

Trend Study 15-6-04

Study site name: Box Springs Chaining.

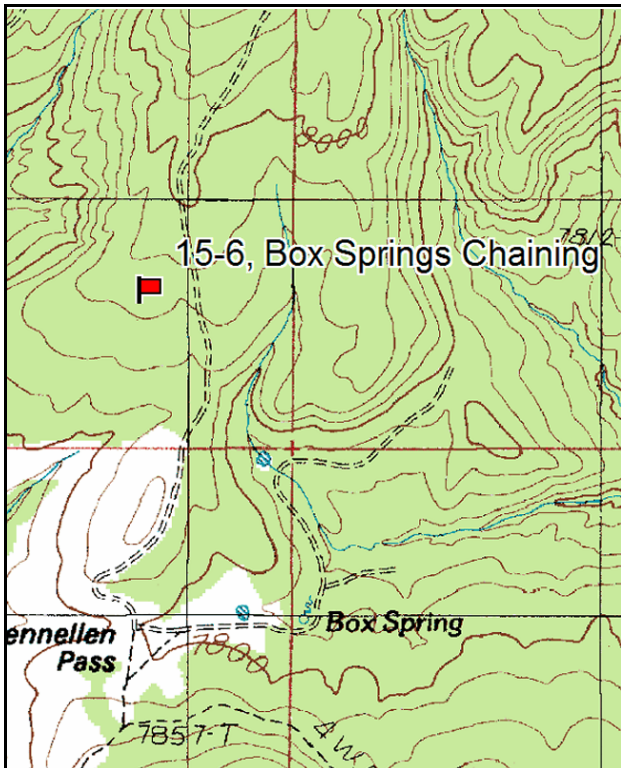
Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 204 degrees magnetic.

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

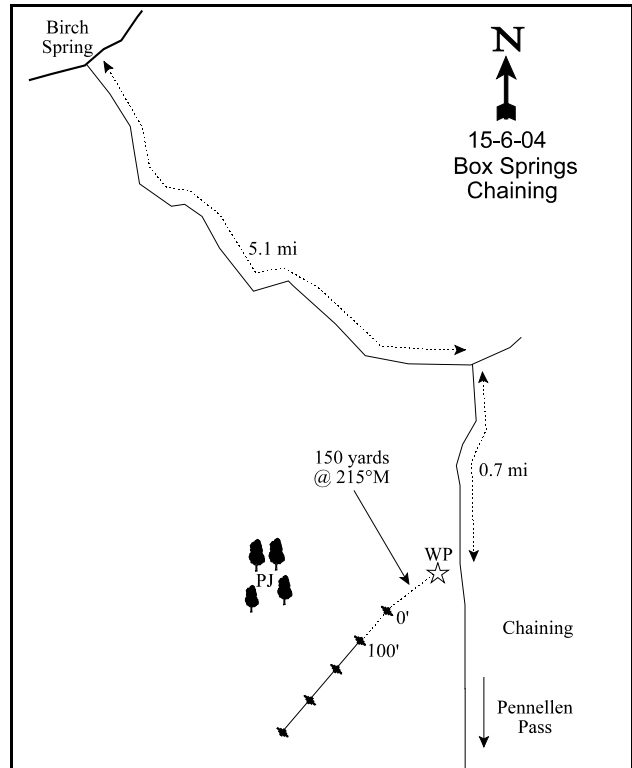
LOCATION DESCRIPTION

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 27, UTM 12S 4207744 N, 516879 E

DISCUSSION

Box Springs Chaining - Trend Study No. 15-6

The Box Springs Chaining study monitors range trend on state land that was chained and seeded in 1984. Prior to the chaining, the site supported a dense stand of tall, mature pinyon with a few juniper. The site elevation is 7,900 feet which slopes gently to the south. Water is available for livestock and wildlife at Box Springs which is located about one-fourth 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 buffalo, which utilize the area mostly during the late spring and summer. A road crosses the chaining and is about one-fourth mile from the study site. Human use is light, with the exception of deer and buffalo hunts, and occasional use made by sightseers and livestock permittees. Pellet group data collected in 1999 indicated light use by wildlife and moderate use by livestock. This data showed 5 deer days use/acre (13 ddu/ha) and 38 cow days use/acre (95 cdu/ha). Buffalo use was estimated at 15 buffalo days use/acre (37 bdu/ha). Nearly all of the cow pats were from the last fall, while the deer and buffalo are mostly from the spring and winter. In 2004, the pellet group data showed 7 deer days use/acre (17 ddu/ha) and only 4 cow days use/acre (9 cdu/ha). The lower use by cows is probably reflective of the drought. Buffalo use was similar to previous use at 20 buffalo days use/acre (48 bdu/ha).

