

DISCUSSION

Buckskin Mountain - Trend Study No. 27-9

Study Information

This study was established in 1997 and is located south of U.S. 89, west of Kaibab Gulch, and just south of Pine Hollow Canyon on the Utah-Arizona border [elevation: 6,300 feet (1,920 m), slope: 4%, aspect: north]. This site was established to better sample critical winter range south of the Vermillion Cliffs. It samples a low flat ridge which supports a Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*) and Utah juniper (*Juniperus osteosperma*) overstory with a basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and grass understory. Pellet group transect data estimated deer use to be extremely heavy in 2003 and 2008 (98 ddu/acre:243 ddu/ha and 100 ddu/acre:248 ddu/ha, respectively). There was only one elk pellet group encountered in both 2003 and 2008. Cattle use was estimated to be light in 2003 and 2008 (4 cdu/acre:11 cdu/ha and 3 cdu/acre:7 cdu/ha, respectively).

Soil

Soils at this site are very similar to those at Fivemile Mountain. Soil texture is a loam with a slight alkaline reaction (pH 7.4). Pavement and rock are abundant in the un-vegetated areas of the surface and throughout the soil profile. Relative combined vegetation and litter cover ranged from 69%-76% from 1997 to 2008. Relative rock and pavement cover ranged from 17%-23% from 1997 to 2008. Relative bare ground cover was low at a range of 5%-7% from 1997 to 2008. The erosion condition rating was classified as stable in 2003 and 2008.

Browse

The key browse on the site are basin big sagebrush and Stansbury cliffrose. Sagebrush accounted for 52%-61% of the total shrub cover from 1997 to 2008. Basin big sagebrush density was estimated at 2,920 plants/acre in 1997, decreasing to 2,180 plants/acre in 2003, and 1,700 plants/acre in 2008. Recruitment of young sagebrush plants in the population has declined from 25% in 1997 to no young sagebrush plants sampled in the population in 2008. Decadence in the sagebrush population has steadily increased from 34% in 1997, to 44%, in 2003, and 75% in 2008. Most of the sagebrush displayed normal vigor in 1997 and 2008, but 53% of the population had poor vigor in 2008. Utilization of sagebrush was light to moderate with a few individuals receiving heavy use in 1997 and 2008, but very little utilization was evident in 2003. Annual leaders on basin big sagebrush averaged 1.5 inches of growth in 2003, and 1.8 inches in 2008.

Cliffrose density was estimated at 240 plants/acre in 1997, 360 plants/acre in 2003, and 220 plants/acre in 2008. This population is mostly mature. There was moderately low decadence in 1997 and 2003, but decadence increased to 73% in 2008. About half of the mature plants were partially unavailable to browsing in all three surveys, resulting in mostly light to moderate use overall. Mature cliffrose average nearly eight feet in height with line-intercept canopy cover ranging from 6%-11% from 1997 to 2008. The number of cliffrose plants displaying poor vigor was low in 1997 and 2003, but increased to 55% in 2008. There has been little recruitment of cliffrose in any of the sample years. Cliffrose leaders had averaged 3.6 inches of annual growth in 2003, and 2.8 inches growth in 2008.

Broom snakeweed (*Gutierrezia sarothrae*) was present on the site with a density of about 1,000 plants/acre in 1997, but was not sampled in 2008. Pinyon pine (*Pinus edulis*) and juniper trees had an estimated combined density of about 140 trees/acre in 2003 and 2008.

Herbaceous Understory

The herbaceous understory is very poor. A total of 10 perennial grasses and forbs were sampled on the transect in the 1997, 2003, and 2008 surveys. Perennial herbaceous species provided less than 0.5% total cover in 1997, and only around 0.05% cover in 2003 and 2008. Cheatgrass (*Bromus tectorum*) dominates the

understory as it provided 99% of the grass cover and nearly half of the total vegetation cover in all three survey years. Cheatgrass had an average cover value of over 20% in 1997 and 2003, but decreased to around 8% in 2008. Because of the high production, the fire hazard created by cheatgrass is very high. A wildfire would be devastating to this important winter range as both basin big sagebrush and cliffrose are fire intolerant species. The abundance of cheatgrass also presents a severe competition problem for seedling and young shrubs, as well as perennial grasses and forbs, that will have a difficult time with establishment and survival in this system.

