

CAVE FLAT CHAINING - TREND STUDY NO. 15-9-09

Vegetation Type: Chained, Seeded P-J

Range Type: Crucial Deer Winter, Crucial Bison Year-Long

NRCS Ecological Site Description: [Semi-desert Shallow Sandy Loam \(Shadscale\), R035XY230UT](#)

Land Ownership: DWR

Elevation: 6,100 ft (1,859 m)

Aspect: southwest

Slope:

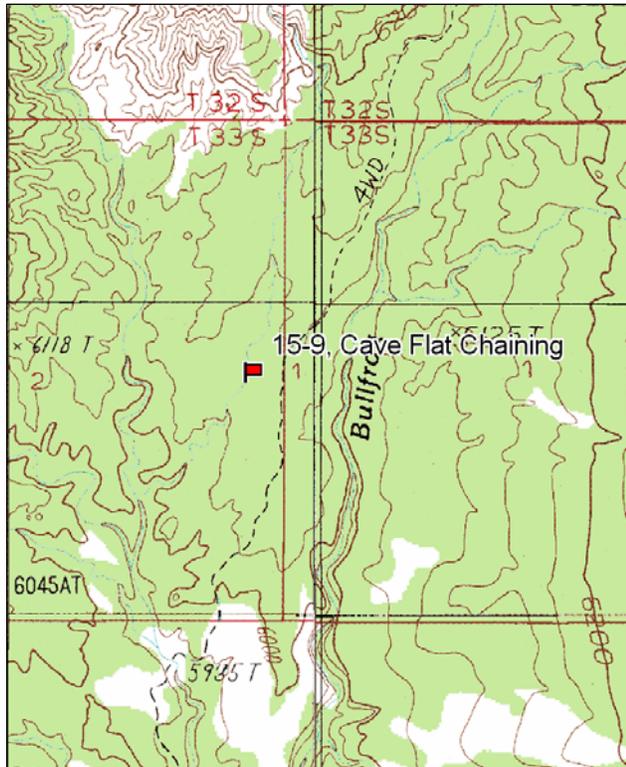
Transect bearing: 165 degrees magnetic.

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

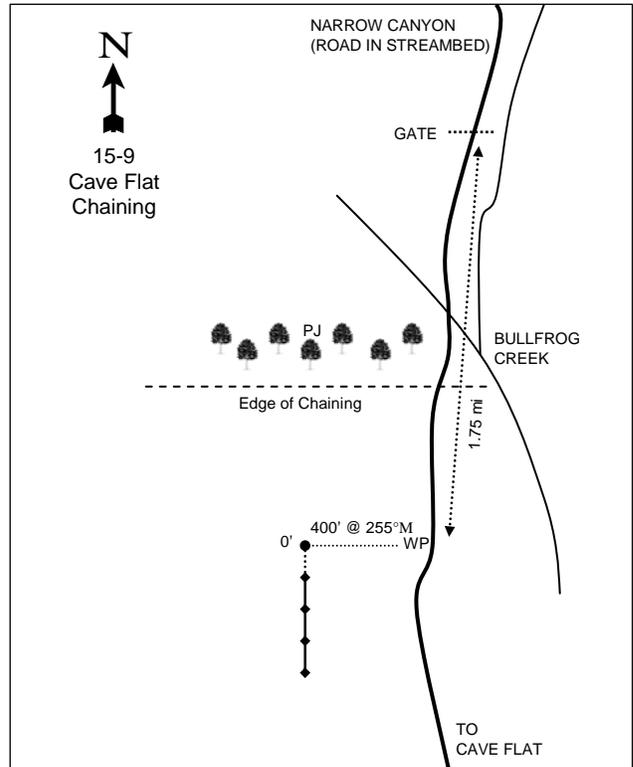
From Pennellen Pass (T32S, R10E, Sec. 21) drive south for 0.4 miles to an intersection. Stay right towards Airplane Spring and go 3.5 miles to an intersection. Turn left, travel along Bullfrog Creek for 1.35 miles to a gate. Continue past the gate and up out of the creek, going 1.75 miles to a witness post on the right side of the road in the chaining. The transect starts 400 feet west (bearing of 255°M) of the witness post. Browse tag#7136.

