

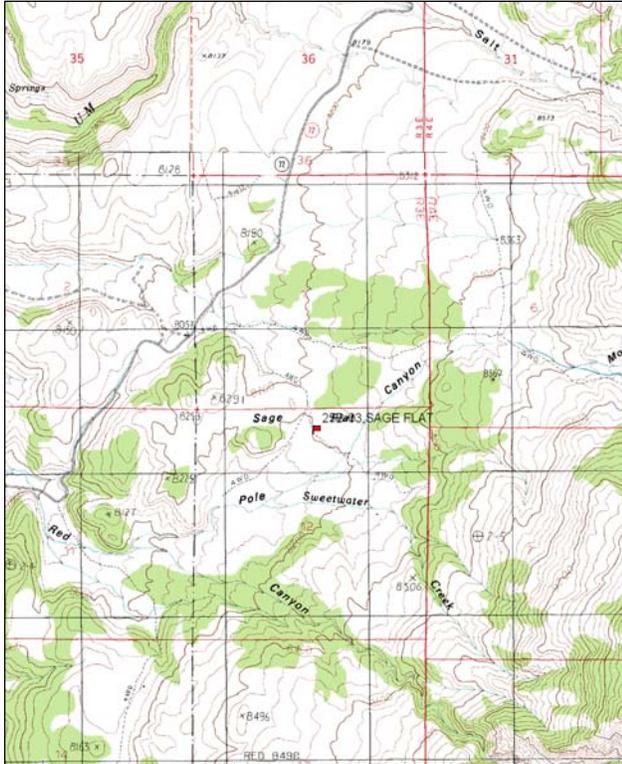
SAGE FLAT - TREND STUDY NO. 25B-3-09

Vegetation Type: Wyoming Big Sagebrush
Range Type: Crucial Deer Winter, Substantial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8,200 ft (2,499 m)
Aspect: Southwest
Slope: 2%-5%
Transect bearing: 165 degrees magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

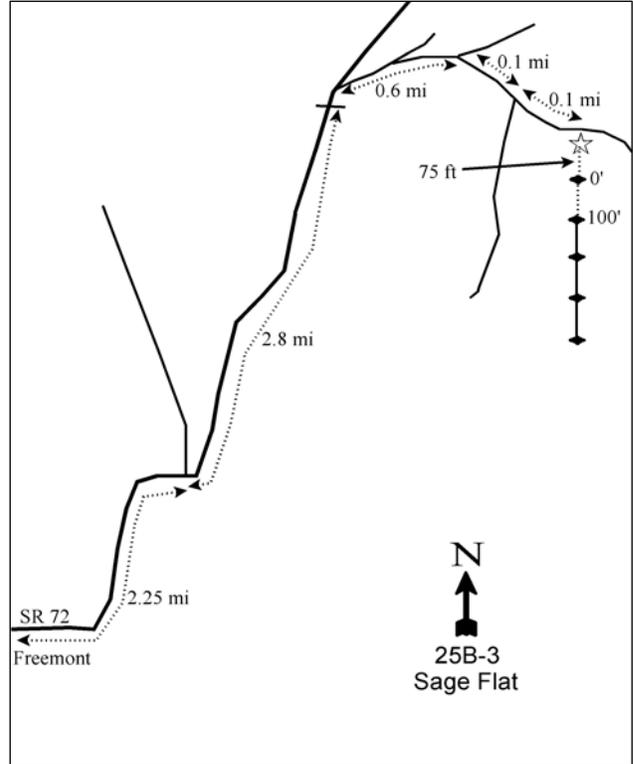
From Fremont travel north on SR 72 for 2.25 miles to a major fork, bear right and continue 2.8 miles on SR 72 to a cattleguard at the Forest Service boundary. One hundred yards beyond the cattleguard turn right. At 0.15 miles, a road forks off to the right. Go up this rough road 0.45 miles to a fork. Turn right and go 0.1 miles to another fork. Turn left at the fork and go 0.1 miles into the flat to a witness post on the right side of the road. The witness post and transect stakes are green steel fence posts with a white top. The frequency baseline, with browse tag #149, starts 75' due south of the witness post.

