

BOX SPRINGS CHAINING - TREND STUDY NO. 15-6-09

Vegetation Type: Chained, Seeded P-J

Range Type: Crucial Deer Spring/Fall/Summer, Crucial Bison Year-Long

NRCS Ecological Site Description: [Upland Shallow Loam \(Pinyon-Utah Juniper\), R035XY315UT](#)

Land Ownership: SITLA

Elevation: 7,900 ft (2,408 m)

Aspect: south

Slope: 5%

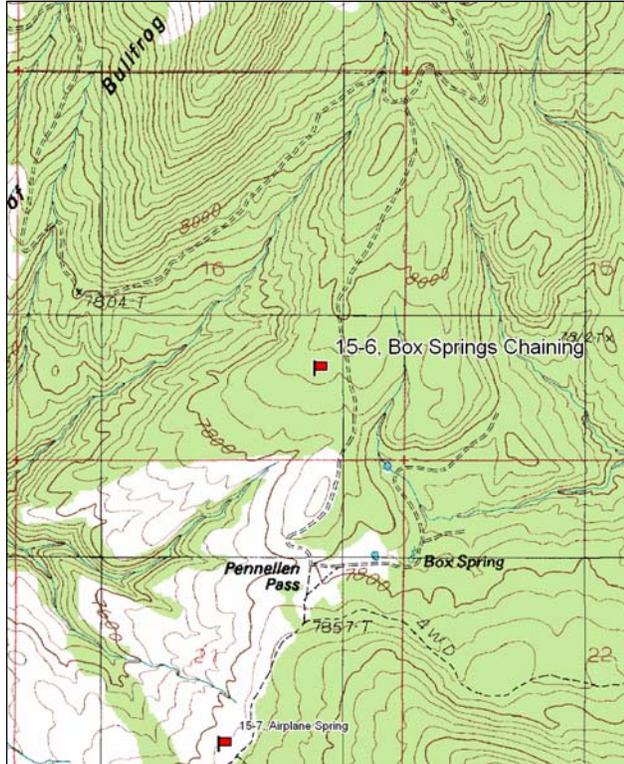
Transect bearing: 204 degrees magnetic.

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

Directions:

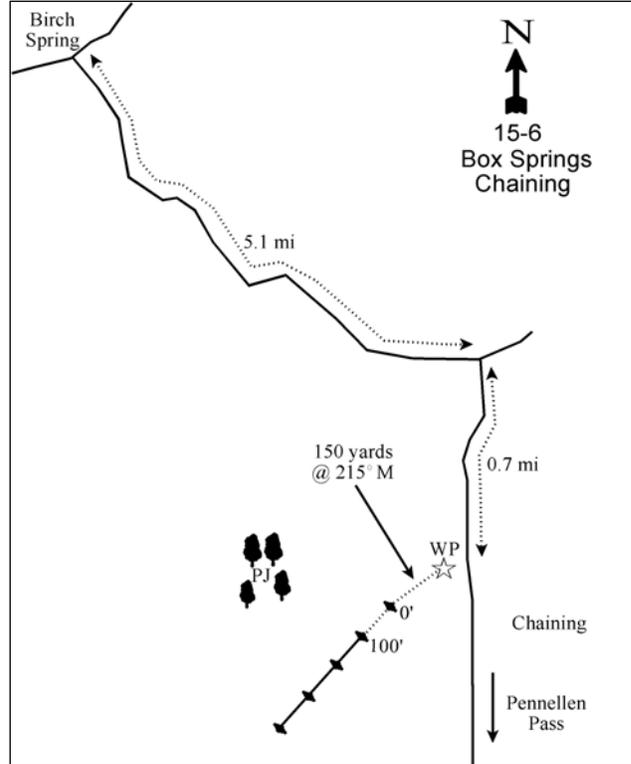
From Birch Spring (T32S, R10E, Sec. 6), proceed southeast for 5.1 miles to a major intersection. Turn right (south) towards Pennellen Pass, and go 0.7 miles. A witness post on the right side of the road marks the transect location in the chaining. The 0-foot baseline stake, a 2-foot tall fence post, is approximately 150 yards from the road and is marked by a red browse tag, #7134. This study runs approximately southwest but since it follows the line of a study established in dense P-J before the chaining.

