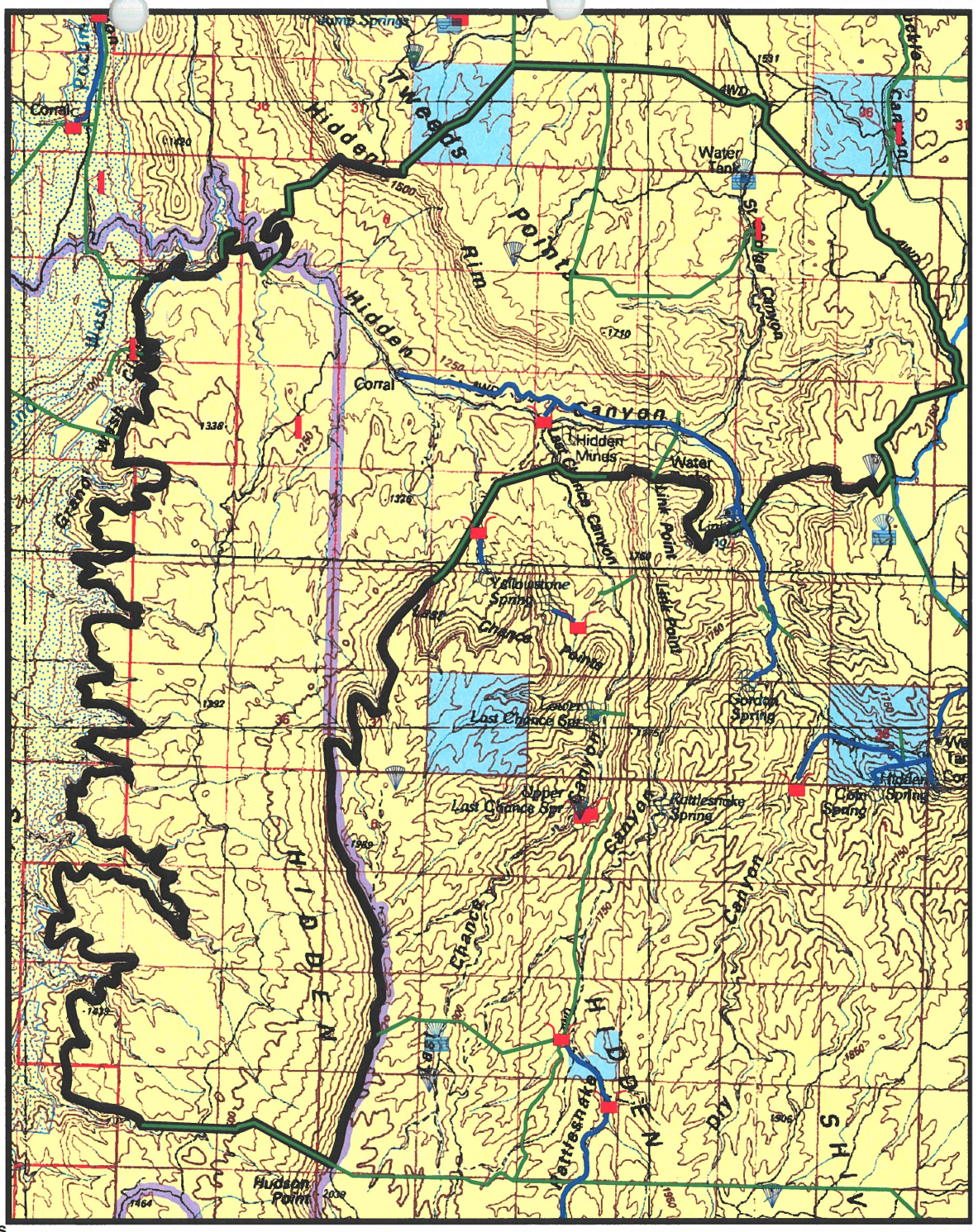
Dennis Curtis 1/4/07

Monument Manager — Date
Grand Canyon – Parashant National Monument

Link Spring Allotment

- Fenced Reservoir
- Trough
- Undeveloped Spring
- Unfenced Reservoir
- Water Storage Tank
- Well
- Wildlife Catchment
- Wildlife Drinker
- Windmill
- Cattleguard
- Corral
- Developed Spring
- Noxious Weeds
- Livestock Catchment
- Key Area
- Fence
- Pipeline
- Monument Boundary
- Monument Boundary
- Monument Boundary
- Allotment Boundary
- Wilderness Boundary

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



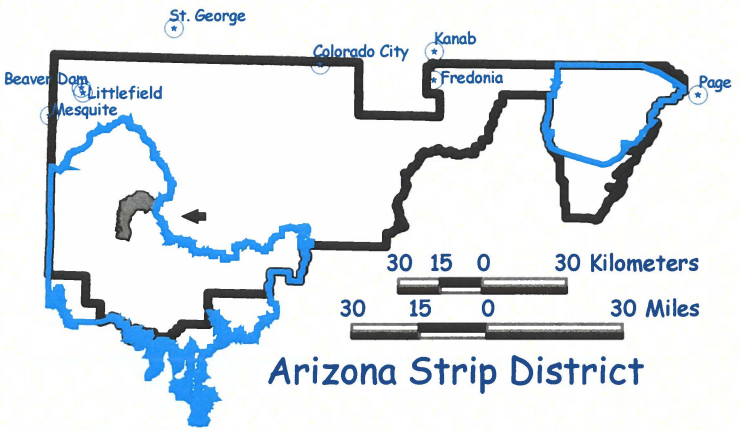
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Bureau of Land Management
Arizona Strip District



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
November 24, 2006

Appendix A

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, 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, 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

Interdisciplinary Assessment Team

Linda Price	Project Coordinator (BLM)
Mike Small	Wildlife Biologist (BLM)
Larry Gearhart	Wilderness/Recreation Specialist (BLM)
Phil Seegmiller	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

Bill Howes
Off Road Vehicle Use
Wizards Motorcycle Club

Kent McComb,
Grazing
Retired, St. George, UT

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

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

Roger McPeek
Public-at-Large
Retired, St. George, UT

Dennis Becenti
Native American Interests
Hopi and Navajo Tribes, AZ

Alternates

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

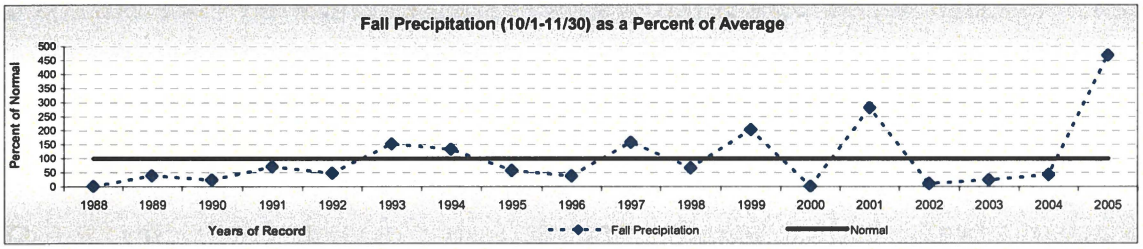
Paul Weaver
Non-Commodity
St. George, UT

