Trend Study 23-3-08

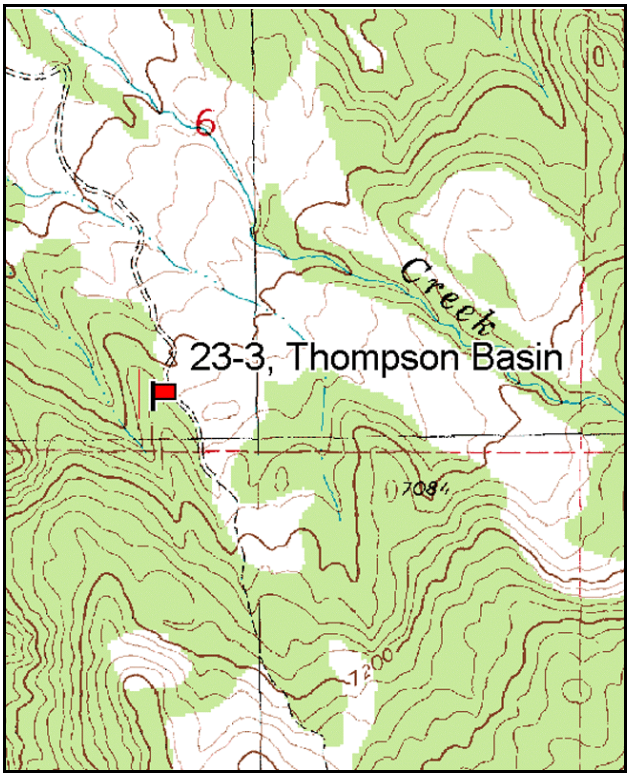
Study site name: Thompson Basin . Vegetation type: Juniper-Pinyon .

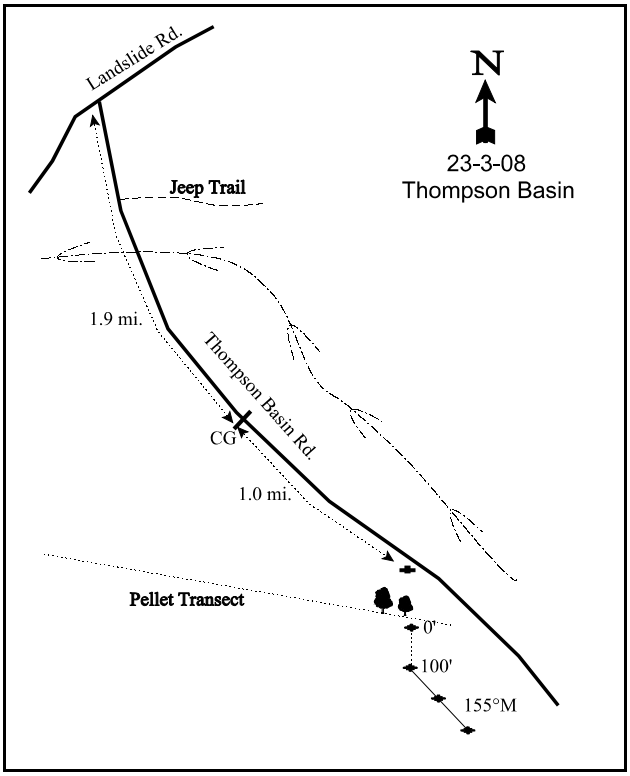
Compass bearing: frequency baseline 155 degrees magnetic. (Lines 2 & 3 155°M)

Frequency belt placement: line 1 (11 & 95ft), line 2 (34 & 71ft), line 3 (59ft). No rebar.

LOCATION DESCRIPTION

From the Monroe City cemetery, go 3.05 miles north and east to a gravel road on the right. Turn here and go 1.0 miles to the Thompson Basin Road. Turn right and proceed 1.9 miles to a cattleguard. Continue 1.0 mile up the road and stop. There is a witness post on the right side of the road. Fifty feet up the hill, there should be a juniper with the center trunk cut out. The 0-foot baseline stake is on the other side of this tree, approximately 60 feet from the road. The 0-foot stake is a 3/4" rebar tagged #7041.