Map Name: Mount Ellen



Township: 32S, Range: 10E, Section: 16

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 516816 E 4207948 N

BOX SPRING CHAINING - TREND STUDY NO. 15-6

Site Information

Site Description: The study monitors is located on state land that was chained and seeded in 1984. Prior to the chaining, the site supported a dense stand of tall, mature pinyon pine (*Pinus edulis*) with a few Utah juniper (*Juniperus osteosperma*). A lop and scatter retreatment was done in 2008 to remove pinyon and juniper trees that had reestablished on the site ([WRI project# 1123](#)). Water is available for livestock and wildlife at Box Springs which is located about a quarter mile southeast of the study. The state land is included within the Pennell Allotment (BLM) grazing program and is leased by the Division of Wildlife Resources. The chaining is a key use area for bison, which utilize the area mostly during the late spring and summer. Pellet data for bison and cattle were combined due to difficulties in distinguishing between species. Bison/cattle use was estimated to be heavy to moderate since 1999. Deer use was estimated to be mostly light since 1999 (Table - Pellet Group Data).

Browse: Browse species are not common on this site. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) are the preferred browse found on the site, but both are found in low densities and cover. Density of mountain big sagebrush has increased and density of bitterbrush has remained similar since 1994 (Table - Browse Characteristics). Mountain big sagebrush cover has steadily increased since 1994, but is still low. Antelope bitterbrush has consistently provided less than 1% cover in all samples (Table - Browse Trends).

Prior to the lop and scatter treatment, pinyon and juniper had begun to reestablish and were the dominant browse species on the site. After the treatment there were few pinyon or juniper trees in the sample area, though pinyon and juniper trees were common surrounding the site. The treatment reduced pinyon density from 94 trees/acre in 2004 to 15 trees/acre in 2009. Juniper density was reduced from 50 trees/acre in 2004 to 19 trees acre in 2009. Total cover of trees was reduced from 10% to 0%.

Herbaceous Understory: Three seeded species dominate the grass component on this site. Crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*A. intermedium*) and sheep fescue (*Festuca ovina*) combined have accounted for between 82% and 95% of the total grass cover in all sample years. Smooth brome (*Bromus inermis*) and orchard grass (*Dactylis glomerata*) are also common, but have decreased in frequency and cover since 1994 (Table - Herbaceous Trends). Forbs are very rare on the site.

Soil: Soil texture is a gravelly, sandy clay loam with an estimated effective rooting depth of nearly 16 inches and a neutral pH (7.3) (Table - Soil Analysis Data). Rocks and small boulders are abundant on the soil surface and throughout the upper sections of the profile. The soil surface is well protected by rock and pavement, vegetation, and litter cover (Table - Basic Cover). The soil erosion condition classification was rated as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1987 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. Preferred browse species are rare on this site. Mountain big sagebrush vigor and decadence remained good.. Antelope bitterbrush recruitment of young bitterbrush increased 33%.
- **1994 to 1999 - stable (0):** Mountain big sagebrush density is decreased to 40 plants/acre, though cover increased to over 1%. Vigor and decadence of sagebrush remained good. Antelope bitterbrush density decreased slightly, but cover increased. Recruitment of young bitterbrush plants decreased with no young plants sampled.

- **1999 to 2004 – stable (0):** Mountain big sagebrush density increased to 80 plants/acre and cover increased to 2%. and recruitment is at 25%. Antelope bitterbrush density increased slightly to 120 plants/acre. No young bitterbrush plants were sampled.
- **2004 to 2009 - slightly up (+1):** Mountain big sagebrush density increased four-fold to 320 plants/acre, and cover increased to near 3%. Recruitment of young sagebrush was good and comprised half of the population. Antelope bitterbrush density decreased 33% to 80 plants/acre. Pinyon-juniper were removed from the site by a lop and scatter treatment. Few live pinyon or juniper trees remain within the study area.