Map Name: Cave Flat



Township: 33S, Range: 9E, Section: 2

Diagrammatic Sketch:



GPS: NAD 83, UTM 510698 E 4201940 N

CAVE FLAT CHAINING - TREND STUDY NO. 15-9

Site Information

Site Description: The study is located east of Cave Flat in a pinyon-juniper chaining and seeding project that was done on state land by the Division of Wildlife Resources in the fall of 1983. The chaining is within the Steele Butte allotment. The study was not accessible in 2004, but was sampled again in 2009. Pellet group data for bison and cattle were combined due to the difficulties in distinguishing between these two species. Bison/cattle use was estimated to be moderately heavy in 1999, but decreased to light use in 2009. Deer use was estimated to be minimal on the site (Table - Pellet Group Data).

Browse: Browse species are lacking on this site. Slender bush eriogonum (*Eriogonum microthecum*) is the only preferred browse species currently sampled on the site, but has produced less than 1% cover since 1994. Broom snakeweed (*Gutierrezia sarothrae*) provided the most cover of any browse species, averaging about 4% cover since 1994 (Table - Browse Trends). Green ephedra (*Ephedra viridis*) was sampled in low numbers until 1994, but has not been sampled since (Table - Browse Characteristics).

Herbaceous Understory: A variety of seeded and native grasses grow on the site. The seeded species crested and intermediate wheatgrass (*Agropyron cristatum* and *A. intermedium*) have historically been the dominant perennial grass species on the site, but have decreased in cover since 1994. Sand dropseed (*Sporobolus cryptandrus*) now provides more cover than both of the two seeded species combined. Cheatgrass (*Bromus tectorum*) was the dominant grass species on the site between 1994 and 1999, but frequency and cover decreased markedly in 2009. Forbs are rare on the site and are dominated by weedy annuals such as Russian thistle (*Salsola iberica*) (Table - Herbaceous Trends).

Soil: The soil is a sandy loam with estimated effective rooting depth of 15 inches and a slightly alkaline pH (7.7). Phosphorus has limited availability for plant growth and development at 5.8 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is fairly high on the site with most of the protective soil cover coming from litter (Table - Basic Cover). The soil erosion condition classification was rated as slight in 2009 primarily due to pedestaling of plants and soil movement.

Trend Assessments

Browse:

- **1987 to 1994 - stable (0):** Browse species are rare on this site. Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. Vigor, decadence, and recruitment of young remained good for the preferred browse species, slender bush eriogonum.
- **1994 to 1999 - stable (0):** Slender bush eriogonum density increased 10% to 860 plants/acre while recruitment remained good at 18%. The only other preferred browse species that had been sampled on the site, green ephedra, was not sampled.
- **1999 to 2009 - slightly down (-1):** Slender bush eriogonum density decreased 21% and no young plants were sampled. Cover of eriogonum remained similar.

Grass:

- **1987 to 1994 – up (+2):** The sum of nested frequency for perennial grasses increased 72%. There was a significant increase in the nested frequency of intermediate wheatgrass and a significant decrease in the nested frequency of Indian ricegrass (*Oryzopsis hymenoides*). Perennial grasses provide 9% cover and annual grasses provide 10%.
- **1994 to 1999 – slightly up (+1):** The sum of nested frequency of perennial grasses increased 10%, though cover decreased to 5%.
- **1999 to 2009 – slightly up (+1):** There was little change in perennial grasses. Cheatgrass decreased significantly in nested frequency and cover decreased from 9% to less than 1%.