Map Name: Loa 1 NE, Utah



Township: 27S, Range: 3E, Section: 12

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 453556 E 4259466 N

SAGE FLAT - TREND STUDY NO. 25B-3

Site Information

Site Description: The Sage Flat trend study is located in an open valley dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). The area has been heavily grazed by livestock since the area was settled. The surrounding area is dominated by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with a black sagebrush (*Artemisia nova*) understory. Past use has led to an almost monotypic shrub type with few herbaceous species. The flat is thought to be an important deer concentration area in winter and spring and would be enhanced by with early season herbaceous species. Deer use has varied between low and moderate since 1981 while elk use has been low or unobserved. Cattle use was moderate in 2004, but not noted in 2009 (Tables – Pellet Group Data).

Browse: Wyoming big sagebrush is the key browse species on this site and dominates the vegetation component. After a large increase in density from 1985 to 1991, sagebrush density has not varied greatly. Decadence levels have remained acceptable (below 30%) since 1991, while recruitment of young plants has been good until 2009 when it decreased to just 7% of the population. Broom snakeweed (*Gutierrezia sarothrae*) is the only other shrub that occurs regularly (Table - Browse Characteristics).

Herbaceous Understory: Grass cover has declined gradually from 4% in 1994 to 2% in 2009. Western wheatgrass (*Agropyron smithii*) is the dominant grass species, but it too has steadily declined (Table - Herbaceous Trends). Forbs are rare on this site.

Soil: The soil is classified as loam with mildly alkaline (pH 7.7). Phosphorous has limited availability for plant growth and development at 4.7 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Erosion is evident on the site with about 50% of the soil surface exposed. Gullies have been filled in with small trees and flow patterns and pedestalling occur on the site. A gully is found near the 300' stake and a few others are crossed by the belts. The soil erosion condition was classified as moderate in 2004 and has improved to stable in 2009.

Trend Assessments

Browse:

- **1985 to 1991 - up (+2):** Wyoming big sagebrush density increased 71% to 12,665 plants/acre. Recruitment of young was high at 50% of the population and decadence was moderate at 24%.
- **1991 to 1994 – stable (0):** Differences in density may be related to the larger sample area used in 1994; therefore trend was determined using other parameters. Wyoming big sagebrush recruitment decreased slightly, but was still high with young plants representing 39% of the population. Decadence decreased slightly to 16%.
- **1994 to 1999 - stable (0):** Wyoming big sagebrush density decreased slightly compared to past years, but recruitment of young plants increased slightly to 43% of the population, and decadence was moderate at 24%. Broom snakeweed density decreased 68% to 1,200 plants/acre.
- **1999 to 2004 - stable (0):** Wyoming big sagebrush density was similar, though recruitment decreased to 27% which was still considered good. Broom snakeweed density increased nearly fourfold to 4,500 plants/acre.
- **2004 to 2009 - slightly down (-1):** Wyoming big sagebrush density remained similar, but recruitment of young plants decreased and was low at 7%. Decadence increased slightly and was moderate at 27%.

Grass:

- **1985 to 1991 – slightly up (+1):** The sum of nested frequency of perennial grasses increased 14%. Western wheatgrass was the predominant grass.

- **1991 to 1994 - stable (0):** The sum of nested frequency is unchanged and cover was 4%. Western wheatgrass was still the dominant species and provided 60% of grass cover.
- **1994 to 1999 – stable (0):** The sum of nested frequency of perennial grasses was unchanged but cover decreased from 4% to 3% with western wheatgrass representing 39% of grass cover.
- **1999 to 2004 – slightly down (-1):** The sum of nested frequency of perennial grasses decreased 20% while cover was nearly similar to the last reading. No single species provided over 1% cover.
- **2004 to 2009 – slightly down (-1):** The sum of nested frequency of perennial grasses decreased 20% again while cover was only slightly lower at 2%. No one grass provided over 1% cover.

