

Trend Study 10-15-05

Study site name: East Thompson Bench.

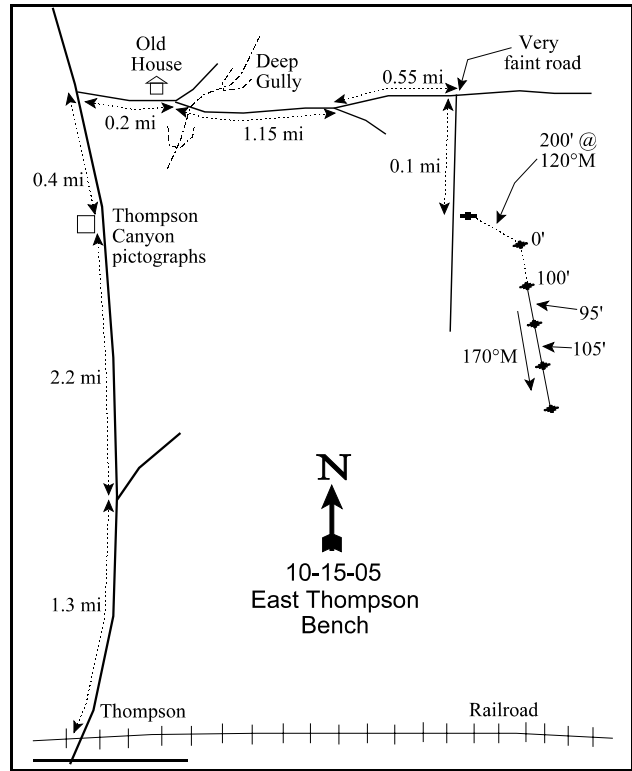
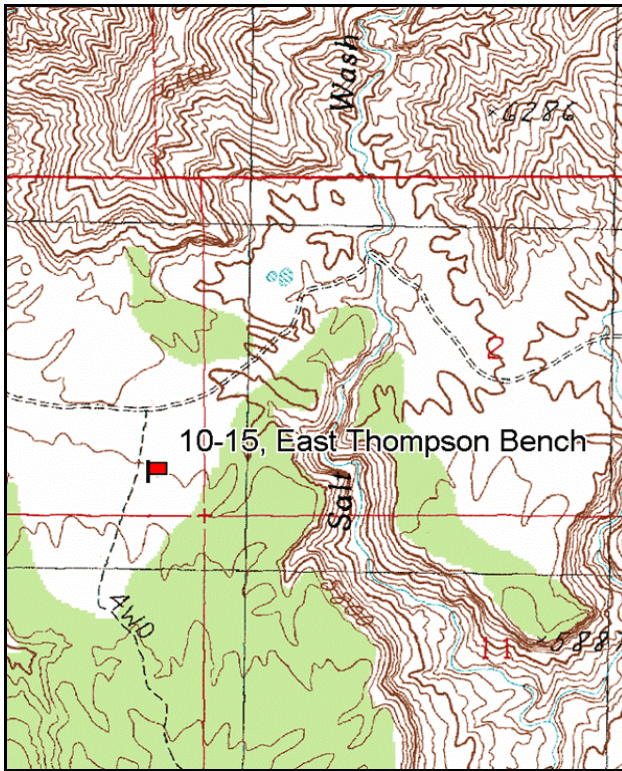
Vegetation type: Pinyon-Juniper.

Compass bearing: frequency baseline 170 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). No rebar marking belt placement on belts 1 and 4.

LOCATION DESCRIPTION

From the railroad crossing in the town of Thompson, travel 1.3 miles north up the main road to a fork. Stay left and go 2.2 miles to the Thompson Canyon pictographs. Continue 0.4 miles. Make a sharp right turn and go 0.2 miles past an old house and a railroad cut to a fork. Turn right across a deep gully and go 1.15 miles to a fork. Stay left and continue 0.55 miles to a very faint road on the right. Turn on this road and go 0.1 mile to a witness post (a steel rebar) on the left side of the road. The first baseline post is 200 feet away at a bearing of 120°M from the witness post.