Forb:

- **1987 to 1994 - slightly down (-1):** The sum of nested frequency for perennial forbs is down 32%, but forbs are rare on this site. Weedy annual species, especially Russian thistle, have doubled in frequency. There was a significant decrease in the nested frequency of yellow sweet clover (*Melilotus officinalis*). Perennial forb cover is low at 1%.
- **1994 to 1999 – stable (0):** The sum of nested frequency for perennial forbs is similar to the last sample, but weedy annual species have declined. Total forb cover is 2%
- **1999 to 2009 - slightly down (-1):** The sum of nested frequency for perennial forbs is down 41% while weedy annual forbs have increased four-fold. Cover of perennial forbs decreased to less than 1%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

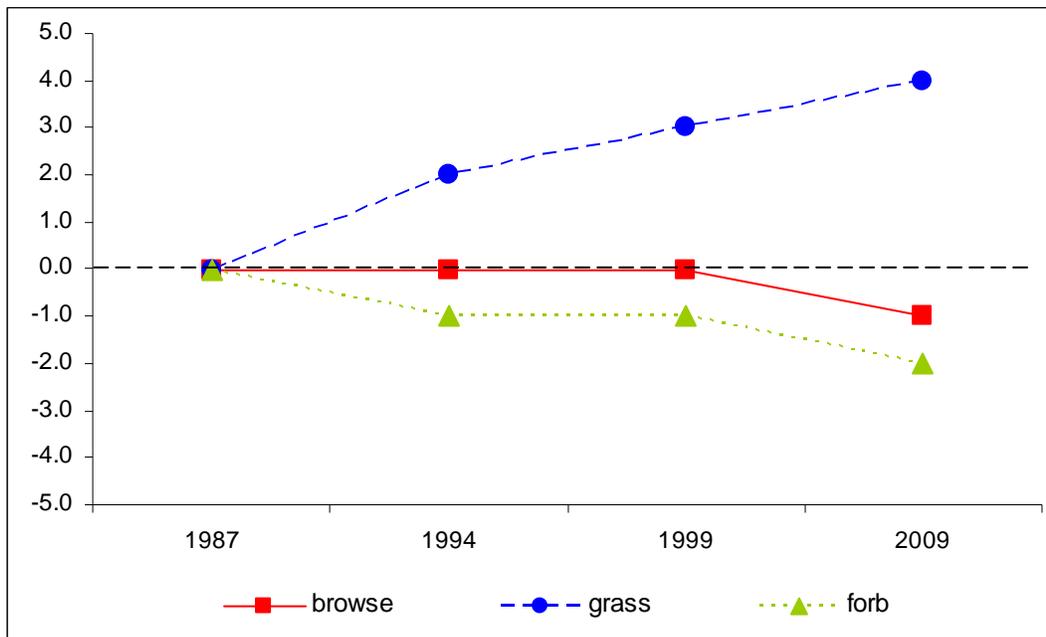
Management unit 15 Study no: 9

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	0.1	0	0	17.7	-7.4	1.8	0	12.2	Very Poor
99	0.1	0	0	9.1	-6.9	2.1	0	4.5	Very Poor
09	0.2	0	0	11.7	-0.5	1.5	0	12.9	Poor

Trend Summary

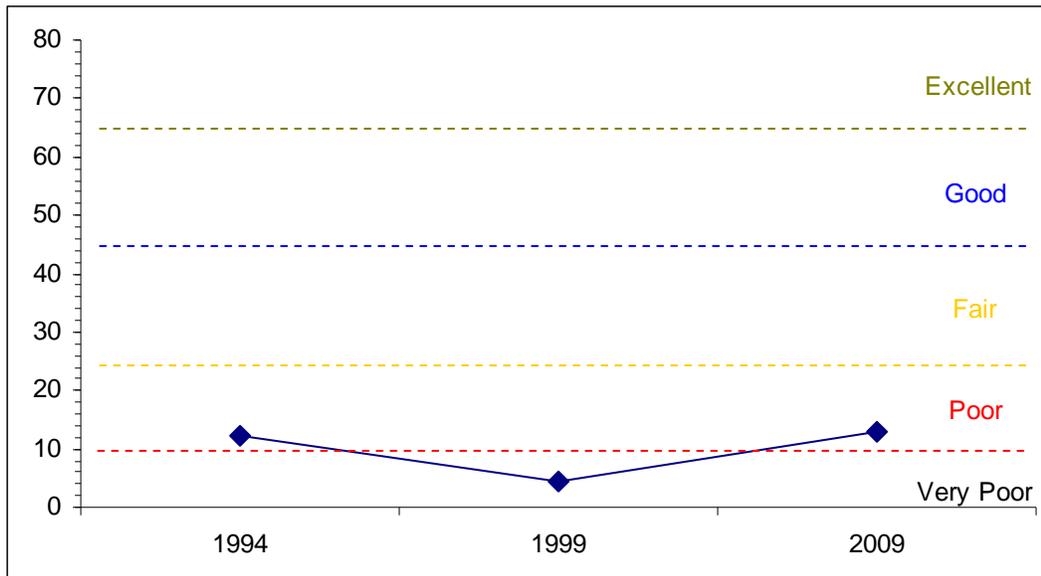
CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 15, Study no: 9



