

Trend Study 23R-3-08

Study site name: Plateau Harrow .

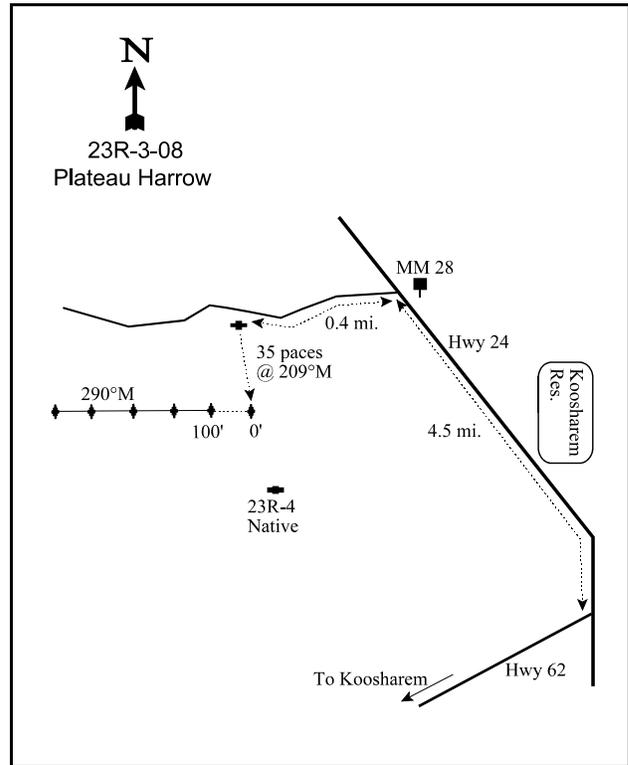
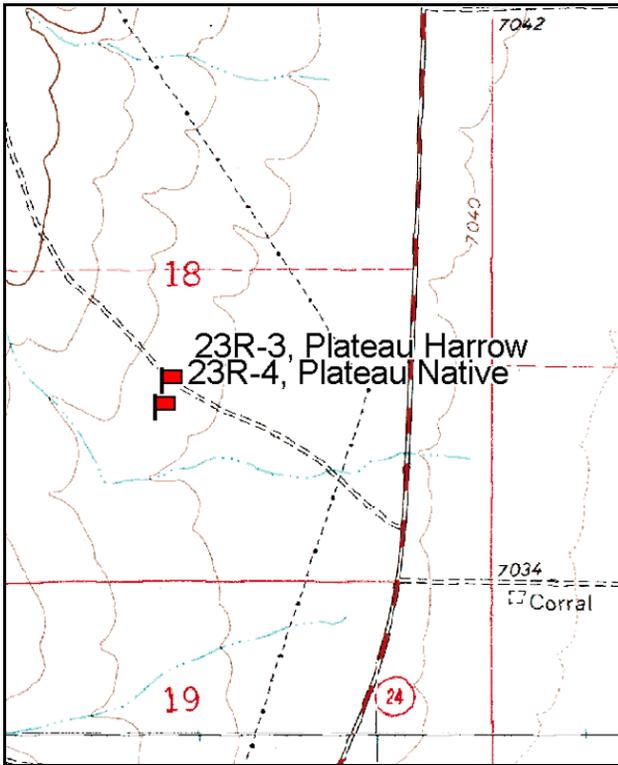
Vegetation type: Perennial Grass .

Compass bearing: frequency baseline 290 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

Start at highway 62 and highway 24 in Koosharem. Drive north on Hwy 24 for 4.5 miles to mile marker 28. Near mile marker 28, turn on to a road going west. Travel 0.4 mile to the witness on the left side of the road. From the witness post, walk 35 paces at 209 degrees magnetic to the 0' stake.