Map Name Sego Canyon

Diagrammatic Sketch

Township: 21S, Range 20E, Section 3

GPS: NAD 27, UTM 12S 4318244 N, 613733 E

## DISCUSSION

### East Thompson Bench - Trend Study No. 10-15

The East Thompson Bench transect is located on a low lying bench east of Thompson Canyon at an elevation of 5,800 feet. This broad flat bench is dominated by junipers and intermixed with small openings of Wyoming big sagebrush. The bench has a gentle slope with a northern aspect. Water is limited in the area, but spring runoff flows through most of the intermittent washes in late winter or early spring. This site is located within the large Cisco Allotment which is grazed from November 1 to May 10 by 3 cattle permittees. Two sheep permittees also use the allotment from December through early May. In 1986, the BLM reported 61% use in the Thompson Bench area by sheep. In the past, the area was thought to be used heavily by deer, but data from 1995 and 2000 indicate this is not the case in recent years. In 2000, pellet group transect data estimated 35 deer days use/acre (86 ddu/ha) and 1 elk day use/acre (2 edu/ha). Two-thirds of the deer pellet groups were sampled on the first 200 feet of the transect where the area is in a sagebrush opening. Pellet groups decrease in frequency as you move into the pinyon-juniper further down the transect baseline. Pellet group data from 2005 estimated 46 deer days use/acre (112 ddu/ha) and 5 elk days use/acre (12 edu/ha).

Soil texture is a sandy clay loam and is reddish in color. The soil has moderate depth as indicated by the estimated effective rooting depth of over 17 inches. The soil is slightly alkaline (pH of 7.5) with low levels of phosphorus (1.7 ppm) and potassium (48 ppm) (Tiedemann and Lopez 2004). Organic matter is very low at less than 1%. There is little soil protection from vegetation and litter in the shrub interspaces. Several small active gullies are present, but due to the gentle terrain, erosion is not severe. Soil movement is most evident on trails or where the soil has been disturbed. Most of the litter and cryptogams are located directly beneath the canopy of the Wyoming big sagebrush. An erosion condition class assessment in 2005 rated erosion as slight.

Utah juniper is the predominant species. Canopy cover was 14% in 2000 and increased to 16% in 2005. Density was estimated at 84 trees/acre from point-centered quarter data in 2000. This increased to 136 junipers/acre in 2005. Fifty-five percent of the junipers sampled in 2005 were estimated to be taller than 8 feet. Pinyon pine are present, but are much less abundant than juniper.

The preferred key browse species is Wyoming big sagebrush. In 1986, the small openings were not sampled very well and a lower plant density was estimated. With the increased sample size used beginning in mid-1992, a much better estimate was determined. Estimated density was 1,680 plants/acre in 1995 and 1,960 plants/acre in 2000. However, the mature portion of the population decreased by 51% in 2000, while young plants made up a large portion of the population. Unfortunately, it appears that most of these young plants did not survive through drought years. Sagebrush density actually decreased by 53% and dropped down to only 920 plants/acre in 2005. Fifty-two percent of the population was decadent in 1986, this decreased to 42% in 1995 and 45% in 2000. After many years of drought, by 2005 95% of the population was classified as decadent with 89% of the population categorized as dying. Drought, winter injury, utilization, and competition with juniper trees have caused a major decline in this sagebrush population. Recruitment from young plants was high in 2000 at 34% of the population, but was very low (2%) in 2005. No seedlings were sampled in 2005. Sagebrush cover declined from 6% in 2000 to 2% in 2005. Other browse at this site include green ephedra and broom snakeweed.

The herbaceous understory is meager. Cheatgrass and sixweeks fescue were abundant in 1995. Cheatgrass was sampled in 73% of the quadrats in 1995. With drought conditions quadrat frequency was only 14% in 2000 and increased to 32% in 2005. Galleta grass is the most abundant perennial grass followed by bottlebrush squirreltail. Perennial grasses occur sporadically throughout the site and are in low abundance. Sum of nested frequency for perennial grasses has slowly declined with each reading. This would be expected with the associated increases in juniper canopy cover. This site shows similar characteristics to the findings of

Tausch and West (1994), which showed that increased pinyon and juniper cover negatively effects understory cover.

Forbs are sparse and not significant on this site. The most abundant perennial forb is timber poisonvetch. Although considered palatable by all classes of livestock, this plant is in some instances is toxic, and in others, a highly nutritious plant (high protein content). Other perennial forbs encountered include: longleaf phlox, low fleabane, and sego lily. Annual species dominated the scant forb understory in 1995 and 2005 due to the wet spring weather. Common pepperweed was very abundant in 2005.

#### 1986 APPARENT TREND ASSESSMENT

Due to a declining Wyoming big sagebrush population and apparent invasion of junipers and broom snakeweed, the vegetation trend appears to be declining. A treatment for the juniper and/or rest from winter sheep use would be desirable, but neither is called for in the management plan. The soil appears stable.

