

WANSHIP - TREND STUDY NO. 5-4-11

Vegetation Type: Forage Kochia (Seeded)

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Gravelly Loam \(Mountain Big Sagebrush\), R047XA406UT](#)

Land Ownership: Private

Elevation: 6,200 ft (1,890 m)

Aspect: Southwest

Slope: 3-5%

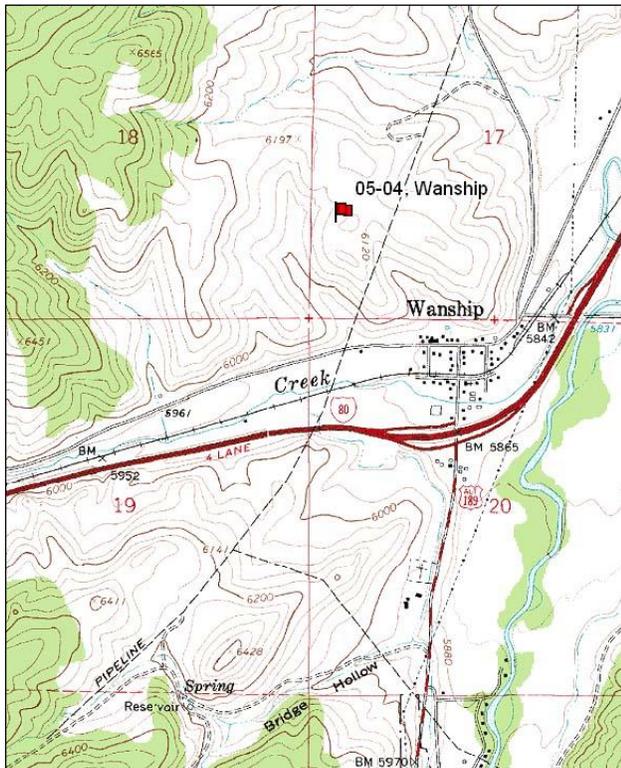
Transect bearing: 161° magnetic

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

Directions:

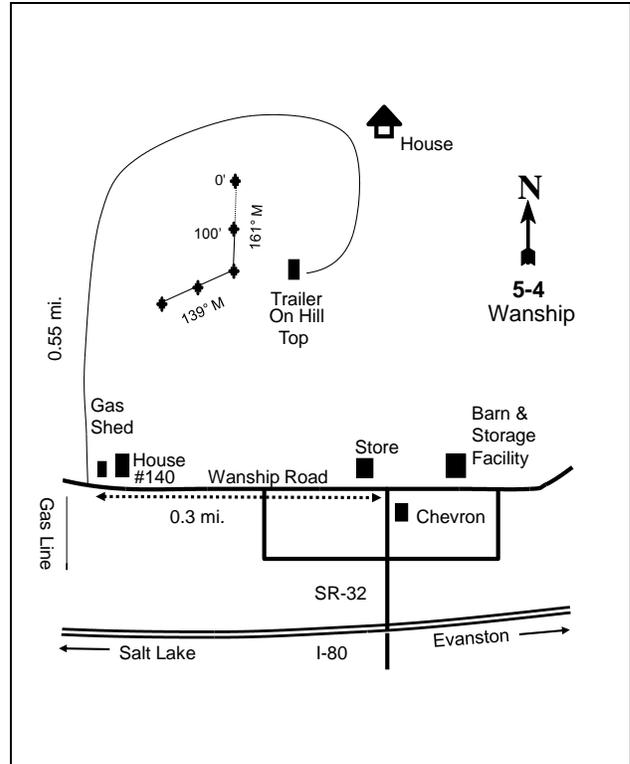
From the I-80 overpass in Wanship (Exit 155), proceed north on 189 to the "T" junction in town with Buck's Chevron on the right. Turn left and go 0.3 miles. Turn right here and go up the draw 0.55 miles to a house on top of the hill. The owner of this home would like to be contacted when the site is read. From the fork in the road take a bearing of 220 degrees magnetic and walk 36 paces to the baseline. The 0-foot stake of the baseline is marked by browse tag #7955. The baseline runs 161 degrees magnetic. The baseline doglegs at the 200-foot baseline stake and runs 193 degrees magnetic.