Map Name: Monroe

Diagrammatic Sketch

Township 25S , Range 2W , Section 6

GPS: NAD 83, UTM 12S 407744 E, 4279268 N

DISCUSSION

Thompson Basin - Trend Study No. 23-3

Study Information

This study is located on a moderately steep slope above Thompson Basin [elevation: 6,880 feet (2,097 m), slope: 25%, aspect: northeast]. An area below the transect was chained approximately 25 years ago by the US Forest Service. A fire also burned through the area approximately 30 years ago. Thompson Basin has been noted historically as a concentration area for deer during the winter. A DWR pellet group transect, which intersects the trend study, indicated a 5-year average of 32 deer days use/acre (80 ddu/ha) between 1980 and 1985 (Jense et al. 1985). The 6-year average from 1986 to 1991 was 9 deer days use/acre (21 ddu/ha) (Jense et al. 1991). A pellet group transect sampled along the study baseline estimated deer use at 21 days use/acre (52 ddu/ha) in 1998, 26 days use/acre (65 ddu/ha) in 2003, and 20 days use/acre (50 ddu/ha) in 2008. Elk use was estimated at 12 days use/acre (30 edu/ha) in 1998, 9 days use/acre (23 edu/ha) in 2003, and 15 days use/acre (38 edu/ha) in 2008. Cattle use was estimated at 1 day use/acre (2 cdu/ha) in 2008. In the past, the area was heavily grazed by sheep, however, the Forest Service has closed the area to livestock grazing to protect watershed values.

Soil

The soil is a sandy clay loam with a neutral reaction (pH 6.6). Relative combined vegetation and litter cover decreased from 62% in 1998 to 49% in 2003 and 2008, while relative combined rock and pavement cover remained rather stable at 31%-36%. Relative bare ground cover increased from 7% in 1998 to 19% by 2008. The erosion condition class was rated as stable in 2003 and moderate in 2008 due to surface rock, litter, and soil movement, as well as the formation of pedestals and flow patterns. There are a few large, active gullies on the hillside and in the valley.

Browse

Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) is the only abundant source of preferred browse, although true mountain mahogany (*Cercocarpus montanus*) and Mormon tea (*Ephedra viridis*) are present in low densities. Sagebrush quadrat cover has remained stable at 4%-5% since 1998. Density decreased from 1,000 plants/acre in 1998 and 2003 to 840 plants/acre in 2008. Decadence has been high in all sample years at 30%-55% of the population. Young recruitment increased slightly from less than 10% of the population before 2003 to 14% in 2008. Plants displaying poor vigor increased from 0% of the population in 1985 to 32% in 1991, decreased to 10% in 1998, then increased to 29% by 2008. Browse use has been mostly light-moderate in all sample years. Annual leader growth averaged 1.5 inches (3.8 cm) in 2003 and 0.7 inches (1.9 cm) in 2008.

Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) combined canopy cover was 23% in 1998, 34% in 2003, and 27% in 2008. Point-centered quarter data estimated pinyon density at 72 trees/acre in 1998 and 63 trees/acre in 2003 and 2008. Average trunk diameter was 4.2 inches (10.7 cm) in 1998 and approximately 5 inches (12.7 cm) in 2003 and 2008. Juniper density was 99 trees/acre in 1998, 97 trees/acre in 2003, and 104 trees/acre in 2008. Trunk diameter averaged 9.9 inches (25.1 cm) in 1998, 8.4 inches (21.4 cm) in 2003, and 9.6 inches (24.3 cm) in 2008.

Herbaceous Understory

Total grass cover was 12% in 1998, 6% in 2003, and 7% in 2008. Perennial grasses dominate the understory. Bluebunch wheatgrass (*Agropyron spicatum*), mutton bluegrass (*Poa fendleriana*), and Sandberg bluegrass (*Poa secunda*) combined provided 94%-98% of the total grass cover since 1998. Bottlebrush squirreltail (*Sitanion hystrix*) and Indian ricegrass (*Oryzopsis hymenoides*) were also present but less frequent. Cheatgrass (*Bromus tectorum*) was sampled in less than 25% of the quadrats since 1998, and provided little cover.