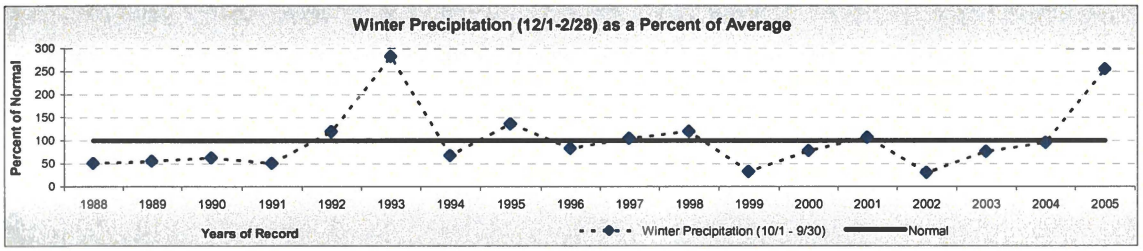
Appendix C

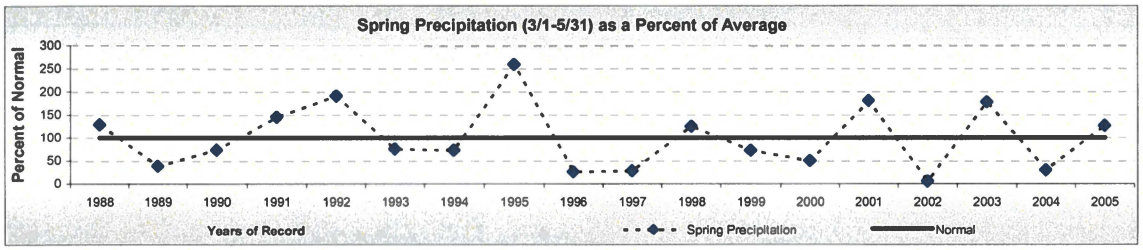
Precipitation

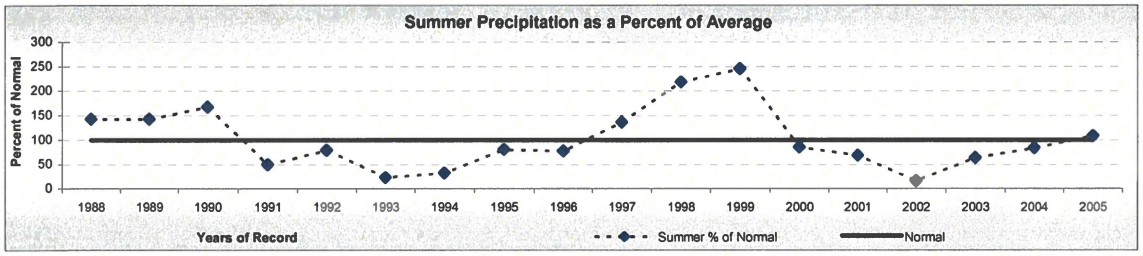
Olaf Knolls Precipitation Rain Gauge Number 08										
Year	Fall	Winter	Spring	Summer	Annual	Fall % of Average	Winter % of Average	Spring % of Average	Summer % of Average	Annual % of Average
1988		1.8	2.6	3.1	7.5		50	128	142	81
1989	0.5	2.0	0.8	3.1	6.4	38	55	38	142	69
1990	0.3	2.3	1.5	3.6	7.7	23	62	73	167	83
1991	1.0	1.8	2.9	1.1	6.8	69	50	145	50	74
1992	0.7	4.3	3.9	1.7	10.6	47	119	190	79	114
1993	2.2	10.3	1.5	0.5	14.5	152	282	75	23	156
1994	1.9	2.5	1.5	0.7	6.5	132	67	73	32	70
1995	0.8	5.0	5.2	1.8	12.7	56	136	258	80	137
1996	0.5	3.0	0.5	1.7	5.7	37	82	26	77	62
1997	2.3	3.8	0.6	3.0	9.6	158	104	28	136	103
1998	0.9	4.4	2.5	4.7	12.6	65	119	124	218	135
1999	2.9	1.2	1.5	5.3	10.9	202	32	72	245	117
2000		2.8	1.0	1.9	5.7		77	50	85	61
2001	4.0	3.9	3.7	1.5	13.0	279	106	180	68	140
2002	0.1	1.1	0.1	0.3	1.7	10	30	5	16	18
2003	0.3	2.8	3.6	1.4	8.1	23	76	177	63	87
2004	0.6	3.5	0.6	1.8	6.5	41	95	30	83	70
2005	6.7	9.3	2.6	2.4	20.9	467	255	126	108	225
Average	1.43	3.65	2.02	2.18	9.28					

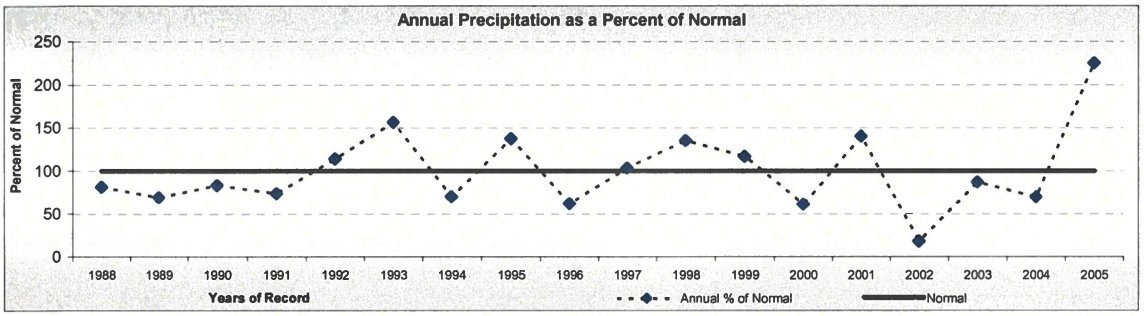
Olaf Knolls Precipitation rain gauge number 08