Soil texture is a gravelly, sandy clay loam with a neutral pH (7.3). Rocks and small boulders are abundant on the soil surface and throughout the upper 2 decimeters of the profile. The soil is fairly deep with an estimated effective rooting depth of nearly 16 inches. The soil surface is well protected by rock, vegetation, and litter cover. There is a slight decrease in relative cover for bare soil in 1999, coupled with an increase in pavement. In 2004, there was a moderate increase in relative percent bare soil. There is evidence of light erosion with surface soil movement and minor pedestaling being noted around bunch grasses. The ratio of protective ground cover to bare soil had decreased by 2004.

Pinyon and juniper not removed by the chaining treatment were estimated at 233 and 100 trees per acre, respectively during the 1987 reading. Point-quarter data from the 1994 and 1999 readings give a much better estimate with a significantly larger sample size. The densities for pinyon and juniper were on average estimated at 78 and 45 trees/acre respectively in both 1994 and 1999. Point-quarter data from 2004 indicates a noticeable increase in pinyon density at 94 trees/acre and slight increase in juniper at 50 trees/acre. Basal diameter of pinyon was estimated at 3.5 inches in 1999 and 3.4 in 2004. Juniper was just over three inches in 1999 and increased to 5 inches by 2004. Thirty-nine percent of the juniper and 10% of the pinyon sampled in 1999 were knocked-down trees from the chaining. Pinyon and juniper provided 66% of the browse cover in 1999 and 68% in 2004. Canopy cover for pinyon and juniper was 10% in 2004. At this level tree dominance begins to negatively effect the herbaceous understory (Tausch and West 1994). This area would be a good one to use thinning measures on, probably thinning by utilizing chainsaws.

Broom snakeweed had an estimated density of 800 plants/acre in 1994, which decreased to 620 plants/acre in 1999, and 640 plants/acre in 2004. Cover is low and this species appears to be stable with a mostly mature age class. Bitterbrush planted by seed dribblers during the chaining, initially established at 266 seedlings/acre in 1987. By 1994, there was an estimated 120 mature bitterbrush plants/acre and density has remained stable since. Utilization has varied from light to heavy, yet vigor has been good. There is no apparent recruitment for bitterbrush, with no seedling or young plants being sampled since 1994. These plants have a decumbent growth form. Mountain big sagebrush is also present on the site, but infrequent. Density has been stable, but cover had increased to nearly 2% by 2004. Height and crown measurements have increased from 25 x 33 inches in 1999 to 33 x 48 inches in 2004.

Intermediate wheatgrass, Fairway crested wheatgrass, and sheep fescue are the predominant seeded grasses. Utilization was light on these species when the site was read in June 1999. By 2004, the effects of the drought

were showing its effects. Both intermediate wheatgrass and sheep fescue decreased substantially in cover and nested frequency, while the more drought tolerant crested wheatgrass increased in cover and nested frequency. However, overall total cover from grasses decreased slightly from 23.4% to 20.7%. Other less abundant seeded grasses include: smooth brome, orchard grass, and Great Basin wildrye. Alfalfa was the most abundant forb in 1987 with a quadrat frequency of 31%. This alfalfa is a rhizomatous variety and was expected to increase on this site, but with drought conditions and heavy use was not found on the site in 2004. Small burnet, another seeded forb, was also fairly common during the 1987 reading, but was found very infrequently in subsequent readings and not at all in 2004.

1994 TREND ASSESSMENT

Due to the gentle terrain and abundant herbaceous vegetation, erosion is not a problem on this site. Ground cover characteristics in 1994 are similar to those of 1987 indicating a stable soil trend. Shrubs are not an important aspect on this site, for it should be noted that all together, they only contribute a little more than 10% of the total vegetative cover. Broom snakeweed is the most abundant shrub on the site, but its numbers are still low at 800 plants/acre with a biotic potential of only about 3%. An estimated 120 young and mature antelope bitterbrush were found growing on the site. Trend for preferred browse is stable, but insignificant. The herbaceous understory is abundant, making up 87% of the vegetative cover. The composition has changed however, as sum nested frequencies of grasses have increased while those of forbs have declined by 63%. Seeded forbs, alfalfa and small burnet, which used to be the dominant forbs on the chaining, have declined significantly. Combined nested frequencies of grasses and forbs have declined slightly indicating a stable to slightly declining trend with the continuing drought.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

winter range condition (DC index) - 31 (v. poor) Mountain big sagebrush/chaining type, this rated poorly because of the lack of a preferred shrub component