Map name: Boobe Hole Reservoir

Diagrammatic Sketch

Township 25S, Range 1E, Section 18

GPS: NAD 83, UTM 12S 426873 E 4276341 N

DISCUSSION

Plateau Harrow - Trend Study No. 23R-3

Study Information

This study was established in 1999 to monitor a seeding and 2-way harrow treatment of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) on private land. It is located approximately 5 miles (8 km) north of Koosharem Reservoir and approximately 0.5 miles (0.8 km) west of Highway 62 [elevation: 7,100 feet (2,164 m), slope: 5%, aspect: southeast]. Another study (Plateau Native, 23R-4) was placed in a nearby, untreated area and was sampled in 1999 and 2003 as a comparison, but was suspended in 2008. The area serves as high-elevation winter and spring/summer range for deer and elk. Local biologists stated that deer have been regularly hit by cars during past winters, and that deer and elk had been seen on the study in winter 1998. Pellet group transect data estimated deer use at 2 days use/acre (5 ddu/ha) in 1999, and 4 days use/acre (10 ddu/ha) in 2003 and 2008. Elk use was estimated at 3 days use/acre (7 edu/ha) in 1999 and 2003, but was not sampled in 2008. Cattle use was estimated at 21 days use/acre (52 cdu/ha) in 2008, but did not appear to be recent. The land owner has also grazed sheep on the area, but it has been rested from sheep grazing since the treatment was completed.

Soil

The soil is a sandy loam with a neutral reaction (pH 7.1). Relative combined vegetation and litter cover increased from 62% in 1999 to 75% in 2008. There is little rock on the soil surface, and relative pavement cover has ranged from 8% to 19% since 1999. Relative bare ground cover has been 10%-22% since 1999. The soil erosion condition was classified as stable in 2003 and 2008.

Browse

Prior to the harrow treatment, the study was dominated by a thick stand of Wyoming big sagebrush, which provided the only preferred browse. The treatment was intended to kill approximately 80% of the sagebrush. Sagebrush density on the untreated comparison study ranged between 1,920 plants/acre and 2,000 plants/acre in 1999 and 2003, while density on the treated study ranged from 700 plants/acre to 840 plants/acre since 1999. Quadrat cover was 17% in 1999 and 22% in 2003 on the untreated study, and increased from 4% in 1999 to 7% in 2008 on the treated study. Therefore, the treatment reduced sagebrush density approximately 60%, and cover approximately 80%. The sagebrush that remained on the treated study increased in population decadence, from 7% in 1999 to 31% in 2008. Young recruitment fluctuated from 5% of the population to 9%. Plants displaying poor vigor increased from 5% of the population in 1999 to 24% in 2008. Browse use was mostly light in 1999 and 2003, and light-moderate in 2008. Annual leader growth averaged 1.7 inches (4.2 cm) in 2003 and 0.8 inches (2.1 cm) in 2008.

Herbaceous Understory

Total grass cover was 17% in 1999, 23% in 2003, and 18% in 2008. Needle-and-thread (*Stipa comata*) is the most abundant perennial grass, and provided 42% of the total grass cover in 1999 and 83%-84% in 2003 and 2008. Indian ricegrass (*Oryzopsis hymenoides*), bluebunch wheatgrass (*Agropyron spicatum*), and bottlebrush squirreltail (*Sitanion hystrix*) were also sampled each year, but provided little cover. Cheatgrass (*Bromus tectorum*) provided 9% cover, but its cover decreased to 1% in 2003 and 2008.

Forbs are diverse and abundant, providing 11% cover in 1999, 8% in 2003, and 5% in 2008. The most common forbs include western stoneseed (*Lithospermum ruderale*), silvery lupine (*Lupinus argenteus*), and Utah deervetch (*Lotus utahensis*). Pale alyssum (*Alyssum alyssoides*) is the only annual forb that has been sampled. It provided 2% cover in 1999, but has provided little since. Seeded species, including Lewis flax (*Linum lewisii*), yellow sweetclover (*Melilotus officinalis*), alfalfa (*Medicago sativa*), sainfoin (*Onobrychis viciaefolia*), and small burnet (*Sanguisorba minor*), were sampled in 1999, but provided little cover.