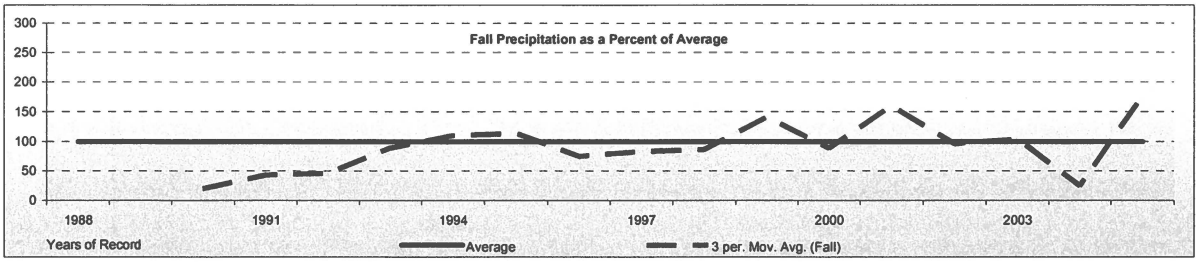


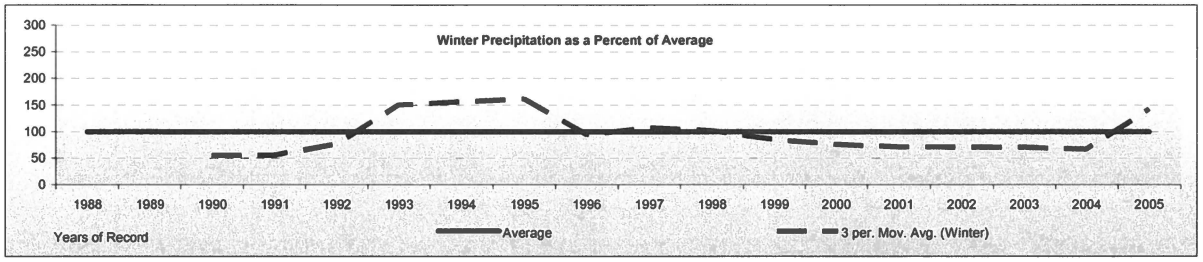


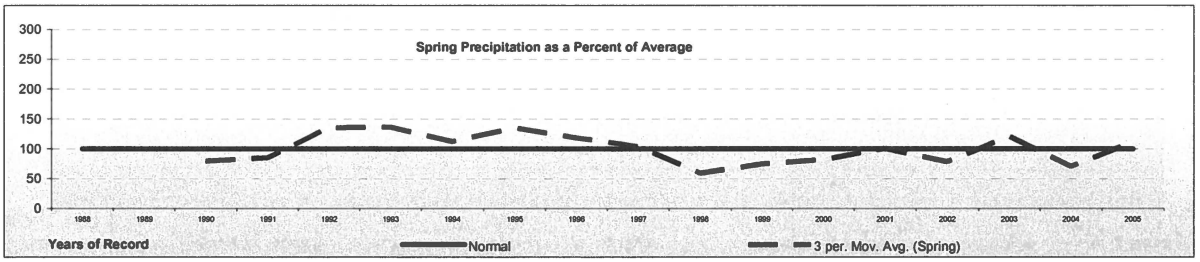


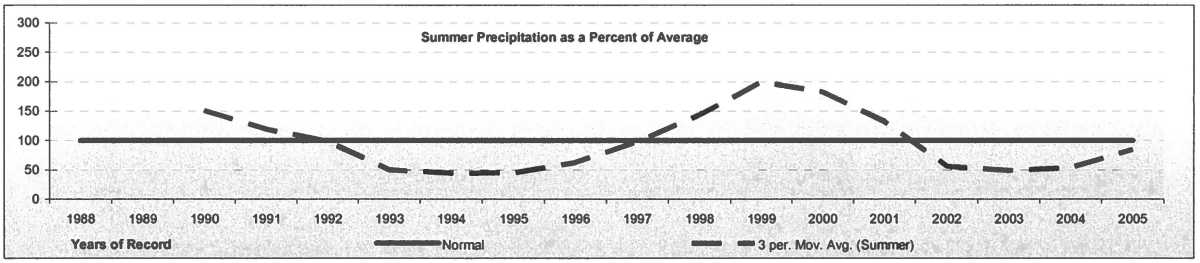


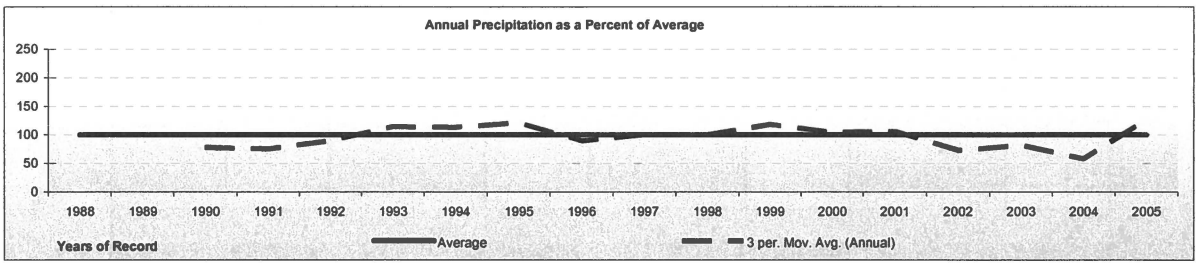
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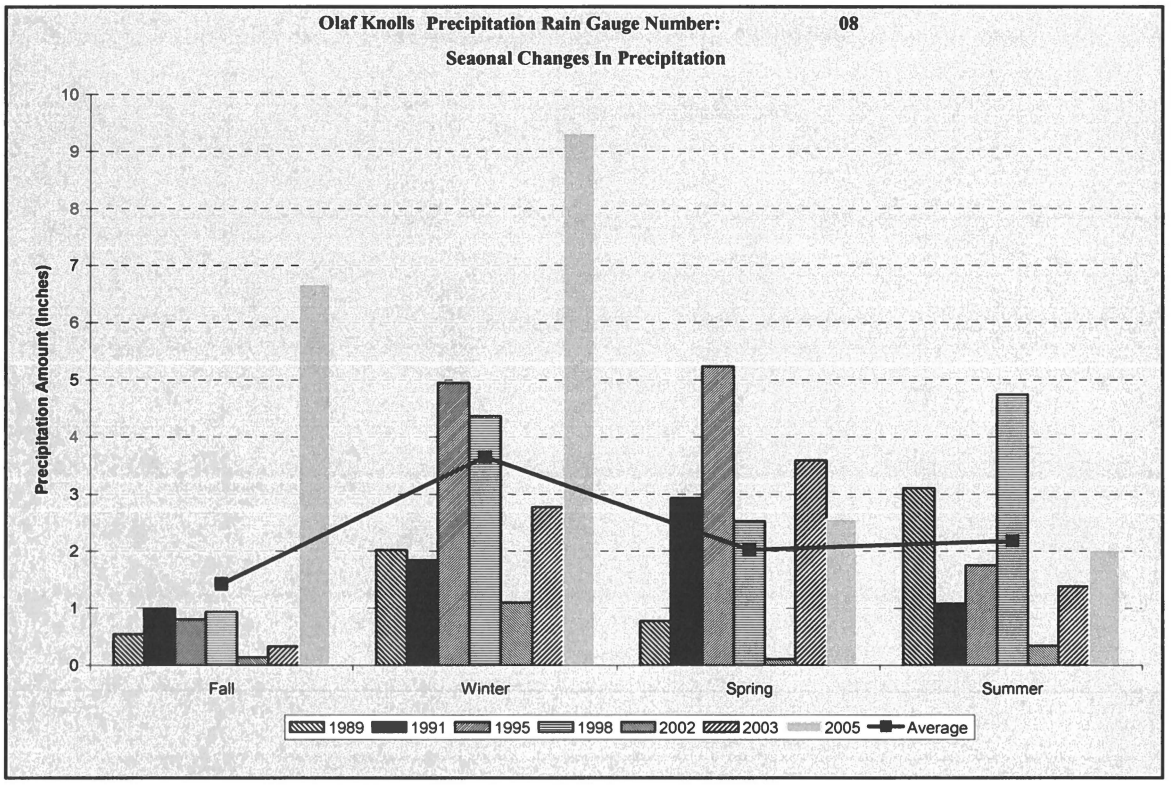