1999 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics to 1994. The proportion of protective ground cover to bare ground remains sufficient to minimize erosion. Browse trend for bitterbrush is stable even with mostly heavy use and lack of recruitment. This is because there are no decadent plants or plants with poor vigor, and it is a relatively long-lived species. The key species (preferred) all together, only make up one-third of the browse cover, and total browse cover only makes up less than 20% of the total vegetative cover. The majority of the browse cover on this site is actually contributed by pinyon and juniper. Herbaceous understory trend is stable. Intermediate, crested wheatgrass, and sheep fescue have remained at similar levels to the previous reading. Perennial grass sum of nested frequency slightly increased in 1999. Sum of nested frequency for forbs also increased, although the forbs are insignificant on this site with the loss of the two preferred species, alfalfa and small burnet. Total forb cover is less than one percent.

TREND ASSESSMENT

soil- stable (3)

browse - stable (3)

herbaceous understory - stable (3)

winter range condition (DC index) - 34 (v. poor) Mountain big sagebrush/chaining type, this rated poorly because of the lack of a preferred shrub component

2004 TREND ASSESSMENT

Trend for soil is slightly downward at this time because of the large increase in relative cover for bare soil. It has increased by 90% since 1999 (9% to 17%). The ratio of protective ground cover to bare soil has also decreased from 3.2:1 to 2.7:1. Browse trend for bitterbrush and mountain big sagebrush remains stable, even with lack of recruitment for bitterbrush. There are no decadent plants or plants with poor vigor, and these shrubs are long-lived species. The preferred browse all together, only make up about one-third of the browse cover. The majority of the browse cover on this site is actually contributed by pinyon and juniper which now makes up 68% of the browse cover. Pinyon-juniper now have cover of 10%, which can negatively effect the understory species. It would be a good idea to plan a thinning treatment with chainsaws, before the herbaceous understory in negatively affected. Herbaceous understory trend is slightly down with the drought. Intermediate wheatgrass and sheep fescue have decreased in abundance with noticeably smaller nested frequency values. Crested wheatgrass has increased in cover during this drought. Perennial grass sum of nested frequency has slightly decreased since 2004. Sum of nested frequency for forbs has basically crashed because of the drought, but was not very high during earlier readings. Total forb cover is less than one-tenth of one percent.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - slightly down (2)

winter range condition (DC index) - 53 (fair) Mountain big sagebrush/chaining type, this is rated higher because of the increase in the preferred shrub component even though there was a slight loss in herbaceous cover since 1999.

HERBACEOUS TRENDS --

Management unit 15 , Study no: 6

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
G	Agropyron cristatum	167	187	186	204	6.28	6.65	10.50
G	Agropyron intermedium	_b 227	_b 216	_{ab} 198	_a 163	7.56	6.84	4.85
G	Bromus inermis	_b 78	_b 94	_b 97	_a 37	2.31	2.99	.72
G	Dactylis glomerata	_b 39	_a 21	_a 10	_a 3	1.59	.07	.15
G	Elymus cinereus	-	5	6	7	.18	.33	.18
G	Festuca ovina	_a 62	_b 101	_b 139	_b 121	5.35	6.50	4.24
G	Sitanion hystrix	1	-	2	-	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		574	624	638	535	23.30	23.39	20.67
Total for Grasses		574	624	638	535	23.30	23.39	20.67
F	Arabis spp.	6	7	4	1	.01	.01	.00
F	Astragalus cicer	1	7	6	1	.04	.12	.00
F	Aster spp.	-	3	-	-	.00	-	-
F	Chaenactis douglasii	-	6	3	-	.04	.06	-
F	Descurainia pinnata (a)	-	-	3	-	-	.00	-

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
F	Hymenoxys acaulis	-	1	1	-	.00	.00	-
F	Ipomopsis aggregata	-	-	3	-	-	.00	-
F	Lappula occidentalis (a)	-	2	-	-	.00	-	-
F	Lesquerella kingii	_{bc} 19	_{ab} 8	_c 36	_a -	.01	.16	-
F	Machaeranthera canescens	-	3	3	-	.03	.03	-
F	Medicago sativa	_b 66	_a 1	_a 1	_a -	.03	.00	-
F	Onobrychis viciaefolia	-	5	-	-	.09	-	-
F	Penstemon palmeri	1	-	-	-	-	-	-
F	Polygonum douglasii (a)	-	2	-	3	.00	-	.00
F	Sanguisorba minor	_b 32	_a 3	_a 1	_a -	.19	.00	-
Total for Annual Forbs		0	4	3	3	0.00	0.00	0.00
Total for Perennial Forbs		125	44	58	2	0.47	0.40	0.00
Total for Forbs		125	48	61	5	0.48	0.40	0.01