1997 DESIRABLE COMPONENTS INDEX

winter range condition (DCI) - poor (23) Low potential scale

2003 TREND ASSESSMENT

Trend for browse is slightly down. Basin big sagebrush has a lower density estimate from 1997 of 2,180 plants/acre, a decrease of 25%. The sagebrush population showed an increase in decadence from 34% in 1997 to 44%. Recruitment in sagebrush was also down with young plants comprising 10% of the population. Cliffrose showed a slight density increase to 360 plants/acre. Decadence remains quite low (17%), and the entire population had normal vigor. Although cliffrose reproduction is low, these plants are long lived and appear to be maintaining themselves at the present time. The herbaceous understory continues to be in very poor condition. The trend for grasses is down. Though already low, the sum of nested frequency and total cover of perennial grasses declined sharply. Cheatgrass continues to dominate the understory although it significantly declined in nested frequency. Cheatgrass cover averaged over 20% in 2003 which creates a serious fire hazard to the key browse species on the site. The trend for forbs is slightly down. The sum of nested frequency of perennial forbs decreased slightly, but the sum of nested frequency and total cover of annual forbs increased substantially.

winter range condition (DCI) - very poor-poor (9) Low potential scale

browse - slightly down (-1)

grass - down (-2)

forb - slightly down (-1)

2008 TREND ASSESSMENT

Trend for browse is down. The density of basin big sagebrush decreased slightly to 1,700 plants/acre, but vigor and decadence declined substantially. Sagebrush plants displaying poor vigor increased from 12% in 2003 to 53%, and decadence increased to 75%. Recruitment in sagebrush was minimal with no young sagebrush plants sampled in the population. The density of cliffrose declined 39% from 2003 to 220 plants/acre. Cliffrose plants displaying poor vigor increased from none in 2003 to 55%, and decadence increased to 73%. Both quadrat cover and line intercept cover have shown steady declines in the average cover of cliffrose since 1998. It appears that cliffrose cover might be underestimated by the quadrat cover method on this site. Trend for grasses is stable, but the condition of grasses is still very poor. Sum of nested frequency of perennial and annual grasses remained relatively constant, but the total cover of cheatgrass did decline to around 8% of the total cover. The trend for forbs is stable, but in very poor condition. Sum of nested frequency of perennial and annual forbs declined slightly and total cover of annual forbs declined substantially, but forbs are still very rare. Drought conditions are probably the primary driver in the decrease in total cover of the shrubs and herbaceous species.

winter range condition (DCI) - very poor (-3) Low potential scale

browse - down (-2)

grass - stable (0)

forb - stable (0)

HERBACEOUS TRENDS --
 Management unit 27 , Study no: 9

T y p e	Species	Nested Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
G	<i>Bouteloua gracilis</i>	1	-	-	.00	-	-
G	<i>Bromus tectorum</i> (a)	_b 453	_a 368	_a 352	25.61	20.39	7.65
G	<i>Festuca ovina</i>	7	1	-	.03	.00	-
G	<i>Poa fendleriana</i>	6	-	-	.21	-	-
G	<i>Poa secunda</i>	10	5	3	.01	.03	.03
G	<i>Sitanion hystrix</i>	_b 26	_a 1	_a 5	.10	.00	.01
G	<i>Vulpia octoflora</i> (a)	_a -	_b 38	_a 4	-	.16	.00
Total for Annual Grasses		453	406	356	25.61	20.55	7.66
Total for Perennial Grasses		50	7	8	0.35	0.03	0.04
Total for Grasses		503	413	364	25.96	20.59	7.70
F	<i>Agoseris glauca</i>	-	-	1	-	-	.00
F	<i>Calochortus nuttallii</i>	6	-	-	.01	-	-
F	<i>Descurainia pinnata</i> (a)	-	5	-	-	.02	-
F	<i>Draba</i> sp. (a)	_a -	_b 46	_a -	-	.27	-
F	<i>Erodium cicutarium</i> (a)	_a -	_b 25	_a -	-	1.04	-
F	<i>Erigeron</i> sp.	6	-	-	.01	-	-
F	<i>Gilia</i> sp. (a)	_a 11	_b 138	_a 7	.01	2.66	.02
F	<i>Holosteum umbellatum</i> (a)	-	2	1	-	.00	.00
F	<i>Lappula occidentalis</i> (a)	_a -	_b 23	_a 7	-	.11	.01
F	<i>Microsteris gracilis</i> (a)	_a 2	_b 16	_{ab} 8	.00	.06	.02
F	<i>Phlox longifolia</i>	5	-	1	.01	-	.00
F	<i>Plantago patagonica</i> (a)	-	2	-	-	.00	-
F	<i>Ranunculus testiculatus</i> (a)	_a 1	_b 28	_c 60	.00	.12	.16
F	<i>Sphaeralcea grossulariifolia</i>	1	10	-	.00	.01	-
F	Unknown forb-annual (a)	-	6	-	-	.04	-
F	<i>Zigadenus paniculatus</i>	-	-	3	-	-	.00
Total for Annual Forbs		14	291	83	0.02	4.35	0.22
Total for Perennial Forbs		18	10	5	0.03	0.01	0.01
Total for Forbs		32	301	88	0.06	4.36	0.23