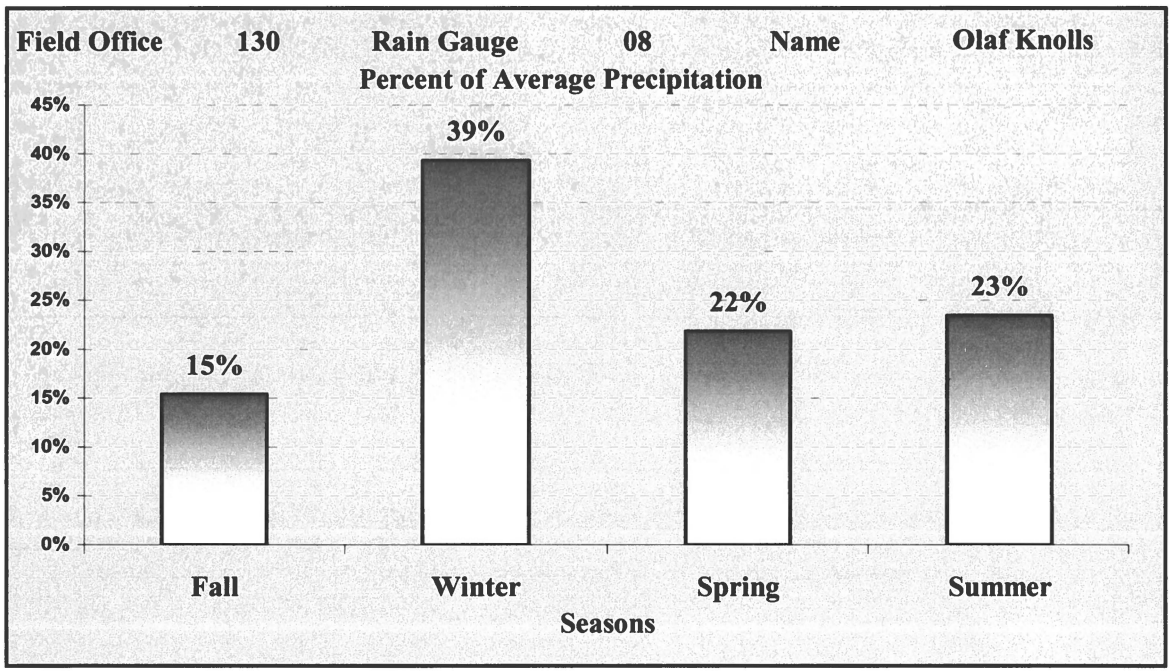






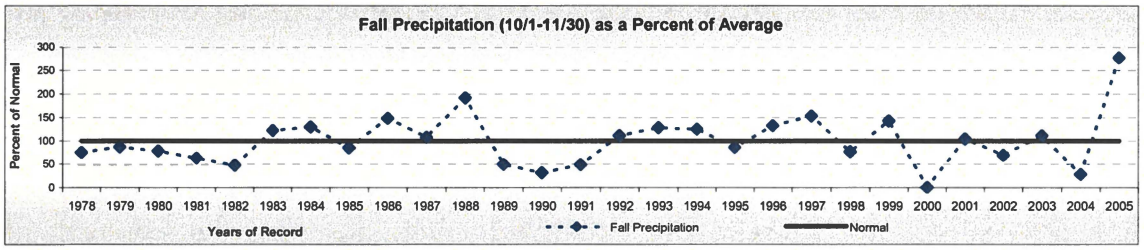


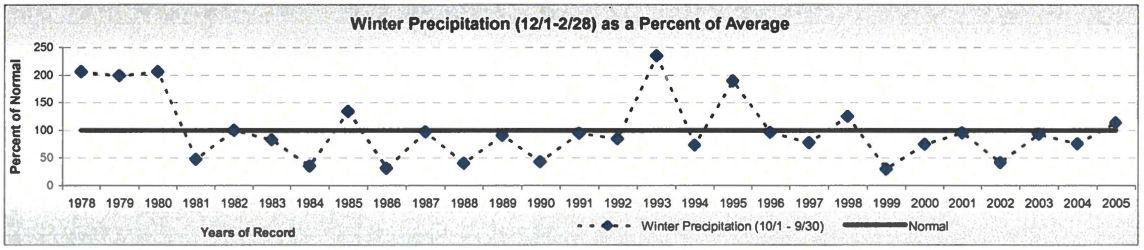

Olaf Knolls Precipitation Rain Gauge Number: 08
Seaonal Changes In Precipitation
Precipitation Amount (Inches)
10
9
8
7
6
5
4
3
2
1
0
Fall
Winter
Spring
Summer
1989 1991 1995 1998 2002 2003 2005 Average

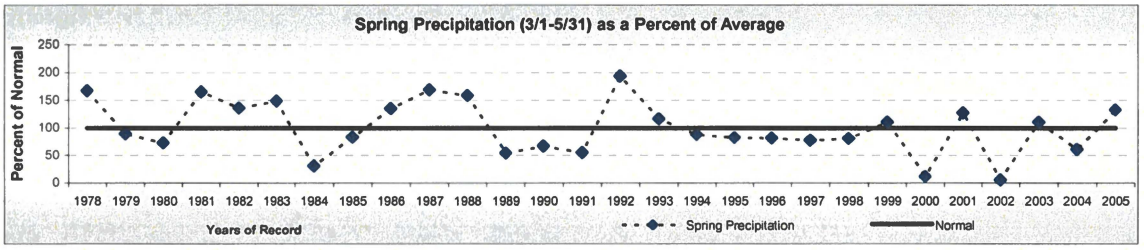

Field Office 130 Rain Gauge 08 Name Olaf Knolls
Percent of Average Precipitation
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
15%
39%
22%
23%
Fall
Winter
Spring
Summer
Seasons

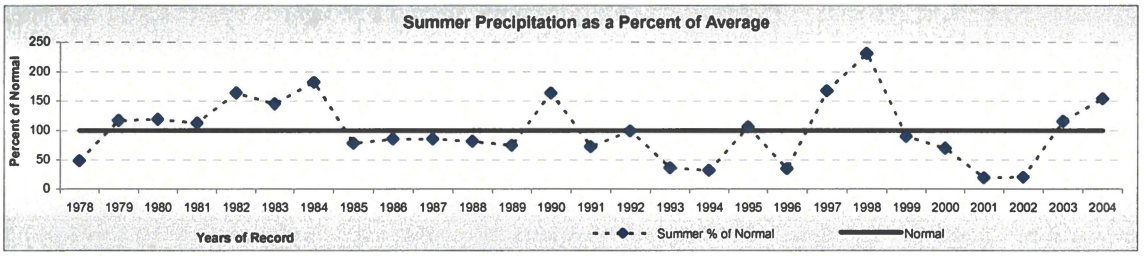
Sullivan Tank Precipitation Rain Gauge Number 25										
Year	Fall	Winter	Spring	Summer	Annual	Fall % of Average	Winter % of Average	Spring % of Average	Summer % of Average	Annual % of Average
1978	1.4	10.0	3.8	1.9	17.0	75	206	167	48	133
1979	1.6	9.6	2.0	4.5	17.8	86	198	89	116	138
1980	1.4	10.0	1.6	4.6	17.7	78	206	72	119	138
1981	1.1	2.3	3.7	4.4	11.5	63	47	165	113	90
1982	0.9	4.8	3.1	6.4	15.1	48	99	136	163	118
1983	2.2	4.0	3.4	5.7	15.2	122	82	148	145	119
1984	2.3	1.7	0.7	7.1	11.8	129	35	31	181	92
1985	1.5	6.5	1.9	3.1	13.0	85	134	83	78	101
1986	2.7	1.5	3.1	3.3	10.6	148	31	135	85	82
1987	1.9	4.7	3.8	3.3	13.8	107	97	168	85	108
1988	3.5	1.9	3.6	3.2	12.2	191	40	158	82	95
1989	0.9	4.4	1.2	2.9	9.4	49	90	54	75	73
1990	0.6	2.1	1.5	6.4	10.5	31	43	66	163	82
1991	0.9	4.6	1.2	2.8	9.5	49	94	55	72	74
1992	2.0	4.1	4.4	3.9	14.3	111	84	193	99	112
1993	2.3	11.4	2.6	1.4	17.8	127	234	116	37	138
1994	2.3	3.5	2.0	1.3	9.0	125	72	87	32	70
1995	1.6	9.2	1.9	4.1	16.8	86	189	82	106	130
1996	2.4	4.7	1.8	1.4	10.3	132	96	81	35	80
1997	2.8	3.8	1.8	6.5	14.8	152	77	77	167	115
1998	1.4	6.1	1.8	9.0	18.3	76	124	80	231	142
1999	2.6	1.4	2.5	3.5	10.0	142	30	110	90	78
2000		3.6	0.3	2.7	6.6		74	11	70	51
2001	1.9	4.6	2.9	0.8	10.1	104	95	127	19	79
2002	1.3	2.0	0.1	0.8	4.2	69	41	5	20	32
2003	2.0	4.5	2.5	4.5	13.5	111	93	110	115	105
2004	0.5	3.7	1.4	6.0	11.5	28	75	60	154	90
2005	5.0	5.5	3.0		13.5	277	113	132		105
Average	1.81	4.86	2.27	3.90	12.84					