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

BROWSE TRENDS --

Management unit 15 , Study no: 6

T y p e	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Artemisia tridentata vaseyana	4	2	3	.18	1.28	1.97
B	Echinocereus spp.	0	1	0	-	.00	-
B	Gutierrezia sarothrae	7	7	7	.18	.06	.33
B	Juniperus osteosperma	0	4	6	3.15	2.34	4.30
B	Opuntia spp.	0	0	1	-	-	-
B	Pinus edulis	0	4	5	.06	1.32	2.65
B	Purshia tridentata	6	5	4	.15	.56	.93
B	Sclerocactus	0	0	1	-	-	-
Total for Browse		17	23	27	3.73	5.58	10.19

CANOPY COVER, LINE INTERCEPT --
Management unit 15 , Study no: 6

Species	Percent Cover
	'04
Artemisia tridentata vaseyana	2.01
Gutierrezia sarothrae	.40
Juniperus osteosperma	3.18
Pinus edulis	6.76
Purshia tridentata	1.01

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 15 , Study no: 6

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

POINT-QUARTER TREE DATA --
Management unit 15 , Study no: 6

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

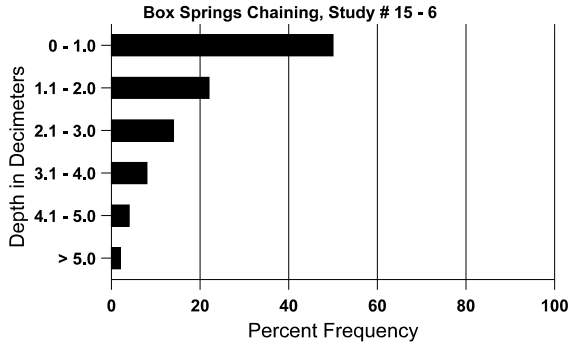
BASIC COVER --
Management unit 15 , Study no: 6

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

SOIL ANALYSIS DATA --
Management unit 15, Study no: 6, Study Name: Box Springs Chaining

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
15.8	48.0 (16.4)	7.3	48.0	23.4	28.6	3.7	13.1	137.6	1.0

Stoniness Index



PELLET GROUP DATA --

Management unit 15 , Study no: 6

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	6	34	15
Deer	1	12	3
Cattle	-	6	1
Buffalo	7	4	3

Days use per acre (ha)	
'99	'04
-	-
5 (13)	7 (17)
38 (95)	4 (9)
15 (37)	20 (48)

BROWSE CHARACTERISTICS --

Management unit 15 , Study no: 6

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata vaseyana</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	80	-	-	80	-	-	0	0	-	-	0	18/20
99	40	-	-	40	-	-	50	0	-	-	0	25/33
04	80	20	20	60	-	-	25	0	-	-	0	33/48
<i>Chrysothamnus nauseosus graveolens</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	40/18
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	0	-	-	-	-	-	0	0	-	-	0	61/58
<i>Echinocereus spp.</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	20	-	20	-	-	-	0	0	-	-	0	-/-
04	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)
<i>Gutierrezia sarothrae</i>												
87	100	-	-	100	-	-	0	0	0	-	0	10/6
94	800	20	320	480	-	-	0	0	0	-	0	7/8
99	620	120	180	320	120	20	0	0	19	19	19	4/5
04	640	-	-	620	20	-	0	0	3	-	0	7/9
<i>Juniperus osteosperma</i>												
87	66	33	66	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	80	-	60	20	-	-	0	0	-	-	0	-/-
04	120	-	20	100	-	-	0	0	-	-	0	-/-
<i>Opuntia spp.</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	40	-	-	40	-	-	0	0	-	-	0	3/8
<i>Pinus edulis</i>												
87	233	33	200	33	-	-	0	0	-	-	0	169/79
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	80	20	40	40	-	-	0	0	-	-	0	-/-
04	100	-	20	80	-	20	0	0	-	-	0	-/-
<i>Purshia tridentata</i>												
87	0	266	-	-	-	-	0	0	0	-	0	-/-
94	120	-	40	80	-	-	67	0	0	-	0	4/9
99	100	-	-	100	-	-	0	80	0	-	0	4/17
04	120	-	-	60	60	-	0	33	50	-	0	6/23
<i>Sclerocactus</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	20	-	-	20	-	-	0	0	-	-	0	1/2