Grass:

- **1987 to 1994 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 9%. There was a significant increase in the nested frequency of sheep fescue.
- **1994 to 1999 - stable (0):** There was little change in perennial grasses on this site.
- **1999 to 2004 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 16% and cover decreased from 23% to 21%. There was a significant decrease in the nested frequency of smooth brome.
- **2004 to 2009 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 13% and cover decreased to 19%.

Forb:

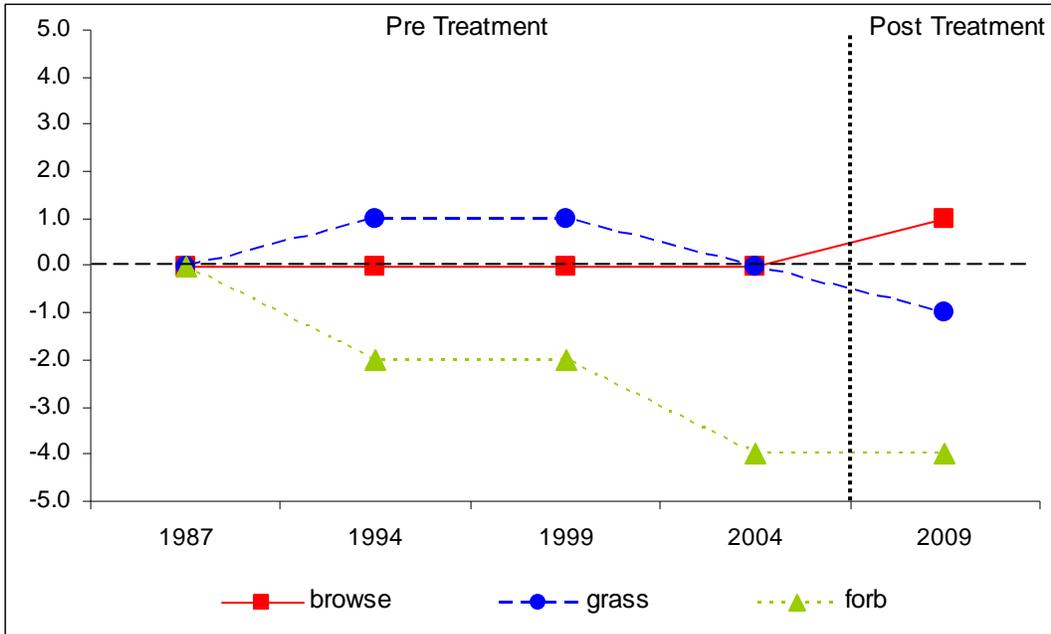
- **1987 to 1994 - down (-2):** Forbs are rare on this site. There was a large decrease in the sum of nested frequency of perennial forbs. There was a significant decrease in the nested frequency of alfalfa and small burnet.
- **1994 to 1999 - stable (0):** There was little change in perennial forbs.
- **1999 to 2004 - down (-2):** There was a large decrease in the sum of nested frequency of perennial forbs and there was no marked cover.
- **2004 to 2009 - stable (0):** There was a slight increase in the sum of nested frequency of perennial forbs, but forbs remained extremely rare.

DEER DESIRABLE COMPONENTS INDEX – MID-LEVEL POTENTIAL SCALE --
Management unit 15, study no: 6