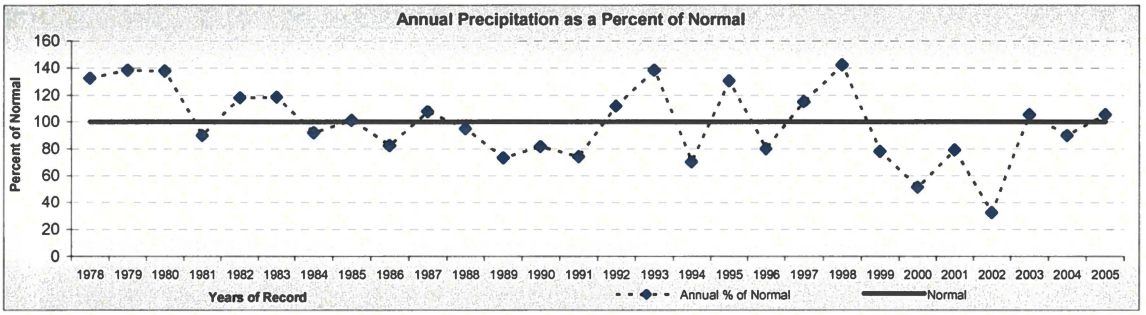
Sullivan Tank Precipitation rain gauge number 25



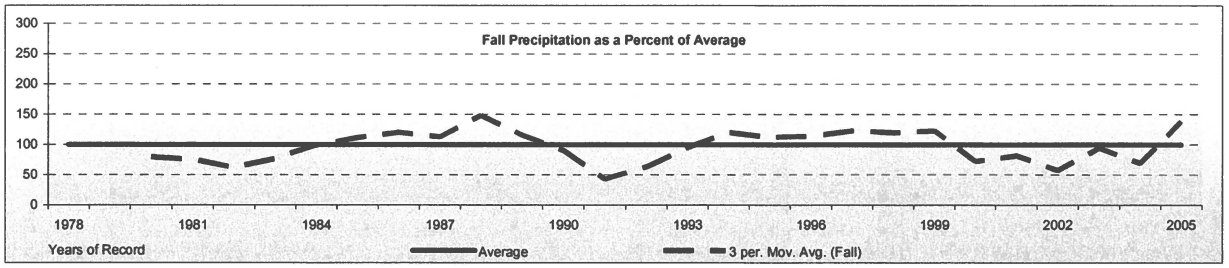


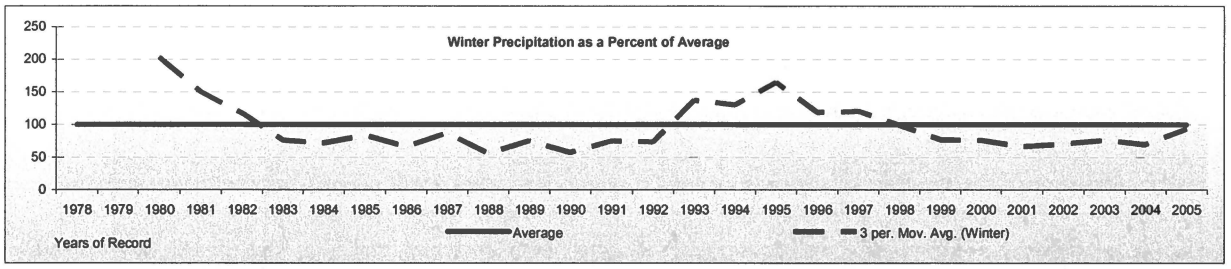


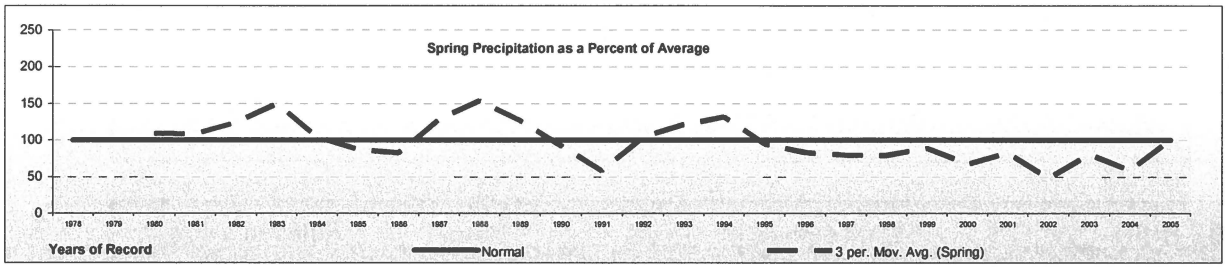


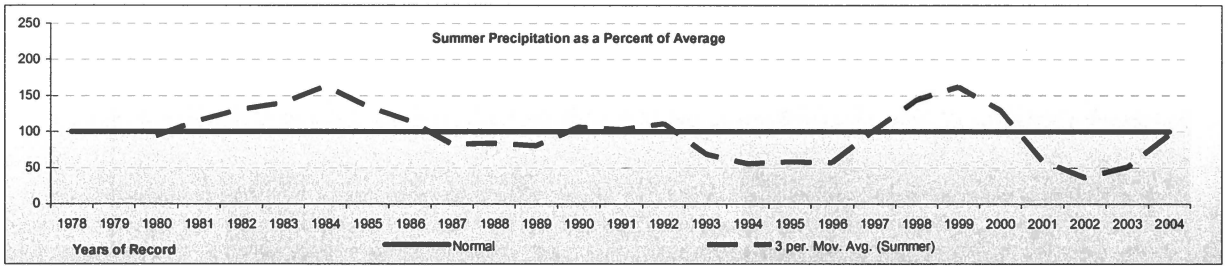


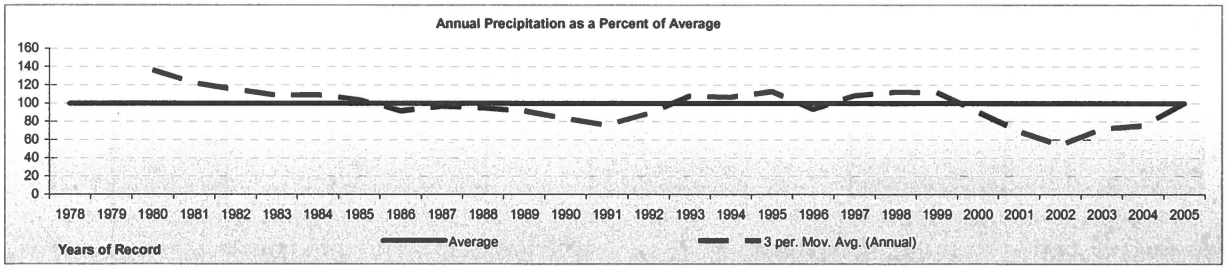
Sullivan Tank Precipitation rain gauge number 25