1999 DESIRABLE COMPONENTS INDEX

The 1999 winter range condition, determined by the Desirable Components Index (DCI), was rated as poor-fair due to low preferred browse cover, moderate perennial grass cover, and high perennial forb cover.

winter range condition (DCI) - poor-fair (25) Low potential scale

2003 TREND ASSESSMENT

The browse trend is stable. Sagebrush density decreased 17%, and decadence increased from 7% of the population to 17%. Young recruitment increased, however, from 5% of the population to 9%. Vigor remained good on most plants. The trend for grass is up. The sum of nested frequency for perennial grasses increased 63%. Needle-and-thread increased significantly in nested frequency, while that for bluebunch wheatgrass and cheatgrass decreased significantly. Cheatgrass quadrat frequency decreased from 96% to 45%. The trend for forbs is down. The sum of nested frequency for perennial forbs decreased 58%. Utah deervetch and silvery lupine decreased significantly in nested frequency. Additionally, all of the seeded forbs that were sampled in 1999 were not sampled in 2003. The DCI rating improved to fair-good due to an increase in perennial grass cover and a decrease in cheatgrass cover.

winter range condition (DCI) - fair-good (45) Low potential scale
browse - stable (0) grass - up (+2) forb - down (-2)

2008 TREND ASSESSMENT

The browse trend is slightly up. Sagebrush density increased 20%, however, decadence also increased from 17% of the population to 31%. However, sagebrush line intercept cover increased from 5% in 2003 to 9%. Young recruitment decreased from 9% of the population to 5%. Plants displaying poor vigor increased from 9% of the population to 24%. The trend for grass is stable. The sum of nested frequency for perennial grasses remained similar to 2003. Cheatgrass increased significantly in nested frequency, and quadrat frequency increased from 45% to 88%. However, cheatgrass cover remained low at 1%. The trend for forbs is slightly up. The sum of nested frequency for perennial forbs increased slightly. Cryptantha (*Cryptantha sp.*) increased significantly in nested frequency. Lewis flax and yellow sweetclover were sampled, although they provided little cover. The DCI rating continued to improve to good due to increased preferred browse cover.

winter range condition (DCI) - good (56) Low potential scale
browse - slightly up (+1) grass - stable (0) forb - slightly up (+1)

HERBACEOUS TRENDS --
 Management unit 23R, Study no: 3

T y p e	Species	Nested Frequency			Average Cover %		
		'99	'03	'08	'99	'03	'08
G	Agropyron spicatum	_b 35	_a 11	_a 4	.87	.48	.15
G	Bromus tectorum (a)	_c 389	_a 126	_b 282	8.64	1.36	1.48
G	Carex sp.	-	-	3	-	-	.00
G	Oryzopsis hymenoides	6	13	12	.24	1.14	.62
G	Sitanion hystrix	8	26	13	.04	.47	.11
G	Stipa columbiana	-	-	4	-	-	.15
G	Stipa comata	_a 165	_b 276	_b 286	7.05	19.36	15.03

Type	Species	Nested Frequency			Average Cover %		
		'99	'03	'08	'99	'03	'08
G	<i>Stipa lettermani</i>	a-	b ²²	b ²⁵	-	.44	.27
Total for Annual Grasses		389	126	282	8.64	1.36	1.48
Total for Perennial Grasses		214	348	347	8.21	21.90	16.34
Total for Grasses		603	474	629	16.85	23.26	17.82
F	<i>Alyssum alyssoides</i> (a)	c ²³⁷	a-	b ¹²⁹	1.51	-	.31
F	<i>Astragalus convallarius</i>	6	3	9	.04	.09	.22
F	<i>Astragalus</i> sp.	-	-	1	-	-	.00
F	<i>Astragalus utahensis</i>	-	-	1	-	-	.00
F	<i>Cryptantha</i> sp.	ab ⁵	a-	b ⁹	.18	.00	.05
F	<i>Eriogonum racemosum</i>	14	12	16	.17	.11	.13
F	<i>Eriogonum umbellatum</i>	3	-	-	.00	-	-
F	<i>Ipomopsis aggregata</i>	1	-	1	.00	-	.00
F	<i>Linum lewisii</i>	3	-	-	.00	-	.00
F	<i>Lithospermum ruderales</i>	43	41	46	3.42	4.54	3.11
F	<i>Lotus utahensis</i>	b ⁶¹	a ⁵	a ⁵	1.25	.24	.04
F	<i>Lupinus argenteus</i>	23	15	10	4.44	3.11	1.46
F	<i>Melilotus officinalis</i>	1	-	1	.00	-	.00
F	<i>Medicago sativa</i>	7	-	-	.02	-	-
F	<i>Onobrychis viciaefolia</i>	11	-	-	.04	-	-
F	<i>Phlox longifolia</i>	-	3	3	-	.00	.01
F	<i>Sanguisorba minor</i>	9	-	-	.09	-	-
F	<i>Sphaeralcea grossulariifolia</i>	1	-	-	.00	-	.00
F	<i>Streptanthus cordatus</i>	-	2	3	-	.00	.00
F	<i>Tragopogon dubius</i>	3	-	-	.00	-	-
Total for Annual Forbs		237	0	129	1.51	0	0.31
Total for Perennial Forbs		191	81	105	9.72	8.12	5.07
Total for Forbs		428	81	234	11.23	8.12	5.39

