

Trend Study 30-52-08

Study site name: Northwest of Enterprise.

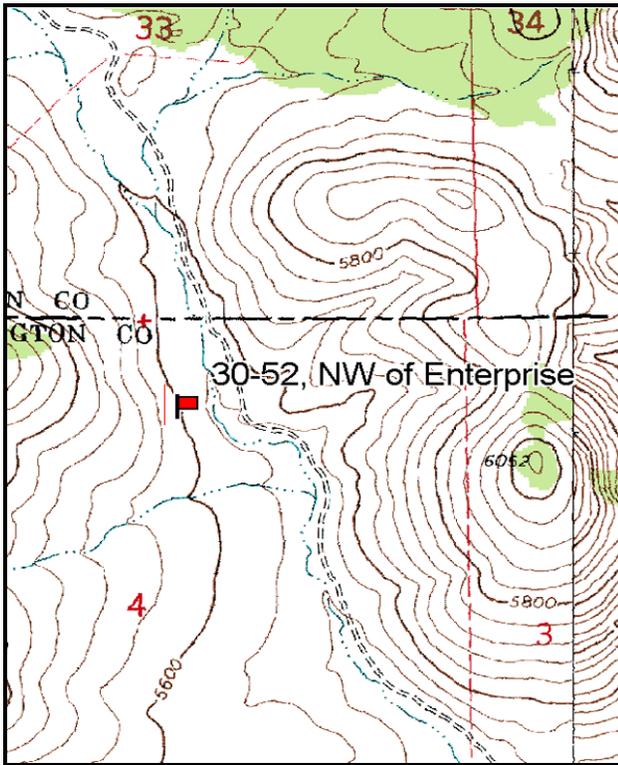
Vegetation type: Burn-Seeding.

Compass bearing: frequency baseline 245 degrees magnetic. (Line 2-4, 289°M)

Frequency belt placement: line 1 (8 & 94ft), line 2 (37ft), line 3 (51ft), line 4 (63ft).

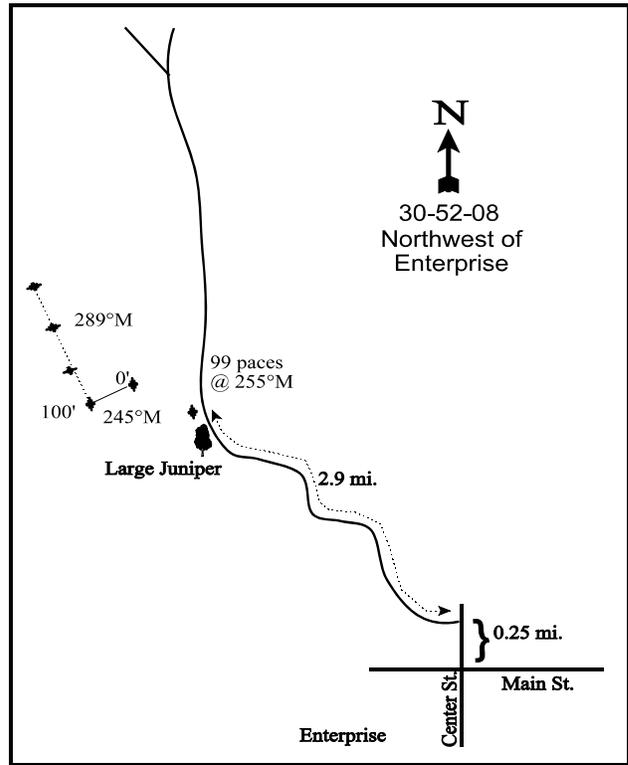
LOCATION DESCRIPTION

Starting from the town of Enterprise, turn north on 2<sup>nd</sup> West and pass over a bridge. From the bridge, drive 0.6 miles to just past 375 West and turn right on Old Modena Road right before the fire hydrant. From there, travel 2.3 miles. Stop where the road makes a turn to the north. On the left side of the road, before the bend, are a few junipers. Past the junipers is a witness post on the left side of the road. From the witness post the 0-foot baseline stake is 99 paces at 260 degrees magnetic, marked with browse tag #223.. The study is marked by green steel "T" fence posts approximately 12 to 18 inches in height.