Forb:

- **1985 to 1991 – slightly up (+1):** Forbs are rare on the site and even small changes in the sum of nested frequency will result in high percent changes. Total forb cover was less than 1% and the sum of nested frequency rose 66%.
- **1991 to 1994 - down (-2):** Total forb cover was less than 1% and nested frequency decreased 71%.
- **1994 to 1999 – slightly up (+1):** Total forb cover was less than 1% and nested frequency increased 42%.
- **1999 to 2004 – slightly down (-1):** Total forb cover was less than 1% and nested frequency decreased 45%.
- **2004 to 2009 – slightly down (-1):** Total forb cover was less than 1% and nested frequency decreased 44%.

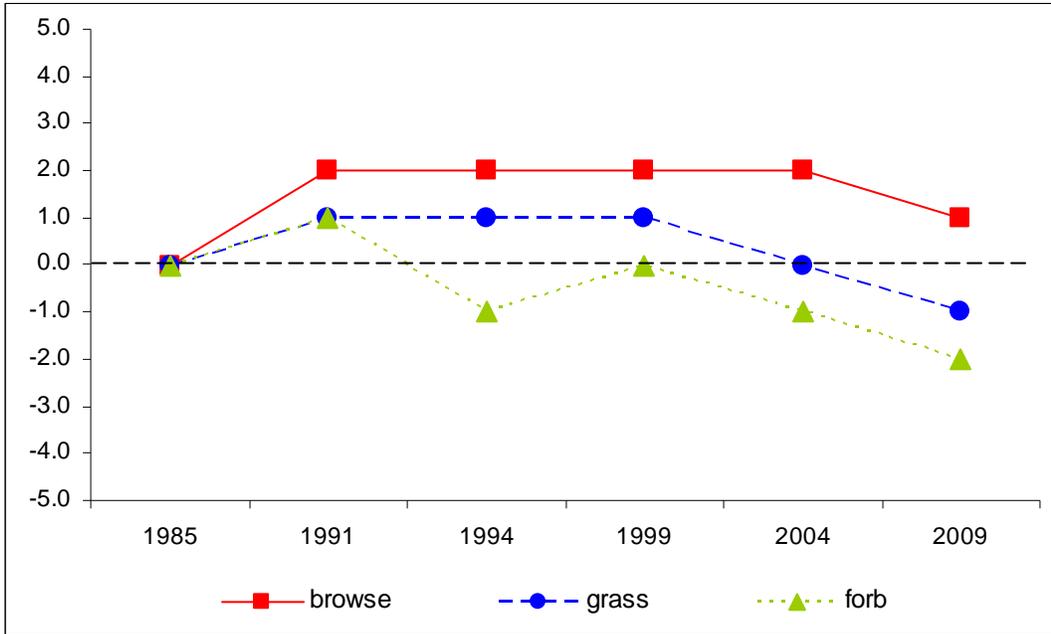
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 25B, study no: 3