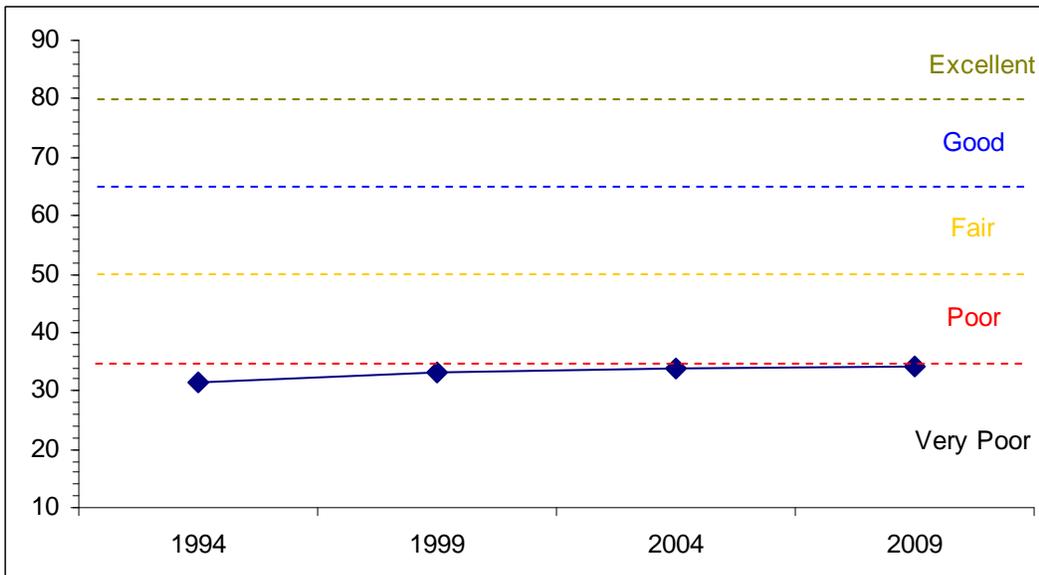
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	0.5	0	0	30	0	0.9	0	31.4	Very Poor
99	2.4	0	0	30	0	0.8	0	33.2	Very Poor-Poor
04	3.9	0	0	30	0	0	0	33.9	Very Poor-Poor
09	3.9	0	0	30	0	0.1	0	34.0	Very Poor-Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 15 Study no: 6



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
 Management unit 15, Study no: 6



HERBACEOUS TRENDS--

Management unit 15, Study no: 6

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	167	187	186	204	176	6.28	6.65	10.50	9.02
G	Agropyron intermedium	c227	c216	bc198	ab163	a120	7.56	6.84	4.85	2.50
G	Bromus inermis	b78	b94	b97	a37	a16	2.31	2.99	.72	.38
G	Dactylis glomerata	b39	a21	a10	a3	a9	1.59	.07	.15	.45
G	Elymus cinereus	-	5	6	7	17	.18	.33	.18	.43
G	Festuca ovina	a62	b101	b139	b121	b128	5.35	6.50	4.24	6.07
G	Sitanion hystrix	1	-	2	-	1	-	.00	-	.00
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		574	624	638	535	467	23.30	23.39	20.67	18.87
Total for Grasses		574	624	638	535	467	23.30	23.39	20.67	18.87
F	Arabis sp.	6	7	4	1	-	.01	.01	.00	-
F	Aster sp.	-	3	-	-	3	.00	-	-	.03
F	Astragalus cicer	1	7	6	1	-	.04	.12	.00	-
F	Chaenactis douglasii	-	6	3	-	-	.04	.06	-	-
F	Descurainia pinnata (a)	-	-	3	-	-	-	.00	-	-
F	Hymenoxys acaulis	-	1	1	-	-	.00	.00	-	-
F	Ipomopsis aggregata	-	-	3	-	-	-	.00	-	.00
F	Lappula occidentalis (a)	-	2	-	-	-	.00	-	-	-
F	Lesquerella kingii	bc19	ab8	c36	a-	b14	.01	.16	-	.03
F	Machaeranthera canescens	-	3	3	-	-	.03	.03	-	-
F	Medicago sativa	b66	a1	a1	a-	a-	.03	.00	-	-
F	Onobrychis viciaefolia	-	5	-	-	-	.09	-	-	-
F	Penstemon palmeri	1	-	-	-	-	-	-	-	-
F	Polygonum douglasii (a)	-	2	-	3	-	.00	-	.00	-
F	Sanguisorba minor	b32	a3	a1	a-	a-	.19	.00	-	-
F	Senecio multilobatus	-	-	-	-	3	-	-	-	.00
F	Tragopogon dubius	-	-	-	-	1	-	-	-	.00
Total for Annual Forbs		0	4	3	3	0	0.00	0.00	0.00	0
Total for Perennial Forbs		125	44	58	2	21	0.47	0.40	0.00	0.07
Total for Forbs		125	48	61	5	21	0.48	0.40	0.01	0.07