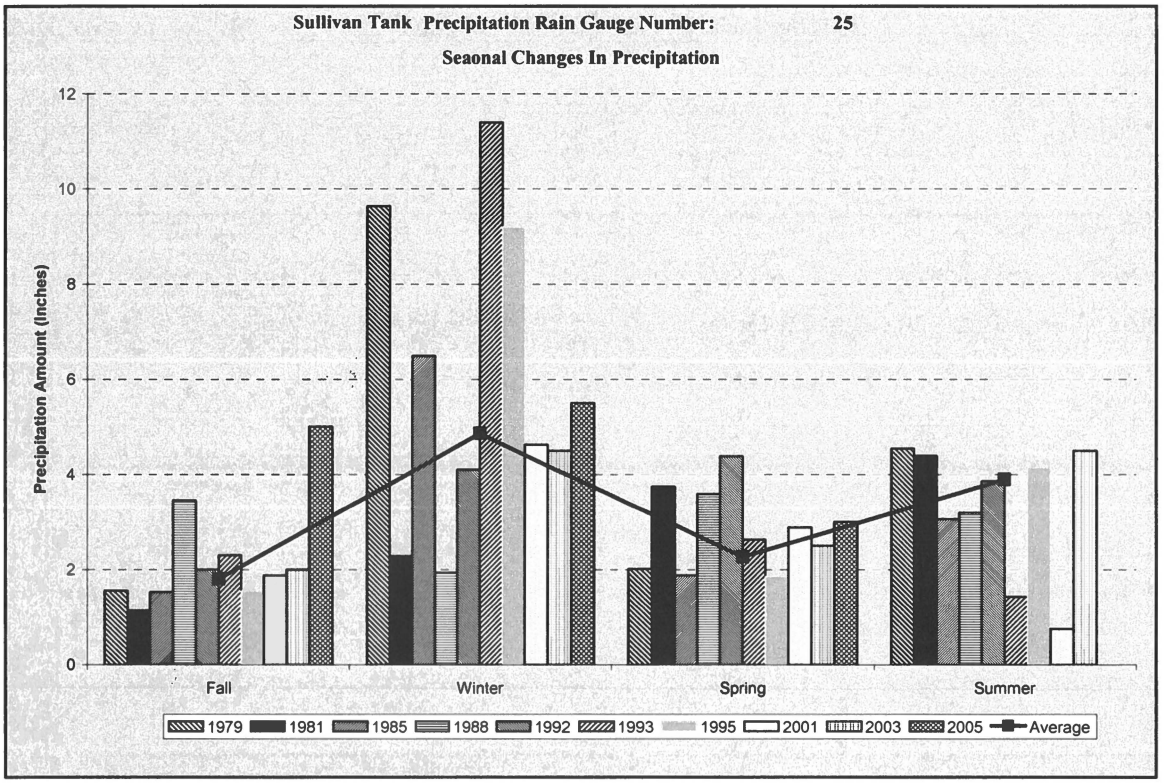


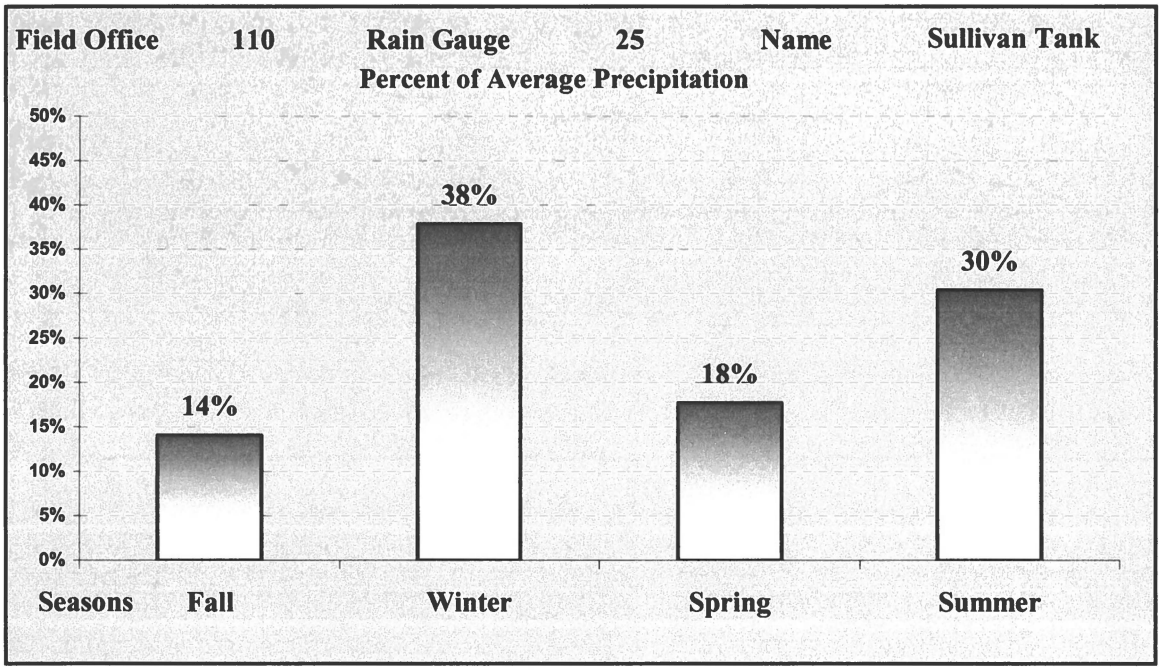








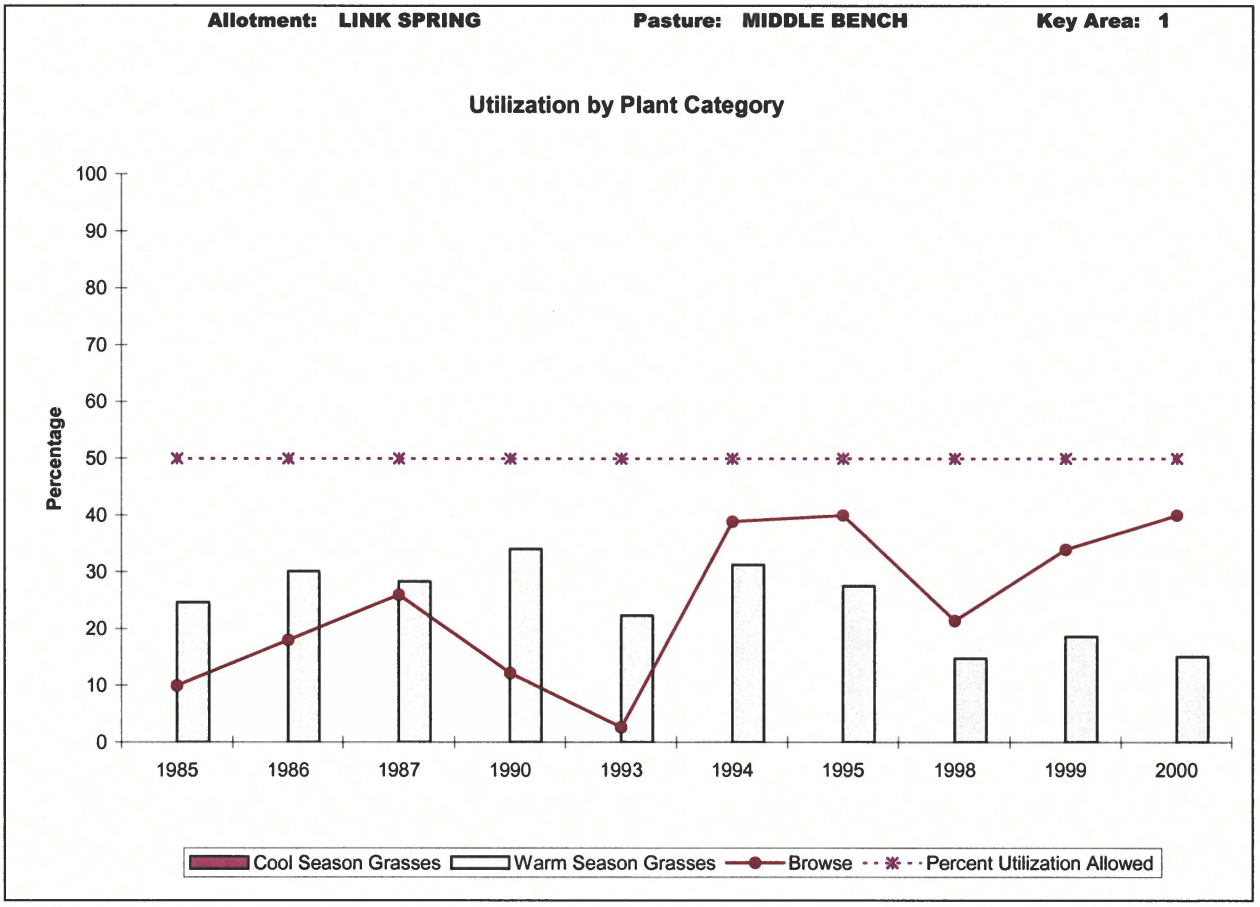

Sullivan Tank Precipitation Rain Gauge Number: 25
Seaonal Changes In Precipitation
Precipitation Amount (Inches)
12
10
8
6
4
2
0
Fall
Winter
Spring
Summer
1979 1981 1985 1988 1992 1993 1995 2001 2003 2005 Average