#### 1995 TREND ASSESSMENT

The Wyoming big sagebrush population is showing slight improvement. Seventy-four percent of the plants were heavily hedged in 1986, then decreased to 24% in 1995. There are nearly as many dead as there are living plants with 19% of the population classified as dying. Decadence slightly decreased in 1995 to 42%. Broom snakeweed was sampled and does not appear to be increasing in density or young age class. With the improvement in Wyoming big sagebrush and an apparently decreasing broom snakeweed population, the browse trend is slightly upward. Annual grasses do not dominate the understory of this site like they do on surrounding sites, but they do make up over 80% of the herbaceous cover. Sum of nested frequency for galleta and Indian ricegrass significantly decreased since 1986, while the increased sample size detected Salina wildrye and mutton bluegrass. The changes in composition of the grass species are likely due to a larger sample size and a better distribution of sampling over the entire site. Forbs add very little to the site and are found primarily beneath the sagebrush crowns. The herbaceous understory trend is stable for now and more of a trend will be evident the next time the site is evaluated. There is little soil movement or pedestaling evident on the site. Soil trend is stable with most of the erosion coming from disturbed areas. Previously, nested frequency was collected only in the sagebrush opening and not in the denser patches of trees. Also, a more accurate Utah juniper density is achieved by sampling throughout the entire vegetation type and not only in the more dense portions of the Utah juniper stand. The DCI score is poor due to low amounts of preferred browse and perennial herbaceous plants.

#### TREND ASSESSMENT

soil - stable (0)

browse - slightly up (+1)

herbaceous understory - stable (0)

winter range condition (DC Index) - poor (18) Lower potential scale

#### 2000 TREND ASSESSMENT

Trend for soil is slightly down due to increased bare ground cover and a lower ratio of protective ground cover to bare soil. Several gullies are present underneath the juniper trees, although these are small, they are active. Trend for browse is slightly down and in poor condition. Even though recruitment from the young age class increased to a high level (34%), decadence still remains high at 45% with 29% of the population classified as dying. The mature portion of the population decreased by 51%. There are nearly as many dead plants as there are live in the population the last two sampling years. However, there appears to be currently enough young plants to replace the decadent/dying sagebrush if they can survive the drought. In addition, there is less heavy use than was reported in 1995. The site is still dominated by an overstory of Utah juniper which has an

overhead canopy cover value of 14%. Increasing juniper cover will continue to negatively effect the sagebrush to a greater degree. Trend for the herbaceous understory is stable, but depleted. Perennial grasses show a very slight decrease in sum of nested frequency from 163 to 156. A positive thing is the significant decline of Cheatgrass. Perennial forbs decreased to half of the sum of nested frequency value reported in 1995, however, they provide less than 1% average cover. The DCI score improved to fair, because of an increase browse cover and an increase in young.

TREND ASSESSMENT

soil - slightly down (-1)

browse - slightly down (-1)

herbaceous understory - stable (0)

winter range condition (DC Index) - fair (32) Lower potential scale

2005 TREND ASSESSMENT

The soil trend is slightly down. The ratio of protective cover improved slightly, but relative bare ground increased from 39% to 47%. Relative litter cover decreased from 28% to 25%. Erosion was rated as slight and the gullies are still active. The browse trend is down. Wyoming big sagebrush density declined 53%. Decadence was 96% in 2005 with 89% of the population classified as dying. In 2005, there were nearly no young plants and no seedlings to replace those that have died or those classified as dying. Drought, winter injury, and competition with juniper trees have caused a major decline in sagebrush. Juniper density is increasing with an associated increase in canopy cover. The herbaceous understory trend is slightly down. The sum of nested frequency for perennial grasses decreased 15%. Cheatgrass and sixweeks fescue each significantly increased. Annual forbs also increased greatly, especially common pepperweed. On the positive side, sego lily frequency was higher. The DCI score decreased to very poor, because of an increase in decadence, a decrease in browse cover, and a decrease in young.