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 27 , Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
B	Artemisia tridentata tridentata	76	65	54	12.19	8.77	6.38
B	Cowania mexicana stansburiana	9	10	9	6.55	2.82	.77
B	Ephedra viridis	3	0	2	.06	.38	.38
B	Gutierrezia sarothrae	27	15	0	1.08	.11	-
B	Juniperus osteosperma	7	5	6	3.57	3.43	2.85
B	Opuntia sp.	3	2	2	.00	.03	.00
Total for Browse		125	97	73	23.48	15.56	10.39

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 9

Species	Percent Cover		
	'97	'03	'08
Artemisia tridentata tridentata	-	7.31	7.11
Cowania mexicana stansburiana	10.80	8.36	5.59
Ephedra viridis	-	-	.06
Gutierrezia sarothrae	-	.06	-
Juniperus osteosperma	5.19	7.19	9.30

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 27 , Study no: 9

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata tridentata	1.5	1.8
Cowania mexicana stansburiana	3.6	2.8

POINT-QUARTER TREE DATA --

Management unit 27 , Study no: 9

Species	Trees per Acre	
	'03	'08
Cowania mexicana stansburiana	61	67
Juniperus osteosperma	78	74

Average diameter (in)	
'03	'08
10.2	12.1
6.8	7.9

BASIC COVER --

Management unit 27 , Study no: 9

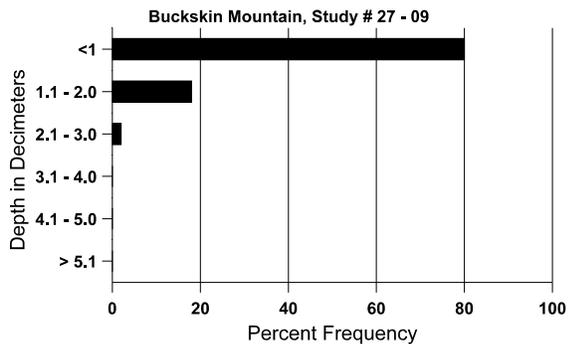
Cover Type	Average Cover %		
	'97	'03	'08
Vegetation	38.47	37.72	20.11
Rock	4.40	5.34	5.23
Pavement	19.59	21.29	13.80
Litter	48.10	43.54	67.65
Cryptogams	.61	.04	.25
Bare Ground	5.84	8.61	7.96

SOIL ANALYSIS DATA --

Management unit 27, Study no: 9, Study Name: Buckskin Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
9.8	70.0 (10.6)	7.4	41.7	32.7	25.6	2.6	25.7	121.6	0.4

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 9

Type	Quadrat Frequency		
	'97	'03	'08
Rabbit	24	14	69
Elk	5	1	-
Deer	49	31	28
Cattle	1	3	1

Days use per acre (ha)	
'03	'08
-	-
1 (2)	1 (2)
98 (243)	100 (248)
4 (11)	3 (7)

BROWSE CHARACTERISTICS --
Management unit 27 , Study no: 9

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata tridentata</i>												
97	2920	640	740	1200	980	1360	30	9	34	15	15	29/37
03	2180	-	220	1000	960	1480	4	0	44	12	12	27/29
08	1700	-	-	420	1280	1760	25	18	75	36	53	33/36
<i>Cowania mexicana stansburiana</i>												
97	240	20	20	180	40	-	17	0	17	8	8	94/95
03	360	-	20	280	60	-	6	17	17	-	0	93/97
08	220	-	20	40	160	-	18	0	73	45	55	84/79
<i>Ephedra viridis</i>												
97	60	-	-	60	-	-	0	0	0	-	0	28/30
03	0	-	-	-	-	-	0	0	0	-	0	35/47
08	40	-	-	20	20	-	50	0	50	-	0	37/53
<i>Gutierrezia sarothrae</i>												
97	1120	-	60	960	100	520	0	0	9	9	9	8/11
03	860	400	440	420	-	40	0	0	0	-	0	6/7
08	0	-	-	-	-	-	0	0	0	-	0	-/-
<i>Juniperus osteosperma</i>												
97	140	-	20	120	-	-	0	0	0	-	0	-/-
03	100	-	-	100	-	-	0	0	0	-	0	-/-
08	120	-	20	80	20	-	0	0	17	-	0	-/-
<i>Opuntia sp.</i>												
97	80	-	40	40	-	20	0	0	-	-	0	6/15
03	40	-	-	40	-	-	0	0	-	-	0	6/18
08	40	-	-	40	-	-	0	0	-	-	0	4/5
<i>Opuntia whipplei</i>												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	15/23
08	0	-	-	-	-	-	0	0	-	-	0	11/26
<i>Pediocactus simpsonii</i>												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	7/24
08	0	-	-	-	-	-	0	0	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Purshia tridentata												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	11/26
Sclerocactus sp.												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	9/24
Yucca sp.												
97	0	-	-	-	-	-	0	0	-	-	0	24/34
03	0	-	-	-	-	-	0	0	-	-	0	30/40
08	0	-	-	-	-	-	0	0	-	-	0	22/30