Field Office 110 Rain Gauge 25 Name Sullivan Tank
Percent of Average Precipitation
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
14%
38%
18%
30%
Seasons Fall Winter Spring Summer

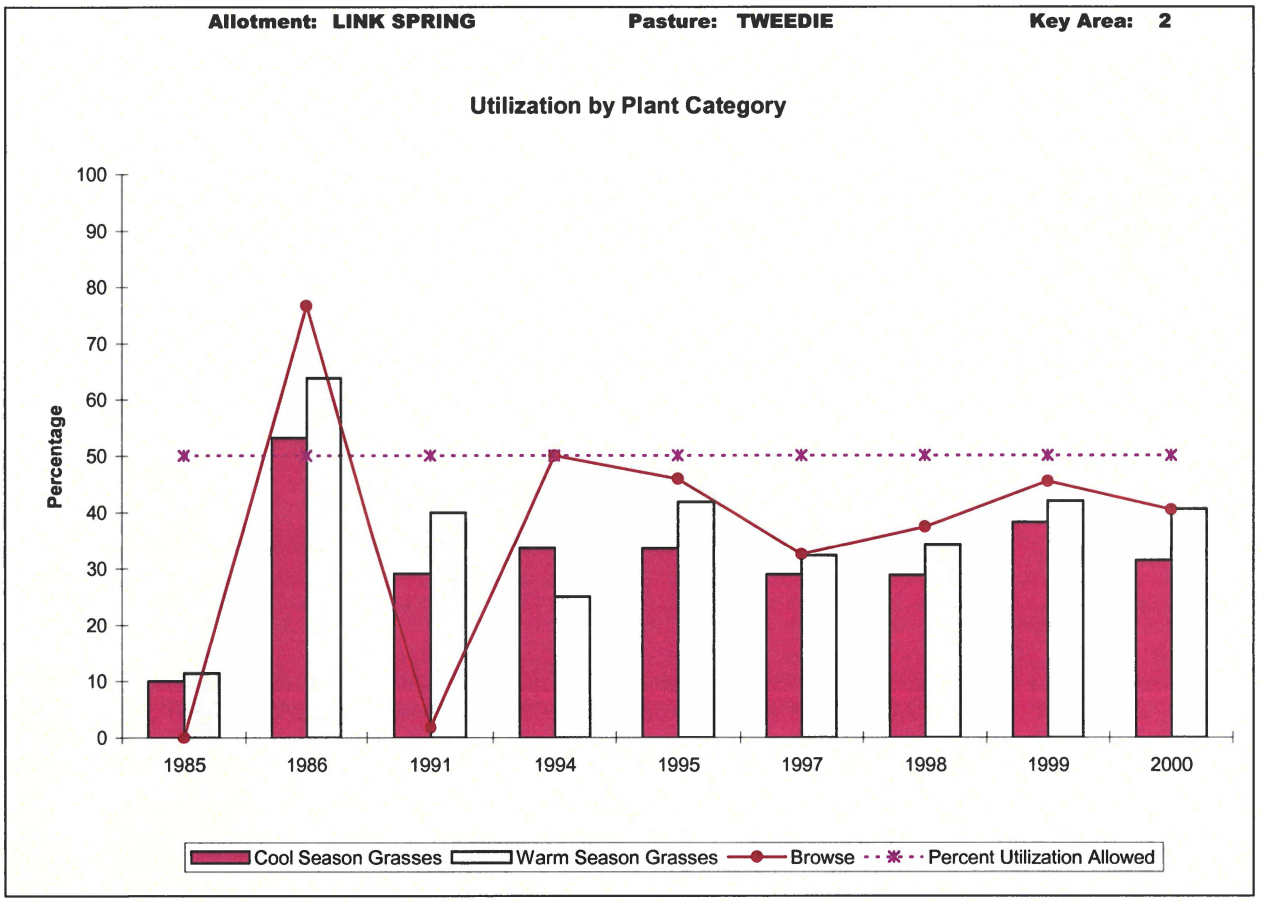
Appendix D:

Vegetation

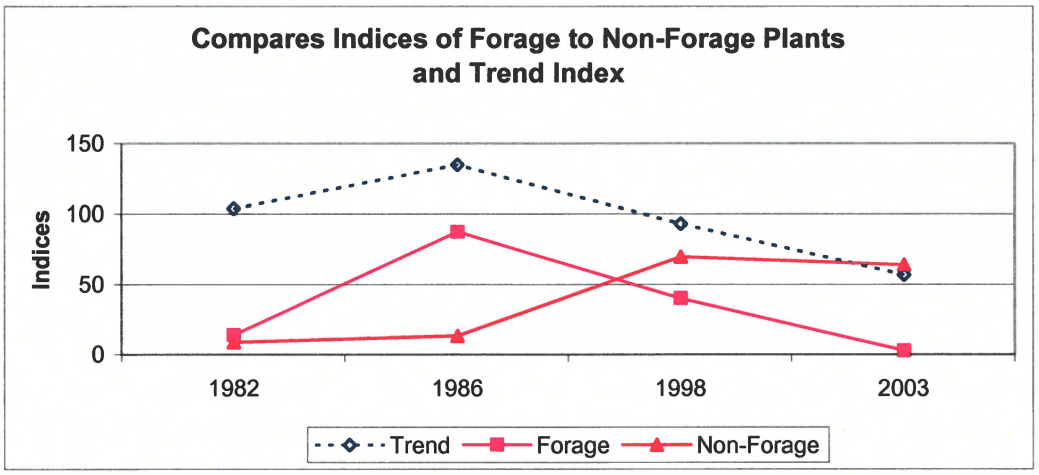
ARIZONA STRIP				UTILIZATION STUDY SUMMARY																09/23/03
ALLOTMENT = LINK SPRING				PASTURE = MIDDLE BENCH				KEY AREA NUMBER = 1											Page 1	
Utilization expressed as a percent use for each species as of the particular year read.																				
Cool Season Grasses																				
	1985	1986	1987	1990	1993	1994	1995	1998	1999	2000										
ORHY																				
SIHY																				
WARM SEASON GRASSES																				
SPCR	20	27	22	33	17	12	28	16	19	20										
BOCU	28	36	32	35	25	34	27	14	18	10										
BROWSE																				
EPNE				25																
COME	10	18	26	9	3	39	40	21	34	40										