TREND ASSESSMENT

soil - slightly down (-1)

browse - down (-2)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - very poor (2) Lower potential scale

HERBACEOUS TRENDS --

Management unit 10 , Study no: 15

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
G	Bromus tectorum (a)	-	c <sub>190</sub>	a <sub>33</sub>	b <sub>69</sub>	b <sub>1.41</sub>	.07	.33
G	Elymus salina	a <sub>-</sub>	b <sub>29</sub>	b <sub>15</sub>	b <sub>16</sub>	.63	.52	1.16
G	Hilaria jamesii	b <sub>129</sub>	a <sub>65</sub>	a <sub>83</sub>	a <sub>60</sub>	.74	1.97	2.26
G	Oryzopsis hymenoides	14	1	4	9	.03	.17	.25
G	Poa secunda	a <sub>-</sub>	b <sub>16</sub>	ab <sub>5</sub>	b <sub>16</sub>	.03	.02	.19
G	Sitanion hystrix	ab <sub>49</sub>	b <sub>52</sub>	ab <sub>49</sub>	a <sub>31</sub>	.83	.36	.76
G	Vulpia octoflora (a)	-	c <sub>186</sub>	a <sub>-</sub>	b <sub>75</sub>	.44	-	.52
Total for Annual Grasses		0	376	33	144	1.85	0.07	0.85

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
	Total for Perennial Grasses	192	163	156	132	2.27	3.05	4.63
	Total for Grasses	192	539	189	276	4.12	3.12	5.49
F	<i>Astragalus convallarius</i>	13	21	20	17	.27	.26	.99
F	<i>Astragalus</i> sp.	-	5	5	4	.01	.01	.01
F	<i>Castilleja linariaefolia</i>	9	8	-	-	.04	-	-
F	<i>Calochortus nuttallii</i>	a <sup>-</sup>	bc <sup>17</sup>	ab <sup>1</sup>	c <sup>22</sup>	.04	.00	.06
F	<i>Chenopodium fremontii</i> (a)	-	1	-	4	.00	-	.03
F	<i>Cryptantha</i> sp.	a <sup>-</sup>	b <sup>14</sup>	a <sup>-</sup>	a <sup>2</sup>	.03	-	.03
F	<i>Descurainia pinnata</i> (a)	-	b <sup>26</sup>	a <sup>-</sup>	c <sup>34</sup>	.05	-	.21
F	<i>Draba</i> sp. (a)	-	-	-	1	-	-	.00
F	<i>Eriogonum cernuum</i> (a)	-	3	-	-	.01	-	-
F	<i>Erigeron pumilus</i>	2	6	5	-	.04	.01	.00
F	<i>Euphorbia</i> sp.	-	1	1	4	.00	.00	.01
F	<i>Gilia hutchinifolia</i> (a)	-	b <sup>72</sup>	a <sup>3</sup>	c <sup>125</sup>	.20	.01	1.12
F	<i>Lappula occidentalis</i> (a)	-	a <sup>6</sup>	a <sup>-</sup>	b <sup>35</sup>	.01	-	.22
F	<i>Lepidium densiflorum</i> (a)	-	b <sup>139</sup>	a <sup>18</sup>	c <sup>178</sup>	.51	.04	8.69
F	<i>Oenothera</i> sp.	-	-	-	2	-	-	.00
F	<i>Phlox longifolia</i>	13	10	8	10	.01	.01	.04
F	<i>Ranunculus testiculatus</i> (a)	-	-	1	-	-	.00	-
F	<i>Schoenocrambe linifolia</i>	-	2	-	-	.00	-	-
F	<i>Sisymbrium altissimum</i> (a)	-	5	-	6	.01	-	.01
F	<i>Townsendia</i> sp.	-	-	-	2	-	-	.00
F	Unknown forb-perennial	1	-	-	-	-	-	-
	Total for Annual Forbs	0	252	22	383	0.81	0.05	10.31
	Total for Perennial Forbs	38	84	40	63	0.47	0.31	1.17
	Total for Forbs	38	336	62	446	1.28	0.36	11.48

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

BROWSE TRENDS --

Management unit 10 , Study no: 15

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	<i>Artemisia tridentata wyomingensis</i>	39	38	30	5.23	6.04	2.01
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	0	1	0	-	-	-
B	<i>Ephedra viridis</i>	3	2	3	.00	.00	.06
B	<i>Gutierrezia sarothrae</i>	22	20	6	.43	.43	.51
B	<i>Juniperus osteosperma</i>	0	12	17	11.85	13.11	12.87
B	<i>Leptodactylon pungens</i>	0	0	2	-	-	-
B	<i>Opuntia sp.</i>	2	2	1	.15	.00	-
Total for Browse		66	75	59	17.68	19.60	15.45

CANOPY COVER, LINE INTERCEPT --

Management unit 10 , Study no: 15

Species	Percent Cover	
	'00	'05
<i>Artemisia tridentata wyomingensis</i>	-	7.30
<i>Juniperus osteosperma</i>	14.19	15.89
<i>Leptodactylon pungens</i>	-	.06