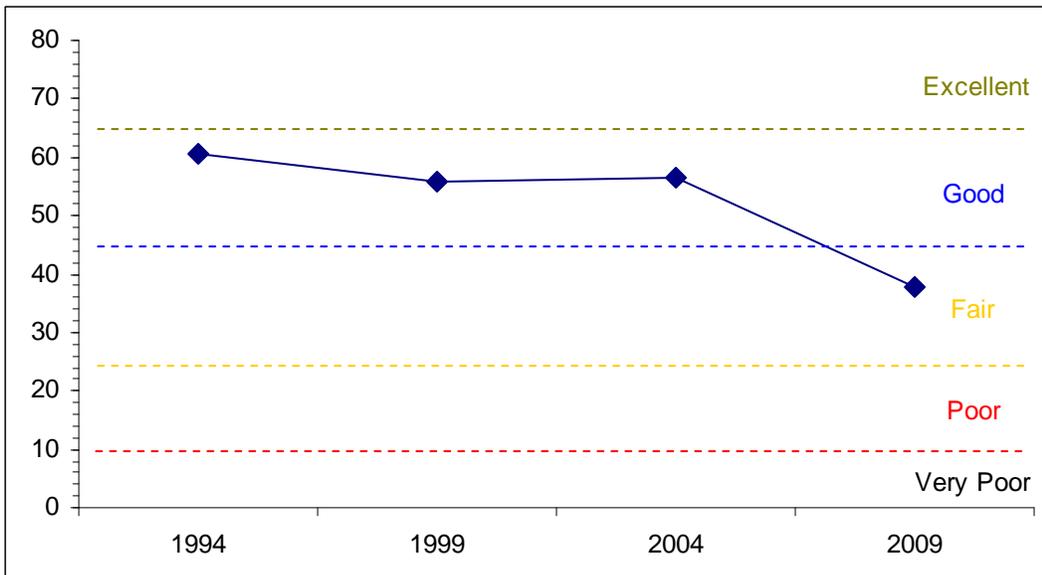
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	27.0	10.2	15.0	8.1	0.0	0.5	0.0	60.7	Good
99	26.2	8.0	15.0	6.0	0.0	0.7	0.0	55.8	Good
04	28.7	9.0	13.0	5.5	0.0	0.4	0.0	56.5	Good
09	22.3	6.9	3.5	4.8	0.0	0.3	0.0	37.8	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 25B Study no: 3



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE
 Management unit 25B, Study no: 3



HERBACEOUS TRENDS--

Management unit 25B, Study no: 3

T y P e	Species	Nested Frequency						Average Cover %			
		'85	'91	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron smithii	a137	b182	b196	a133	a133	a116	2.41	1.15	.72	.84
G	Agropyron spicatum	a-	a-	a-	b62	a3	a2	-	.50	.06	.00
G	Bouteloua gracilis	a-	b10	b17	b16	b15	b11	.25	.36	.74	.68
G	Oryzopsis hymenoides	a5	ab9	ab6	bc22	c29	bc23	.21	.29	.51	.56
G	Poa secunda	5	-	-	-	-	4	-	-	-	.00
G	Sitanion hystrix	d94	cd74	bc57	abc42	ab41	a20	1.14	.66	.69	.30
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		241	275	276	275	221	176	4.03	2.98	2.73	2.41
Total for Grasses		241	275	276	275	221	176	4.03	2.98	2.73	2.41
F	Arabis sp.	-	-	-	2	3	-	-	.01	.03	-
F	Cryptantha sp.	a11	b30	ab13	a-	a5	ab12	.09	-	.02	.13
F	Cymopterus sp.	-	2	-	-	-	-	-	-	-	-
F	Descurainia pinnata (a)	-	-	-	-	-	2	-	-	-	.03
F	Erigeron pumilus	b32	b45	ab22	b40	ab19	a3	.12	.15	.13	.01
F	Hymenoxys richardsonii	4	1	-	2	-	-	.00	.15	-	-
F	Penstemon sp.	-	-	-	1	-	-	.00	.00	-	-
F	Phlox longifolia	b38	c64	a6	ab13	a5	a3	.01	.04	.01	.03
F	Senecio multilobatus	-	1	-	-	-	-	-	-	-	-
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	0	0	0	2	0	0	0	0.03
Total for Perennial Forbs		86	143	41	58	32	18	0.23	0.35	0.18	0.17
Total for Forbs		86	143	41	58	32	20	0.23	0.35	0.18	0.20

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

BROWSE TRENDS--

Management unit 25B, Study no: 3

T y P e	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia frigida	7	13	6	4	.15	.30	.15	.03
B	Artemisia nova	0	3	2	2	-	.63	.63	.15
B	Artemisia tridentata wyomingensis	99	98	99	98	21.47	20.11	22.17	17.67
B	Ceratoides lanata	1	0	0	0	.00	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	9	11	12	14	.01	.00	.03	.01
B	Coryphantha vivipara arizonica	0	3	0	0	-	.00	-	-
B	Eriogonum microthecum	0	0	1	1	-	-	.00	.00
B	Gutierrezia sarothrae	64	36	64	29	.69	.33	2.59	.16
Total for Browse		180	164	184	148	22.33	21.37	25.57	18.03