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

BROWSE TRENDS--

Management unit 15, Study no: 6

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia tridentata vaseyana	4	2	3	13	.18	1.28	1.97	2.63
B	Echinocereus sp.	0	1	0	0	-	.00	-	-
B	Gutierrezia sarothrae	7	7	7	8	.18	.06	.33	.01
B	Juniperus osteosperma	0	4	6	2	3.15	2.34	4.30	.00
B	Opuntia sp.	0	0	1	1	-	-	.00	.00
B	Pinus edulis	0	4	5	0	.06	1.32	2.65	-
B	Purshia tridentata	6	5	4	4	.15	.56	.93	.39
B	Sclerocactus sp.	0	0	1	0	-	-	.00	-
Total for Browse		17	23	27	28	3.73	5.58	10.19	3.05

CANOPY COVER, LINE INTERCEPT--

Management unit 15, Study no: 6

Species	Percent Cover	
	'04	'09
Artemisia tridentata vaseyana	2.01	2.65
Gutierrezia sarothrae	.40	-
Juniperus osteosperma	3.18	-
Opuntia sp.	-	.01
Pinus edulis	6.76	-
Purshia tridentata	1.01	.86

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 15, Study no: 6

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata vaseyana	2.3	1.6
Purshia tridentata	2.6	1.2

POINT-QUARTER TREE DATA--

Management unit 15, Study no: 6

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	45	50	19	3.2	5.1	1.1
Pinus edulis	82	94	15	3.5	3.4	2.2

BASIC COVER--

Management unit 15, Study no: 6

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	11.25	26.25	32.29	32.18	25.34
Rock	1.50	5.50	5.53	5.85	4.59
Pavement	.50	1.02	6.64	5.84	6.65
Litter	73.25	50.34	59.68	48.47	60.89
Cryptogams	0	0	.03	0	.01
Bare Ground	13.50	11.39	10.23	19.49	16.23

SOIL ANALYSIS DATA --

Management unit 15, Study no: 6, Study Name: Box Springs Chaining

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.8	7.3	48	23.4	28.6	3.7	13.1	137.6	1

PELLET GROUP DATA--

Management unit 15, Study no: 6

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	6	34	15	32	-	-	-
Deer	1	12	3	20	5 (13)	7 (17)	16 (40)
Bison/Cattle	7	10	4	8	53 (132)	24 (57)	36 (88)

BROWSE CHARACTERISTICS--

Management unit 15, Study no: 6

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier utahensis									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	12/19
Artemisia tridentata vaseyana									
87	0	0	0	-	-	0	0	0	-/-
94	80	0	100	-	-	0	0	0	18/20
99	40	0	100	-	-	50	0	0	25/33
04	80	25	75	-	20	25	0	0	33/48
09	320	50	50	-	-	6	0	0	24/38

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Chrysothamnus nauseosus graveolens										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	40/18	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	61/58	
09	0	0	0	-	-	0	0	0	66/47	
Echinocereus sp.										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
Gutierrezia sarothrae										
87	99	0	100	0	-	0	0	0	10/6	
94	800	40	60	0	20	0	0	0	7/8	
99	620	29	52	19	120	0	0	19	4/5	
04	640	0	97	3	-	0	0	0	7/9	
09	700	49	51	0	60	0	0	0	5/5	
Juniperus osteosperma										
87	66	100	0	-	33	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	80	75	25	-	-	0	0	0	-/-	
04	120	17	83	-	-	0	0	0	-/-	
09	40	0	100	-	-	0	0	50	-/-	
Opuntia sp.										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	0	100	-	-	0	0	0	3/8	
09	60	0	100	-	-	0	0	0	4/16	
Pinus edulis										
87	232	86	14	-	33	0	0	0	169/79	
94	0	0	0	-	-	0	0	0	-/-	
99	80	50	50	-	20	0	0	0	-/-	
04	100	20	80	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
Purshia tridentata										
87	0	0	0	0	266	0	0	0	-/-	
94	120	33	67	0	-	67	0	0	4/9	
99	100	0	100	0	-	0	80	0	4/17	
04	120	0	50	50	-	0	33	0	6/23	
09	80	0	100	0	-	0	75	0	9/26	

		Age class distribution			Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Sclerocactus sp.									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	1/2
09	0	0	0	-	-	0	0	0	1/2