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10 , Study no: 15

Species	Average leader growth (in)
	'05
<i>Artemisia tridentata wyomingensis</i>	1.7

POINT-QUARTER TREE DATA --

Management unit 10 , Study no: 15

Species	Trees per Acre	
	'00	'05
<i>Juniperus osteosperma</i>	84	136

Average diameter (in)	
'00	'05
3.0	3.9

**BASIC COVER --**

Management unit 10 , Study no: 15

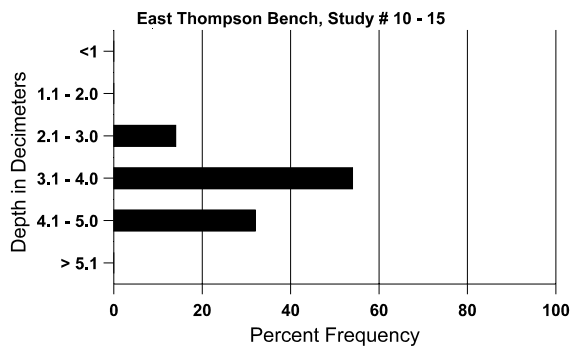
Cover Type	Average Cover %			
	'86	'95	'00	'05
Vegetation	8.25	26.71	25.85	26.68
Rock	0	.68	.15	.06
Pavement	0	.10	.75	.78
Litter	40.25	34.96	34.76	27.98
Cryptogams	4.25	9.87	13.65	5.19
Bare Ground	47.25	30.85	47.48	53.02

**SOIL ANALYSIS DATA --**

Herd Unit 10, Study # 15, Study Name: East Thompson Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
17.2	61.0 (18.0)	7.5	50.0	28.0	22.0	0.7	1.7	48.0	0.6

**Stoniness Index**



**PELLET GROUP DATA --**

Management unit 10 , Study no: 15

Type	Quadrat Frequency		
	'95	'00	'05
Sheep	22	-	-
Rabbit	43	36	58
Elk	-	8	6
Deer	19	19	31

Days use per acre (ha)	
'00	'05
-	-
-	-
1 (2)	5 (12)
35 (88)	46 (12)

BROWSE CHARACTERISTICS --  
Management unit 10 , Study no: 15

		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>												
86	<b>899</b>	33	133	300	466	-	26	74	52	9	19	18/20
95	<b>1680</b>	540	120	860	700	1460	43	24	42	19	19	20/31
00	<b>1960</b>	40	660	420	880	1160	48	7	45	29	29	21/29
05	<b>920</b>	-	20	20	880	1660	22	70	96	89	89	13/19
<i>Chrysothamnus viscidiflorus stenophyllus</i>												
86	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
95	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
00	<b>20</b>	-	20	-	-	-	0	0	-	-	0	-/-
05	<b>0</b>	-	-	-	-	-	0	0	-	-	0	7/13
<i>Ephedra viridis</i>												
86	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
95	<b>80</b>	-	20	60	-	-	0	0	0	-	0	16/16
00	<b>40</b>	-	-	20	20	-	0	50	50	50	50	9/9
05	<b>60</b>	-	-	40	20	-	0	33	33	33	33	21/19
<i>Gutierrezia sarothrae</i>												
86	<b>3466</b>	33	366	3100	-	-	0	0	0	-	0	8/7
95	<b>1160</b>	20	300	860	-	20	0	0	0	-	0	8/8
00	<b>860</b>	-	120	500	240	80	0	0	28	7	7	6/8
05	<b>200</b>	20	-	200	-	-	0	0	0	-	0	9/10
<i>Juniperus osteosperma</i>												
86	<b>200</b>	33	100	100	-	-	0	0	-	-	0	94/104
95	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
00	<b>260</b>	20	20	240	-	40	0	0	-	-	0	-/-
05	<b>340</b>	-	140	200	-	-	0	0	-	-	0	-/-
<i>Leptodactylon pungens</i>												
86	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
95	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
00	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
05	<b>140</b>	60	-	140	-	-	0	0	-	-	0	4/6
<i>Opuntia sp.</i>												
86	<b>33</b>	-	-	33	-	-	0	0	-	-	0	7/7
95	<b>40</b>	-	-	40	-	-	0	0	-	-	0	6/12
00	<b>40</b>	20	20	20	-	-	0	0	-	-	0	5/14
05	<b>20</b>	-	-	20	-	-	0	0	-	-	0	7/31

		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)
Sclerocactus sp.												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	20	0	0	-	-	0	-/-