Forbs are sparse and provided 1%-3% cover since 1998. Desert phlox (*Phlox austromontana*) provided the majority of the forb cover. Longleaf phlox (*Phlox longifolia*), rockcress (*Arabis sp*.), and tansymustard (*Descurainia pinnata*) were also relatively abundant.

1991 TREND ASSESSMENT

The browse trend is slightly down. Sagebrush density decreased from 1,599 plants/acre to 1,466 plants/acre, and decadence increased from 33% of the population to 55%. Young recruitment remained stable at 9% of the population. Plants exhibiting poor vigor increased from 0% of the population to 32%. The trend for grass is up. The sum of nested frequency for perennial grasses increased substantially. Bluebunch wheatgrass, Sandberg bluegrass, mutton bluegrass, and bottlebrush squirreltail increased significantly in nested frequency. The trend for forbs is up. The sum of nested frequency for perennial forbs greatly increased. Desert phlox increased significantly in nested frequency.

browse - slightly down (-1) grass - up (+2) forb - up (+2)

1998 TREND ASSESSMENT

The browse trend is stable. Browse density changes may have been related to the larger sample area in 1998, therefore, the trend was determined using other parameters. Sagebrush decadence remained high, although it decreased from 55% of the population to 30%. Young recruitment decreased slightly from 9% of the population to 6%. Plants displaying poor vigor decreased from 32% of the population to 10%. The trend for grass is down. The sum of nested frequency for perennial grasses decreased 27%. Bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail decreased significantly in nested frequency. The trend for forbs is down. The sum of nested frequency for perennial forbs decreased 52%. Longleaf phlox decreased significantly in nested frequency. The winter range condition, determined by the Desirable Components Index (DCI), was rated as very poor due to low preferred browse and perennial forb cover, despite moderate perennial grass cover.

winter range condition (DCI) - very poor (31) Mid-level potential scale
browse - stable (0) grass - down (-2) forb - down (-2)

2003 TREND ASSESSMENT

The browse trend is stable. Sagebrush density remained similar to 1998 at 1,000 plants/acre. However, decadence increased from 30% of the population to 42%. Young recruitment also slightly increased from 6% of the population to 10%. Plants displaying poor vigor increased from 10% of the population to 24%. The trend for grass is slightly down. The sum of nested frequency for perennial grasses decreased 17%. Mutton bluegrass decreased significantly in nested frequency, and that for Sandberg bluegrass increased significantly. The trend for forbs is stable. The sum of nested frequency for perennial forbs increased slightly. The DCI rating remained very poor.

winter range condition (DCI) - very poor (20) Mid-level potential scale
browse - stable (0) grass - slightly down (-1) forb - stable (0)

2008 TREND ASSESSMENT

The browse trend is slightly down. Sagebrush density decreased 16%, and decadence remained high at 40% of the population. Young recruitment increased slightly from 10% of the population to 14%. Plants displaying poor vigor continued to increase, from 24% of the population to 29%. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little. Mutton bluegrass increased significantly in nested frequency, while that for Sandberg bluegrass decreased significantly. The trend for forbs is stable. The sum of nested frequency for perennial forbs decreased slightly. Tansymustard decreased significantly in nested frequency. The DCI rating remained very poor.

winter range condition (DCI) - very poor (19) Mid-level potential scale
browse - slightly down (-1) grass - stable (0) forb - stable (0)