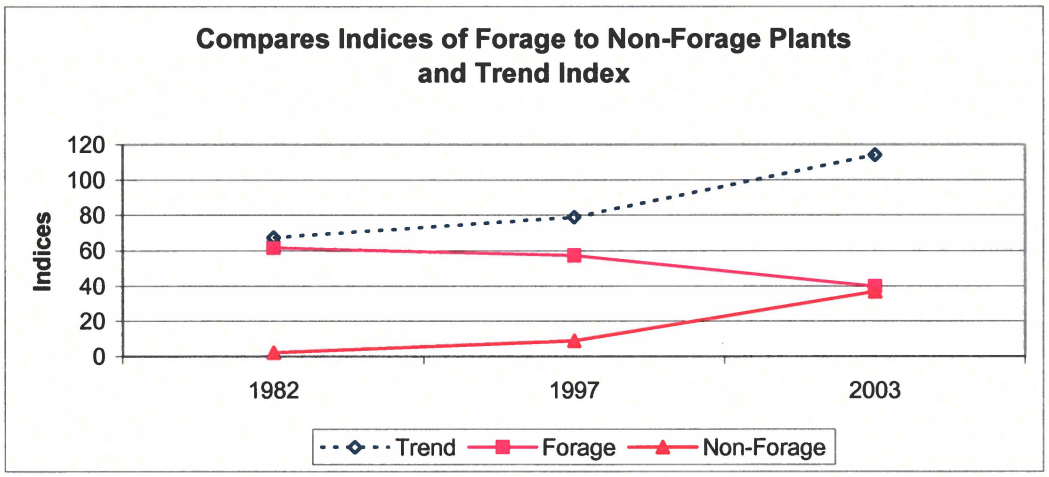
ARIZONA STRIP					UTILIZATION STUDY SUMMARY																09/23/03
ALLOTMENT = LINK SPRING					PASTURE = TWEEDIE					KEY AREA NUMBER = 2									Page 1		
Utilization expressed as a percent use for each species as of the particular year read.																					
Cool Season Grasses																					
	1985	1986	1991	1994	1995	1997	1998	1999	2000												
ORHY			22																		
SIHY	10	53	22	34	34	29	29	38	31												
KOCR			40																		
WARM SEASON GRASSES																					
HIJA	11	66																			
SPCR	12	50	40	25	42	32	34	42	41												
BOGR		66																			
BROWSE																					
EPNE		77	2	50	50	39	39	50	41												
COME			2	50	42	26	36	41	40												



Allotment: LINK SPRING **Pasture: MIDDLE BENCH** **Key Area: 1**



Allotment: LINK SPRING **Pasture: TWEEDIE** **Key Area: 2**



Auxiliary Ecological Status Studies:

Allotment:	Link Spring				Pasture:	Middle Bench			
DWR	Key Area #:		Auxiliary ES #1			Year Read:		2003	
Ecological Site:	Shallow Upland (Cal) 9-13					Rating:	Late		Allowed
		Tally					Climax	Allowable	Composition
Species		1	2	3	WTD	% Comp	Comp	%	Total
Browse	Totals	38	38	38	380	78%	81%	78%	62%
*Other Shrubs	Cora	22	23	23	223	46%	65%	46%	
3% added	Epne	3	2	2	27	6%	5%	5%	
	Opunt	2	2	2	20	4%	2%	2%	
	Qutu*	2	2	2	20	4%	2%	2%	
	Pimo	2	2	2	20	4%			
	Cegr*	1	1	1	10	2%	1%	1%	
	Gafl	1	1	1	10	2%			
	Juos	2	2	2	20	4%			
	Chgr	1	1	1	10	2%	2%	2%	
	Come	1	1	1	10	2%	3%	2%	
	Fapa	1	1	1	10	2%	2%	2%	
Forbs	Totals	11	11	11	110	22%	5%	5%	7%
	AAFF	1	1	1	10	2%	3%	2%	
	Brru1	6	5	5	57	12%	1%	1%	
	AAGG	4	5	5	43	9%	4%	4%	
Totals					490	100%	90%	69%	

Allotment:	Link Spring				Pasture:	Middle Bench			
DWR	Key Area #:		Auxiliary ES #2				Year Read:	2003	
Ecological Site:	Shallow Sandy Loam (Cal) 9-13					Rating:	Late		Allowed
		Tally					Climax	Allowable	Composition
Species		1	2	3	WTD	% Comp	Comp	%	Total
Browse	Totals	39	39	39	390	76%	93%	76%	60%
	Prfa*	2	2	2	20	4%	2%	2%	
	Chvi8	2	2	2	20	4%	3%	3%	
	Come	5	5	5	50	10%	10%	10%	
	Cora	10	10	10	100	20%	60%	20%	
	Juos	3	3	3	30	6%	6%	6%	
	Opunt	1	1	1	10	2%	3%	2%	
	Arcto*	4	4	4	40	8%	4%	4%	
	Yubr*	1	1	1	10	2%	1%	1%	
	Qutu*	2	2	2	20	4%	2%	2%	
	Gafl*	1	1	1	10	2%	1%	1%	
	Fran*	2	2	2	20	4%			
*Other Shrubs	Cegr	1	1	1	10	2%			
10% added	Epne	1	1	1	10	2%	8%	2%	
	Pimo	3	3	3	30	6%	6%	6%	
	Yuba	1	1	1	10	2%	7%	2%	
Grasses	Totals	2	2	2	20	4%	5%	4%	4%
Other Perennial Grasses Group with Stipa 0-5% Allowed	Arist*	1	1	1	10	2%	2%	2%	
	Stipa	1	1	1	10	2%	3%	2%	
Forbs	Totals	10	10	10	100	20%	10%	10%	11%
	AAFF	5	5	4	49	10%	5%	5%	
	Brru1*	1	1	1	10	2%			
	AAGG	3	3	4	31	6%	5%	5%	
	Balley	1	1	1	10	2%	1%	1%	
Totals					510	100%	129%	75%	

Allotment:	Link Spring				Pasture:	Middle Bench			
DWR		Key Area #:		Auxiliary ES #3			Year Read:	2003	
Ecological Site:	Shallow Upland (Cal) 10-14					Rating:	Late		Allowed
		Tally					Climax	Allowable	Composition
Species		1	2	3	WTD	% Comp	Comp	%	Total
Browse	Totals	31	31	31	310	61%	80%	61%	46%
*Other Shrubs	Cora	15	15	15	150	29%	65%	29%	
3% added	Epne	5	4	4	47	9%	5%	5%	
	Yubr*	3	3	3	30	6%			
	Yuba	4	4	4	40	8%	5%	5%	
	Opunt	1	2	2	13	3%	2%	2%	
	Prfa*	2	2	2	20	4%	3%	3%	
	Fapa	1	1	1	10	2%	2%	2%	
Grasses	Totals	1	1	1	10	2%	30%	2%	2%
	Stipa	1	1	1	10	2%	2%	2%	
Forbs	Totals	19	19	19	190	37%	5%	5%	10%
*Other annual	AAFF	14	14	14	140	27%	3%	3%	
Grasses	PPFF	1	1	1	10	2%	2%	2%	
1% added	Brru-2*	2	2	2	20	4%	1%	1%	
3% allowed	AAGG	2	2	2	20	4%	5%	4%	
Totals					510	100%	95%	58%	

Allotment:	Link Spring				Pasture:	Middle Bench			
DWR		Key Area #:		Auxiliary ES #4			Year Read:	2003	
Ecological Site:	Shallow Upland (Cal) 10-14					Rating:	Late		Allowed
		Tally					Climax	Allowable	Composition
Species		1	2	3	WTD	% Comp	Comp	%	Total
Browse	Totals	35	35	35	350	80%	81%	80%	68%
*Other Shrubs	Cora	26	25	25	257	58%	65%	58%	
3% added	Epne	2	3	3	23	5%	5%	5%	
	Yubr*	1	1	1	10	2%			
	Yuba						5%		
	Opunt						2%		
	Prfa*						2%		
	Fapa*						1%		
	Come*	3	3	3	30	7%	3%	3%	
	Chvi	1	1	1	10	2%	2%	2%	
	Juos	2	2	2	20	5%			
Grasses	Totals						25%		
	Stipa						2%		
Forbs	Totals	9	9	9	90	20%	5%	5%	5%
*Other annual	AAFF	8	8	8	80	18%	3%	3%	
Grasses	PPFF								
	Brru1*	1	1	1	10	2%	5%	2%	
	AAGG								
Totals					440	100%	95%	74%	

APPENDIX E
Wildlife Data

Arizona Game & Fish Unit 13B Mule Deer Population Counts				
Year	**Number of Animals Surveyed**	**Bucks/100 Does**	**Fawns/100 Does**	**Population Estimate**
1985	108	30	50	1000-1500
1986	41	29	18	1000-1500
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	<1000
1993	117	126	52	800-1000
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	84	29	46	No Estimate
2004	102	34	57	No Estimate
2005	128	65	72	No Estimate