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE

Management unit 15, Study no: 9



HERBACEOUS TRENDS--

Management unit 15, Study no: 9

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'09	'94	'99	'09
G	Agropyron cristatum	b38	b32	b43	a6	2.09	.73	.04
G	Agropyron intermedium	a21	b127	c175	b125	4.76	3.35	1.75
G	Aristida purpurea	b12	a-	ab3	b19	-	.04	.26
G	Bouteloua gracilis	-	-	1	4	-	.00	.01
G	Bromus tectorum (a)	-	b234	b273	a85	8.77	9.21	.68
G	Elymus junceus	-	7	3	7	.42	.00	.07
G	Oryzopsis hymenoides	c25	ab16	a12	ab12	.13	.15	.10
G	Sitanion hystrix	b31	b40	ab9	a3	1.25	.22	.03
G	Sporobolus cryptandrus	a7	a8	a6	b91	.16	.04	3.59
G	Vulpia octoflora (a)	-	b34	a-	a-	1.10	-	-
Total for Annual Grasses		0	268	273	85	9.87	9.21	0.68
Total for Perennial Grasses		134	230	252	267	8.84	4.56	5.86
Total for Grasses		134	498	525	352	18.72	13.77	6.55
F	Astragalus moencopensis	-	-	-	3	-	-	.00
F	Astragalus mollissimus	b19	a6	ab16	a-	.04	.15	-
F	Chaenactis douglasii	a-	a-	b10	a3	-	.07	.00
F	Cryptantha humilis	a4	b33	ab17	b29	.60	.51	.70
F	Descurainia pinnata (a)	-	b25	b27	a-	.35	.47	-
F	Eriogonum cernuum (a)	-	-	-	4	-	-	.02
F	Eriogonum sp.	4	-	-	-	-	-	-
F	Erodium cicutarium (a)	-	-	4	-	-	.03	-
F	Holosteum umbellatum (a)	-	4	-	-	.01	-	-
F	Lactuca serriola	7	-	-	-	-	-	-
F	Lappula occidentalis (a)	-	1	7	2	.00	.18	.00

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'09	'94	'99	'09
F	Medicago sativa	2	4	-	-	.00	-	-
F	Melilotus officinalis	_b 60	_a -	_a -	_a -	-	-	-
F	Penstemon sp.	_a 4	_b 22	_{ab} 13	_a -	.22	.28	-
F	Penstemon speciosus	-	-	-	4	-	-	.04
F	Plantago patagonica (a)	-	-	3	-	-	.01	-
F	Psilostrophe sparsiflora	2	-	-	-	-	-	-
F	Salsola iberica (a)	_b 76	_b 122	_a 2	_c 191	1.83	.00	2.30
F	Streptanthus cordatus	-	3	-	-	.00	-	-
F	Townsendia incana	-	1	10	-	.00	.04	-
Total for Annual Forbs		76	152	43	197	2.20	0.70	2.33
Total for Perennial Forbs		102	69	66	39	0.89	1.06	0.75
Total for Forbs		178	221	109	236	3.10	1.77	3.08