Map Name: Hebron

Township 37S, Range 17W, Section 4



Diagrammatic Sketch

GPS: NAD 83, UTM 12S 256166 E, 4165270 N

## DISCUSSION

### Northwest of Enterprise - Trend Study No. 30-52

#### Study Information

This trend study is located on critical deer winter range northwest of the town of Enterprise [elevation: 5,600 feet (1,707 m), slope: 25%, aspect: northeast]. The vegetation type is Wyoming big sagebrush-grass. Little sign of deer was noted in 1992. Pellet group data from 1998 estimated 40 deer and 2 cow days use/acre (99 ddu/ha and 5 cdu/ha). The site burned prior to the 2003 reading which eliminated all the browse in the entire area. The lower, flatter terrain was chained after seed was flown on. Deer still use the area and pellet group data from 2003 estimated 23 deer days use/acre (56 ddu/ha). Cattle had used the site sometime in 2002 at an estimated 12 days use/acre (30 cdu/ha) but had not yet used the site in 2003. The 2008 pellet group data estimated 8 deer days use/acre (20 ddu/ha) and 17 cow days use/acre (43 cdu/ha).

#### Soil

Soils are moderately deep but rocky on the surface and within the profile. Effective rooting depth is estimated at about 19 inches. Rock and erosion pavement are abundant on the surface, making up nearly 40% cover in 2003. The upper part of the site is very rocky as soil has moved down slope. There are signs of past erosion in the form of soil pedestalling and terracing of the slope, but current litter and vegetation cover seem to be sufficient to hold the soil in place. The soil erosion condition was classified as stable in 2008.

#### Browse

The key browse species prior to the fire was Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). The sight supported an over mature stand of sagebrush, which has steadily declined in density from 6,733 plants/acre in 1982 to 2,660 by 1998. Utilization was moderate to heavy in 1982 and 1992, but more light to moderate in 1998. Decadence increased from 23% in 1982 to 48% in 1998. Vigor was good that year, yet reproduction was poor with dead plants nearly as numerous as mature plants (1,180 live vs 1,160 dead plants/acre). The wildfire prior to the 2003 reading eliminated all of the sagebrush in the area.

Cliffrose (*Cowania mexicana stansburiana*) provided some additional forage with an estimated 380 plants/acre in 1998. It had received moderate to heavy use, yet vigor was normal and reproduction was good. The only other browse species of significance was broom snakeweed (*Gutierrezia sarothrae*). Juniper trees (*Juniperus osteosperma*) were scattered throughout the site. Point-quarter data from 1998 estimated 20 trees/acre with an average basal diameter of 8 inches. Overhead canopy cover averaged 8%. Wildfire eliminated nearly all of the shrubs on the site. Burned juniper trees on the more level terrain were chained and seeded. The only shrubs left in 2003 were a few resprouting ephedra (*Ephedra viridis*), some broom snakeweed, and a good stand of seeded prostrate kochia (*Kochia prostrata*) which numbered 3,200 plants/acre in 2003. That has since increased to 17,580 plants/acre in 2008. Some kochia was moderately and heavily browsed in 2003 and 2008.

#### Herbaceous Understory

Perennial grasses were abundant and diverse with mutton bluegrass (*Poa fendleriana*) and Sandberg bluegrass (*P. secunda*) being the most common grass species prior to the fire. Annual cheatgrass (*Bromus tectorum*) was also present, providing 17% of the grass cover in 1998. Forbs were fairly diverse, yet no species was common. The 12 annual and perennial forbs encountered in 1998 provided less than 1% total cover. The most common species included deervetch (*Lotus plebius*), longleaf phlox (*Phlox longifolia*), and a milkvetch

(*Astragalus sp.*). In 2003, the herbaceous composition was dominated by perennial grasses, but western wheatgrass (*Agropyron smithii*) and galleta (*Hilaria jamesii*) provided most of the grass cover (75%). Sandberg bluegrass was also common in 2003. Annual cheatgrass was present but not nearly as abundant as it was in 1998. Forbs were still lacking and produced only about 1% total cover in 2003. By 2008, cheatgrass had taken over, representing 74% of grass cover and 67% of total vegetation cover, and the nested frequency of cheatgrass increased five-fold. Perennial grasses still provide 8% cover with western wheatgrass and galleta. Gooseberryleaf globemallow (*Sphaeralcea grossulariifolia*) was the only fairly common species in 2003. Deervetch was the most common forb in 2008 but provided less than 1% cover.