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

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
G	Agropyron spicatum	$_{a}$41	$_{c}$203	$_{b}$124	$_{b}$151	$_{b}$143	4.71	2.65	4.00
G	Bromus tectorum (a)	-	-	36	44	55	.19	.18	.33
G	Oryzopsis hymenoides	-	-	-	2	-	-	.03	.01
G	Poa fendleriana	$_{a}$41	$_{c}$128	$_{c}$162	$_{a}$7	$_{b}$70	6.05	.04	1.47
G	Poa secunda	$_{a}$17	$_{c}$138	$_{b}$85	$_{c}$148	$_{b}$88	1.00	2.59	.57
G	Sitanion hystrix	$_{a}$4	$_{b}$43	$_{a}$1	$_{a}$1	$_{a}$14	.00	.00	.11
Total for Annual Grasses		0	0	36	44	55	0.18	0.18	0.33
Total for Perennial Grasses		103	512	372	309	315	11.77	5.31	6.17
Total for Grasses		103	512	408	353	370	11.96	5.50	6.50
F	Antennaria rosea	1	3	-	-	1	-	-	.03
F	Arabis sp.	-	17	8	11	8	.02	.07	.02
F	Castilleja chromosa	-	8	-	-	-	-	-	-
F	Collinsia parviflora (a)	-	-	-	51	-	-	.21	-
F	Crepis acuminata	-	5	-	-	-	-	-	-
F	Descurainia pinnata (a)	-	-	$_{a}$-	$_{b}$92	$_{a}$12	-	.75	.03
F	Draba sp. (a)	-	-	-	5	-	-	.02	-
F	Erigeron eatonii	-	3	3	-	-	.00	-	-
F	Erigeron pumilus	3	6	-	-	-	-	-	-
F	Eriogonum racemosum	3	1	3	-	-	.03	-	-
F	Gilia sp. (a)	-	-	-	1	-	-	.00	-
F	Holosteum umbellatum (a)	-	-	$_{a}$-	$_{b}$14	$_{a}$-	-	.03	.00
F	Machaeranthera canescens	5	-	-	-	-	-	-	-
F	Phlox austromontana	$_{a}$12	$_{b}$52	$_{b}$56	$_{b}$63	$_{b}$50	1.24	1.70	1.09
F	Phlox longifolia	$_{a}$-	$_{c}$59	$_{a}$3	$_{b}$15	$_{b}$17	.01	.07	.04
F	Streptanthus cordatus	-	-	1	1	1	.00	.00	.00
Total for Annual Forbs		0	0	0	163	12	0	1.02	0.04
Total for Perennial Forbs		24	154	74	90	77	1.31	1.84	1.20
Total for Forbs		24	154	74	253	89	1.31	2.87	1.24

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

BROWSE TRENDS --
Management unit 23 , Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	Artemisia tridentata vaseyana	40	35	29	4.21	4.77	3.73
B	Chrysothamnus viscidiflorus stenophyllus	0	0	1	-	.00	0.0
B	Gutierrezia sarothrae	0	1	0	-	.00	-
B	Juniperus osteosperma	10	10	12	8.44	12.06	4.61
B	Opuntia sp.	12	14	17	.06	.04	.45
B	Pinus edulis	4	5	5	4.00	6.38	2.02
Total for Browse		66	65	64	16.72	23.27	10.82

CANOPY COVER, LINE INTERCEPT --
Management unit 23 , Study no: 3

Species	Percent Cover		
	'98	'03	'08
Artemisia tridentata vaseyana	-	4.26	4.15
Juniperus osteosperma	16.79	25.36	19.20
Opuntia sp.	-	.03	.16
Pinus edulis	6.00	8.44	8.16

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 23 , Study no: 3

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata vaseyana	1.5	0.7

POINT-QUARTER TREE DATA --
Management unit 23 , Study no: 3

Species	Trees per Acre		
	'98	'03	'08
Juniperus osteosperma	99	97	104
Pinus edulis	72	63	63

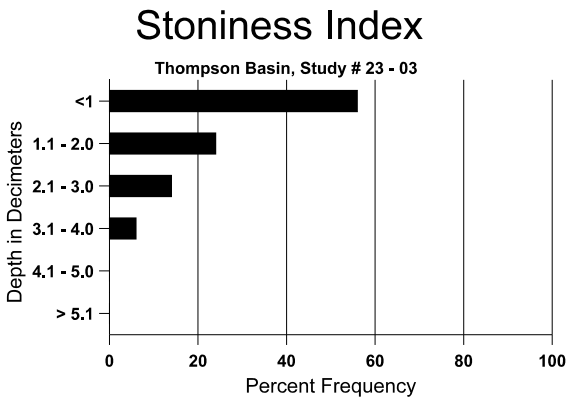
Average diameter (in)		
'98	'03	'08
9.9	8.4	9.6
4.2	5.3	4.8