CANOPY COVER, LINE INTERCEPT--

Management unit 25B, Study no: 3

Species	Percent Cover	
	'04	'09
Artemisia frigida	-	.05
Artemisia nova	.08	.31
Artemisia tridentata wyomingensis	23.20	21.04
Gutierrezia sarothrae	1.79	.10

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 25B, Study no: 3

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata wyomingensis	1.5	0.5

BASIC COVER--

Management unit 25B, Study no: 3

Cover Type	Average Cover %					
	'85	'91	'94	'99	'04	'09
Vegetation	6.00	2.50	24.93	24.49	26.55	20.60
Rock	.50	.50	1.67	.54	2.04	.01
Pavement	2.50	4.00	.98	4.90	4.84	6.38
Litter	30.00	27.00	18.25	19.50	19.04	19.51
Cryptogams	5.00	10.50	7.34	7.58	10.43	3.29
Bare Ground	56.00	55.50	50.48	46.57	46.81	59.15

SOIL ANALYSIS DATA --

Management unit 25B, Study no: 3, Study Name: Sage Flat

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
18.3	7.7	42.6	31.8	25.6	1.9	4.7	67.2	0.7

PELLET GROUP DATA--

Management unit 25B, Study no: 3

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	25	53	11	54	-	-	-
Elk	4	3	3	-	6 (15)	3 (7)	-
Deer	1	2	2	12	21 (52)	9 (23)	9 (22)
Cattle	4	2	1	-	15 (37)	-	1 (2)

BROWSE CHARACTERISTICS--
Management unit 25B, Study no: 3

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia frigida</i>									
85	0	0	0	0	-	0	0	0	-/-
91	132	50	50	0	-	0	50	0	5/7
94	320	0	100	0	-	0	0	0	3/5
99	500	24	68	8	20	44	32	0	3/5
04	220	0	100	0	-	27	0	0	3/4
09	100	0	100	0	-	0	20	0	6/8
<i>Artemisia nova</i>									
85	0	0	0	0	-	0	0	0	-/-
91	0	0	0	0	-	0	0	0	-/-
94	0	0	0	0	-	0	0	0	-/-
99	140	57	29	14	-	57	0	0	6/10
04	140	0	71	29	-	0	0	14	9/16
09	120	0	67	33	-	0	0	33	7/13
<i>Artemisia tridentata wyomingensis</i>									
85	7398	17	40	43	9199	47	33	4	19/20
91	12665	50	26	24	933	16	11	5	20/26
94	12960	39	45	16	40	46	0	8	19/29
99	11920	43	33	24	280	54	10	8	18/27
04	11360	27	54	20	20	26	8	11	15/23
09	11480	7	67	27	-	28	2	21	14/20
<i>Ceratoides lanata</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
94	20	100	0	-	-	0	0	0	2/2
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
85	0	0	0	0	-	0	0	0	-/-
91	0	0	0	0	-	0	0	0	-/-
94	240	8	58	33	-	0	0	0	4/6
99	280	21	14	64	-	0	29	43	4/6
04	360	33	61	6	-	17	0	6	4/5
09	300	7	80	13	-	0	0	13	2/4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Coryphantha vivipara arizonica</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	60	100	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Eriogonum microthecum</i>									
85	0	0	0	0	-	0	0	0	-/-
91	0	0	0	0	-	0	0	0	-/-
94	0	0	0	0	-	0	0	0	-/-
99	0	0	0	0	-	0	0	0	-/-
04	40	0	50	50	-	0	100	50	7/2
09	20	0	100	0	-	0	0	0	2/4
<i>Gutierrezia sarothrae</i>									
85	8998	18	68	14	2066	1	.74	.74	7/5
91	9932	44	52	5	133	7	.67	3	3/2
94	3760	7	85	9	60	0	0	.53	5/5
99	1200	47	50	3	840	0	0	2	6/6
04	4500	0	100	0	-	0	0	0	6/8
09	820	2	95	2	-	0	0	2	5/6
<i>Opuntia sp.</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	3/9
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-