#### 1992 TREND ASSESSMENT

The key browse species, Wyoming big sagebrush, has no recruitment, density has declined by 42%, and decadence has increased. On the positive side, vigor has improved. Broom snakeweed had declined in density by 34%. Overall, the browse trend is down. Quadrat frequencies for grasses are down slightly, while forbs have increased. Combined, summed quadrat frequencies of forbs and grasses have remained constant since the previous reading.

browse - down (-2)                      grasses - slightly down (-1)                      forbs - stable (0)

#### 1998 TREND ASSESSMENT

Trend for browse is slightly down. Differences in density of browse species may be related to the larger sample area used in 1998; therefore, trend for browse was determined using other parameters. Wyoming big sagebrush decadence has remained high (48%), and reproduction is not sufficient to maintain the population. Cliffrose is found on the site in small numbers. Cliffrose reproduction is good. Trend for the herbaceous understory is up for perennial grasses, but stable for forbs which only make up only 4% of the herbaceous cover. Sum of nested frequency for perennial grasses has increased dramatically with a significant increase in the frequency of mutton and Sandberg bluegrass.

Winter range condition (DCI) - fair-good (46) low potential scale  
browse - slightly down (-1)                      grasses - up (+2)                      forbs - stable (0)

#### 2003 TREND ASSESSMENT

This site burned prior to the 2003 reading which eliminated all of the sagebrush on this site. Trend for browse is down due to the elimination of Wyoming big sagebrush and cliffrose from the site. A good stand of seeded prostrate kochia has established at an estimated density of 3,100 plants/acre. Some of these plants displayed moderate to heavy use in 2003. Trend for the grasses is down due to a decline in the sum of nested frequency for perennial grasses. Perennial grasses still dominate the composition with western wheatgrass, galleta, and Sandberg bluegrass providing most of the grass cover. Some seeded crested wheatgrass has established on the site. Trend for forbs is stable. Forbs are still lacking with only gooseberryleaf globemallow being fairly common.

Winter range condition (DCI) - poor-fair (26) low potential scale  
browse - down (-2)                      grasses - down (-2)                      forbs - stable (0)

2008 TREND ASSESSMENT

Browse trend is up, recovering from a fire. Kochia is now the dominant browse species representing 98% of browse cover and 14% of total cover. Kochia density has increased 467% to 17,580 plants/acre with no decadence. Broom snakeweed is the only other browse species on the site but occurs at low levels, 160 plants/acre. The herbaceous understory has become dominated once again by cheatgrass which now accounts for 74% of all grass cover and 67% of all vegetation cover with a significant increase in nested frequency. Perennial grass nested frequency declined from 379 to 334 (a 12% decrease) while cover declined 26%. Blue grama and western wheatgrass still account for 88% of perennial cover. Forbs still occur at a low frequency and provide little cover but have increased somewhat from 2003. Deer vetch is the principal perennial species although it occurs at low levels.

Winter range condition (DCI) - very poor (4) low potential scale

browse - up (+2)

grasses - down (-2)

forbs - slightly up (+1)

HERBACEOUS TRENDS --

Management unit 30 , Study no: 52

T y p e	Species					Average Cover %		
		'92	'98	'03	'08	'98	'03	'08
G	Agropyron cristatum	a-	a-	b18	b15	-	.27	.38
G	Agropyron smithii	ab68	a44	bc91	c118	.55	3.40	3.11
G	Agropyron spicatum	-	-	3	-	-	.15	-
G	Bromus tectorum (a)	-	b261	a56	c358	3.09	.16	24.34
G	Hilaria jamesii	a55	ab81	bc124	c148	1.78	5.25	4.22
G	Koeleria cristata	2	2	-	-	.03	-	-
G	Oryzopsis hymenoides	11	1	6	3	.00	.16	.15
G	Poa fendleriana	b60	c101	a-	a-	5.88	-	-
G	Poa secunda	a41	c215	b132	a29	5.57	2.00	.31
G	Sitanion hystrix	b54	b54	a5	a21	.92	.03	.15
G	Unknown grass - perennial	3	-	-	-	-	-	-
G	Vulpia octoflora (a)	-	c67	b12	a-	.30	.02	-
Total for Annual Grasses		0	328	68	358	3.40	0.18	24.34
Total for Perennial Grasses		294	498	379	334	14.76	11.28	8.34
Total for Grasses		294	826	447	692	18.17	11.46	32.68
F	Allium sp.	-	-	8	-	-	.01	-
F	Antennaria rosea	-	3	-	-	.03	-	-
F	Astragalus sp.	5	11	-	2	.19	-	.00
F	Calochortus nuttallii	a3	ab16	ab9	b17	.03	.02	.05
F	Cirsium sp.	-	-	-	3	-	-	.01
F	Collinsia parviflora (a)	-	b18	a-	b26	.04	-	.06