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

BROWSE TRENDS--

Management unit 15, Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'09	'94	'99	'09
B	Chrysothamnus nauseosus graveolens	3	7	8	.00	.15	1.00
B	Chrysothamnus viscidiflorus	0	1	0	-	.00	-
B	Ephedra viridis	1	0	0	.00	-	-
B	Eriogonum microthecum	20	18	11	.11	.10	.12
B	Gutierrezia sarothrae	70	93	85	1.62	5.50	3.81
B	Juniperus osteosperma	0	0	0	-	-	.15
B	Opuntia sp.	1	0	0	.03	-	-
B	Pinus edulis	0	1	1	.15	.00	.15
Total for Browse		95	120	105	1.91	5.77	5.23

CANOPY COVER, LINE INTERCEPT--

Management unit 15, Study no: 9

Species	Percent Cover '09
Chrysothamnus nauseosus graveolens	3.09
Eriogonum microthecum	.06
Gutierrezia sarothrae	3.53
Pinus edulis	.85

POINT-QUARTER TREE DATA--

Management unit 15, Study no: 9

Species	Trees per Acre	Average diameter (in)
	'09	'09
Juniperus osteosperma	28	7.1
Pinus edulis	21	2.3

BASIC COVER--

Management unit 15, Study no: 9

Cover Type	Average Cover %			
	'87	'94	'99	'09
Vegetation	2.50	23.29	21.92	15.56
Rock	3.75	4.23	4.46	6.12
Pavement	3.00	.99	1.56	3.67
Litter	47.50	31.52	29.63	30.60
Cryptogams	0	.01	.27	.06
Bare Ground	43.25	30.29	43.31	52.56

SOIL ANALYSIS DATA --

Management unit 15, Study no: 9, Study Name: Cave Flat Chaining

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.1	7.7	65.3	18.2	16.6	1.2	5.8	128	0.6

PELLET GROUP DATA--

Management unit 15, Study no: 9

Type	Quadrat Frequency			Days use per acre (ha)	
	'94	'99	'09	'99	'09
Rabbit	12	29	31	-	-
Deer	1	1	2	-	3 (8)
Bison/Cattle	-	24	7	52 (128)	9 (22)

BROWSE CHARACTERISTICS--

Management unit 15, Study no: 9

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>Chrysothamnus nauseosus graveolens</i>									
87	33	100	0	0	-	0	0	0	-/-
94	60	67	0	33	-	0	0	33	18/27
99	200	50	50	0	40	20	10	0	23/28
09	160	0	88	13	-	13	25	13	30/34
<i>Chrysothamnus viscidiflorus</i>									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	100	0	0	3/6
09	0	0	0	-	-	0	0	0	-/-
<i>Cowania mexicana stansburiana</i>									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	61/69
<i>Ephedra viridis</i>									
87	66	0	100	-	-	50	50	0	15/16
94	40	0	100	-	-	0	100	0	11/23
99	0	0	0	-	-	0	0	0	20/36
09	0	0	0	-	-	0	0	0	32/44
<i>Eriogonum microthecum</i>									
87	1432	16	81	2	133	0	0	0	7/6
94	780	18	77	5	80	15	0	3	4/7
99	860	30	53	16	160	16	12	2	3/4
09	680	0	97	3	-	0	26	0	3/5
<i>Gutierrezia sarothrae</i>									
87	2666	46	54	0	5166	0	0	0	13/16
94	7180	43	55	2	1480	0	0	2	46/39
99	21540	27	71	2	2480	2	0	.74	7/9
09	7260	8	67	25	-	0	0	24	6/7
<i>Juniperus osteosperma</i>									
87	66	50	50	-	-	0	0	0	98/47
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	20	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
87	33	0	100	-	-	0	0	0	4/4
94	20	0	100	-	-	0	0	0	3/14
99	0	0	0	-	-	0	0	0	4/11
09	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Pinus edulis</i>										
87	33	100	0	-	33	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	
<i>Shepherdia rotundifolia</i>										
87	66	100	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	6/48	
99	0	0	0	-	-	0	0	0	28/35	
09	0	0	0	-	-	0	0	0	31/47	