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

BROWSE TRENDS --

Management unit 23R, Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'99	'03	'08	'99	'03	'08
		B	Artemisia tridentata wyomingensis	28	27	28	3.71
B	Leptodactylon pungens	0	1	1	-	.00	.00
B	Opuntia sp.	3	4	7	.00	.03	.04
Total for Browse		31	32	36	3.71	4.63	7.20

CANOPY COVER, LINE INTERCEPT --

Management unit 23R, Study no: 3

Species	Percent Cover	
	'03	'08
Artemisia tridentata wyomingensis	4.96	9.10
Leptodactylon pungens	-	.13
Opuntia sp.	.06	.40

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 23R, Study no: 3

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata wyomingensis	1.7	0.8

BASIC COVER --

Management unit 23R, Study no: 3

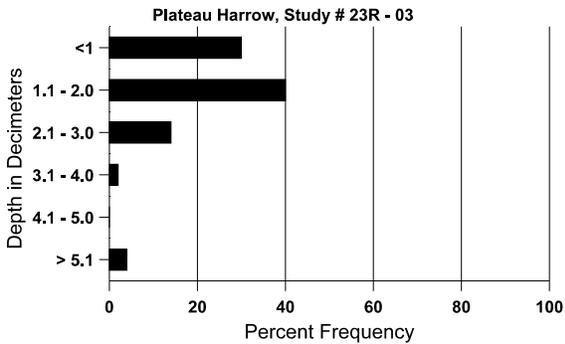
Cover Type	Average Cover %		
	'99	'03	'08
Vegetation	35.65	35.26	34.48
Rock	.58	1.15	.22
Pavement	15.69	20.71	9.61
Litter	29.06	41.16	51.57
Cryptogams	.01	0	.00
Bare Ground	22.47	10.45	19.85

SOIL ANALYSIS DATA --

Management unit 23R, Study no: 3, Study Name: Plateau Harrow

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
13.5	68.0 (10.9)	7.1	63.6	19.8	16.6	1.6	10.9	198.4	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 23R, Study no: 3

Type	Quadrat Frequency		
	'99	'03	'08
Rabbit	12	84	60
Elk	1	1	-
Deer	-	-	1
Cattle	-	-	14

Days use per acre (ha)		
'99	'03	'08
-	-	-
3 (7)	3 (7)	-
2 (5)	4 (10)	4 (10)
-	-	21 (52)

BROWSE CHARACTERISTICS --
 Management unit 23R, Study no: 3

		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)
Amelanchier utahensis												
99	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	9/12
08	0	-	-	-	-	-	0	0	-	-	0	17/22
Artemisia tridentata wyomingensis												
99	840	-	40	740	60	460	7	0	7	5	5	21/33
03	700	20	60	520	120	20	6	0	17	6	9	21/29
08	840	-	40	540	260	320	40	0	31	17	24	24/41
Leptodactylon pungens												
99	0	-	-	-	-	-	0	0	0	-	0	-/-
03	20	-	-	20	-	-	0	0	0	-	0	5/9
08	40	-	-	20	20	-	0	0	50	-	0	8/13
Opuntia sp.												
99	80	-	40	20	20	-	0	0	25	25	25	4/13
03	100	-	-	100	-	-	0	0	0	-	0	5/12
08	220	-	-	200	20	-	0	0	9	9	9	4/14
Symphoricarpos oreophilus												
99	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	17/24
08	0	-	-	-	-	-	0	0	-	-	0	21/51