BASIC COVER --
Management unit 23 , Study no: 3

Cover Type	Average Cover %				
	'85	'91	'98	'03	'08
Vegetation	2.75	6.00	33.60	29.34	18.60
Rock	29.00	24.25	21.23	28.35	22.82
Pavement	18.00	14.25	17.47	14.74	14.09
Litter	38.00	35.50	42.68	30.02	39.34
Cryptogams	1.50	.75	.14	.28	.20
Bare Ground	10.75	19.25	8.38	17.11	22.46

SOIL ANALYSIS DATA --
Management unit 23, Study no: 3, Study Name: Thompson Basin

Effective rooting depth (in)	Temp °F (depth)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
12.7	74.7 (9.6)	6.6	54.0	19.4	26.6	2.0	10.5	166.4	0.8



PELLET GROUP DATA --
Management unit 23 , Study no: 3

Type	Quadrat Frequency		
	'98	'03	'08
Sheep	2	-	-
Rabbit	23	21	39
Elk	4	1	4
Deer	12	8	20
Cattle	-	-	-

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	-	-
11 (27)	9 (23)	15 (38)
21 (52)	26 (64)	20 (50)
-	-	1 (2)

BROWSE CHARACTERISTICS --
Management unit 23 , 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)
Artemisia tridentata vaseyana												
85	**1599**	-	133	933	533	-	46	8	33	-	0	11/21
91	**1465**	-	133	533	799	-	50	18	55	7	32	14/22
98	**1000**	60	60	640	300	720	14	0	30	4	10	20/29
03	**1000**	-	100	480	420	280	12	6	42	24	24	20/28
08	**840**	-	120	380	340	260	14	12	40	26	29	21/33
Cercocarpus montanus												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	-	0	22/33
08	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Chrysothamnus viscidiflorus stenophyllus												
85	**266**	-	-	133	133	-	25	0	50	-	0	11/14
91	**265**	-	-	199	66	-	25	0	25	8	25	11/14
98	**0**	-	-	-	-	-	0	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	0	-	0	8/10
08	**20**	-	20	-	-	-	0	0	0	-	0	13/20
Ephedra viridis												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	-	0	12/22
03	**0**	-	-	-	-	-	0	0	-	-	0	11/9
08	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Gutierrezia sarothrae												
85	**0**	-	-	-	-	-	0	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	0	-	0	-/-
03	**40**	-	-	-	40	-	0	0	100	100	100	-/-
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)
Juniperus osteosperma												
85	**66**	133	-	66	-	-	0	0	-	-	0	69/93
91	**199**	-	133	66	-	-	0	0	-	-	0	118/79
98	**200**	-	100	100	-	40	0	0	-	-	0	-/-
03	**200**	-	60	140	-	20	0	0	-	-	10	-/-
08	**240**	-	60	180	-	-	0	0	-	-	8	-/-
Opuntia sp.												
85	**133**	-	-	133	-	-	0	0	0	-	0	3/2
91	**199**	-	-	199	-	-	0	0	0	-	0	4/5
98	**320**	20	60	240	20	40	0	0	6	-	0	5/10
03	**360**	-	60	300	-	-	0	0	0	-	0	5/11
08	**420**	-	40	280	100	-	0	0	24	5	5	5/13
Pinus edulis												
85	**66**	-	66	-	-	-	0	0	-	-	0	-/-
91	**66**	-	66	-	-	-	0	0	-	-	0	-/-
98	**80**	20	20	60	-	40	0	0	-	-	0	-/-
03	**100**	-	40	60	-	40	0	0	-	-	0	-/-
08	**100**	40	40	60	-	-	0	0	-	-	0	-/-