Type	Species					Average Cover %		
		'92	'98	'03	'08	'98	'03	'08
F	<i>Crepis acuminata</i>	-	-	2	2	-	.03	.03
F	<i>Cymopterus</i> sp.	-	6	1	4	.07	.03	.06
F	<i>Draba</i> sp. (a)	-	<sub>b</sub> 20	<sub>a</sub> -	<sub>a</sub> -	.05	-	-
F	<i>Erigeron pumilus</i>	-	1	-	1	.03	-	.00
F	<i>Eriogonum umbellatum</i>	2	-	-	-	-	-	-
F	<i>Helianthus annuus</i> (a)	-	-	2	4	-	.00	.01
F	<i>Lappula occidentalis</i> (a)	-	-	-	3	-	-	.00
F	<i>Lactuca serriola</i>	-	-	-	1	-	-	.00
F	<i>Lithospermum</i> sp.	-	-	-	-	-	.00	-
F	<i>Lotus plebeius</i>	<sub>c</sub> 94	<sub>b</sub> 39	<sub>a</sub> 1	<sub>ab</sub> 24	.18	.00	.91
F	<i>Lupinus</i> sp. (a)	-	-	-	4	-	-	.01
F	<i>Machaeranthera canescens</i>	3	-	-	-	-	-	-
F	<i>Microsteris gracilis</i> (a)	-	<sub>b</sub> 25	<sub>a</sub> -	<sub>b</sub> 23	.05	-	.06
F	<i>Phlox longifolia</i>	<sub>ab</sub> 15	<sub>b</sub> 32	<sub>a</sub> 13	<sub>a</sub> 1	.11	.08	.00
F	<i>Plantago patagonica</i> (a)	-	4	-	-	.01	-	-
F	<i>Sisymbrium altissimum</i> (a)	-	2	-	8	.00	-	.05
F	<i>Sphaeralcea grossulariifolia</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>c</sub> 34	<sub>b</sub> 9	-	.71	.03
F	<i>Tragopogon dubius</i>	-	-	-	4	-	-	.06
F	<i>Trifolium</i> sp.	-	-	-	1	-	-	.03
F	Unknown forb-annual (a)	-	-	2	-	-	.03	-
Total for Annual Forbs		0	69	4	68	0.16	0.04	0.20
Total for Perennial Forbs		122	108	68	69	0.65	0.90	1.21
Total for Forbs		122	177	72	137	0.81	0.94	1.42

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

BROWSE TRENDS --

Management unit 30 , Study no: 52

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	Amelanchier utahensis	1	0	0	.00	-	-
B	Artemisia tridentata wyomingensis	76	0	0	9.16	-	-
B	Chrysothamnus nauseosus	0	0	0	.38	-	-
B	Chrysothamnus viscidiflorus	14	0	0	.51	-	-
B	Cowania mexicana stansburiana	12	0	0	.49	-	-
B	Ephedra viridis	0	1	0	-	.00	-
B	Gutierrezia sarothrae	54	46	7	1.14	.65	.05
B	Juniperus osteosperma	2	0	0	5.09	-	-
B	Kochia prostrata	0	36	54	-	.98	2.33
B	Polygala subspinosa	0	0	2	-	-	.00
B	Purshia tridentata	1	0	0	.00	-	-
Total for Browse		160	83	63	16.79	1.64	2.38

CANOPY COVER, LINE INTERCEPT --

Management unit 30 , Study no: 52

Species	Percent Cover		
	'98	'03	'08
Gutierrezia sarothrae	-	.35	.01
Juniperus osteosperma	8.39	-	-
Kochia prostrata	-	2.13	1.70

BASIC COVER --

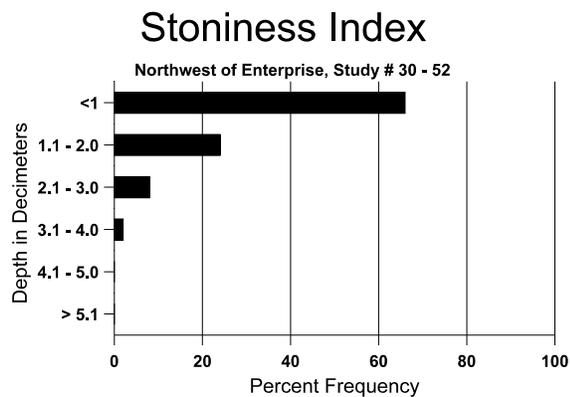
Management unit 30 , Study no: 52

Cover Type	Average Cover %				
	'82	'92	'98	'03	'08
Vegetation	1.50	4.25	38.27	14.06	39.98
Rock	20.25	30.50	36.20	35.83	31.52
Pavement	6.25	10.75	6.67	3.94	1.70
Litter	56.75	45.75	38.02	38.18	45.84
Cryptogams	2.25	.75	2.40	.03	.16
Bare Ground	13.00	7.50	13.41	16.97	2.40

SOIL ANALYSIS DATA --

Management unit 30, Study no: 52, Study Name: Northwest of Enterprise

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
4.8	48.0 (17.7)	6.6	32.6	45.2	22.2	2.7	25.9	732.8	0.5



PELLET GROUP DATA --

Management unit 30 , Study no: 52

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	10	18	44
Horse	1	-	-
Deer	16	12	12
Cattle	-	4	14

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	-	-
40 (99)	23 (56)	12 (20)
2 (5)	12 (30)	17 (43)

BROWSE CHARACTERISTICS --

Management unit 30 , Study no: 52

		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)
Amelanchier utahensis												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	0	-	0	-/-
98	20	-	-	-	20	-	0	0	100	-	0	-/-
03	0	-	-	-	-	-	0	0	0	-	0	-/-
08	0	-	-	-	-	-	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>Artemisia tridentata wyomingensis</i>												
82	<b>6731</b>	-	599	4599	1533	-	33	23	23	7	24	22/23
92	<b>3931</b>	-	199	1799	1933	-	61	14	49	-	2	24/24
98	<b>2660</b>	40	200	1180	1280	1160	23	0	48	20	20	19/28
03	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	0	-	0	18/21
<i>Chrysothamnus viscidiflorus</i>												
82	<b>66</b>	-	-	66	-	-	0	0	0	-	0	4/7
92	<b>66</b>	-	-	66	-	-	0	0	0	-	0	11/14
98	<b>800</b>	-	220	560	20	-	0	0	3	-	0	11/18
03	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
<i>Cowania mexicana stansburiana</i>												
82	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
92	<b>133</b>	-	133	-	-	-	0	0	-	-	0	-/-
98	<b>380</b>	80	120	260	-	-	26	47	-	-	0	31/25
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Ephedra viridis</i>												
82	<b>133</b>	-	-	133	-	-	50	0	0	-	0	11/6
92	<b>199</b>	-	199	-	-	-	33	0	0	-	0	-/-
98	<b>0</b>	-	-	-	-	-	0	0	0	-	0	32/51
03	<b>40</b>	-	20	-	20	-	0	100	50	-	0	17/12
08	<b>0</b>	-	-	-	-	-	0	0	0	-	0	8/13
<i>Gutierrezia sarothrae</i>												
82	<b>8265</b>	-	533	6599	1133	-	0	0	14	2	6	8/11
92	<b>5466</b>	66	-	5466	-	-	0	0	0	-	0	11/10
98	<b>4060</b>	80	540	3380	140	40	0	0	3	2	2	6/8
03	<b>1740</b>	20	380	680	680	640	5	5	39	26	28	4/7
08	<b>160</b>	340	-	120	40	-	0	0	25	-	0	7/9
<i>Juniperus osteosperma</i>												
82	<b>66</b>	-	-	66	-	-	0	0	-	-	0	67/131
92	<b>0</b>	66	-	-	-	-	0	0	-	-	0	-/-
98	<b>40</b>	-	-	40	-	-	0	0	-	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	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)
<b>Kochia prostrata</b>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	3100	-	1040	2060	-	-	27	4	-	-	0	8/11
08	17580	1600	3520	14060	-	-	42	24	-	-	0	6/7
<b>Leptodactylon pungens</b>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	4/5
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<b>Opuntia sp.</b>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	4/20
<b>Polygala subspinosa</b>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	40	-	-	40	-	-	50	0	-	-	0	3/5
<b>Purshia tridentata</b>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	20	-	-	20	-	-	100	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	6/13