Map Name: Wanship



Township: 1N Range: 5E Section: 17

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 465100 E 4518498 N

## WANSHIP - TREND STUDY NO. 5-4

### Site Information

Site Description: The site was established in 1984 and samples crucial winter range north of Wanship and west of the Weber River that is privately owned. A wildfire burned the entire area sometime after the 1990 reading and eliminated most of the browse, which was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Deer use during the winter of 1983-84 was light because of deep crusted snow and deer were supplementary fed a pelleted ration of alfalfa at feeding stations located along the frontage road near Wanship. Gopher activity was noted in 1996. Deer pellet groups were sampled in high abundance in 2001 and 2006, but moderate abundance in 2011. Elk pellet groups were sampled in low abundance in 2006, but moderate abundance in 2001 and 2011. The land owner said that there were nearly 50 deer wintering in the area and he counted over 100 elk on the ridge just west of the site during the 2000/2001 winter. The landowner also said that cattle heavily graze the area later in the summer. Cattle pats were sampled in low abundance in 2001 (Table - Pellet Group Data).

Browse: The key browse species are mountain big sagebrush and forage kochia (*Kochia prostrata*). Sagebrush density was considered high between 1984 and 1990; however, the fire that burned the site eliminated most of the sagebrush. It is unclear whether the burn was seeded with sagebrush or if it was seeded naturally. Moreover, the density of sagebrush has steadily decreased over the duration of the study. Prior to the fire the sagebrush population was mostly decadent with high amounts of poor vigor. Since the fire however, the demographic has transitioned to the mature age class with low decadence and good vigor. Utilization of mountain big sagebrush has been moderate to heavy over the course of the study. Since the fire, the average height/crown of sagebrush plants has increased over the sample years. Young sagebrush recruitment peaked in 1996, but has been minimal for the majority of the study (Table - Browse Characteristics).

Forage kochia was seeded after the fire and has established well. The kochia population is dense, but decreased markedly in density in 2006; moreover, the population has decreased in density over the duration of the study. The kochia population is centered within the mature age class with very little decadence and good vigor in the population. Utilization of forage kochia has been light to moderate. The kochia population has been strongly vigorous. Young forage kochia recruitment is active, but has steadily decreased since 1996. Other browse species include antelope bitterbrush (*Purshia tridentata*), white rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *albicaulis*), stickyleaf low rabbitbrush (*C. viscidiflorus* ssp. *viscidiflorus*), Saskatoon serviceberry (*Amelachier alnifolia*), broom snakeweed (*Gutierrezia sarothrae*), pricklypear cactus (*Opuntia* sp.), and gray horsebrush (*Tetradymia canescens*) (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory is dominated by the perennial grass community. No specific seed mix is available, but seeded grass species sampled after the fire include crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*A. intermedium*), and orchard grass (*Dactylis glomerata*). Crested wheatgrass and intermediate wheatgrass have established well, but orchard grass has decreased since 1996. Crested wheatgrass has steadily increased every year in nested frequency since 1996, and is the dominant herbaceous species. The native grass species bluebunch wheatgrass (*Agropyron spicatum*) and Sandberg bluegrass (*Poa secunda*) have persisted after the fire. Sandberg bluegrass has steadily increased in cover since 1996. Cheatgrass (*Bromus tectorum*) was abundant in 1996, but has since decreased significantly in nested frequency and cover. The forb community is moderately diverse, but perennial species are deficient. The seeded species alfalfa (*Medicago sativa*) occurs occasionally, and the seeded species small burnet (*Sanguisorba minor*) was only sampled in 1996 (Table - Herbaceous Trends).

Soil: The study is located within the Ayoub-Dunford-Melling complex, and the soil is likely part of the Ayoub component. The component is located on mountain slopes. The parent material consists of colluvium and slope alluvium derived from andesite (Soil Survey Staff 2011). The soil is fairly deep but rocky on the surface. The soil texture is a loam with a neutral soil reaction (pH 6.6) (Table - Soil Analysis Data). Bare ground cover

is moderately low, and a high amount of protective ground cover is provided by rock, vegetation, and litter (Table - Basic Cover). Erosion is minimal because of the gentle terrain and soil permeability. Thus, the soil erosion condition has been classified as stable since 2001.

## Trend Assessments

### Browse:

- **1984 to 1990 - slightly down (-1):** The density for mountain big sagebrush decreased 13% from 3,531 plants/acre to 3,065 plants/acre. Decadence within the sagebrush population increased from 50% to 62%. The sagebrush population increased in poor vigor from 10% to 25%. Recruitment of young sagebrush was maintained at 8%.
- **1990 to 1996 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. The wildfire removed most of the mature plants from the study and therefore most of the available winter browse. However, recruitment of young plants was very good and comprised 98% of the population. Decadence and poor vigor within the mountain big sagebrush population decreased to 0%. The seeded species forage kochia was sampled for the first time and had a density of 11,980 plants/acre. The addition of forage kochia has added value to the browse component.
- **1996 to 2001 - slightly up (+1):** The density for mountain big sagebrush decreased 13% from 2,880 plants/acre to 2,500 plants/acre. Most of the young plants sampled in 1996 have established and mature plants increased from 60 plants/acre to 2,360 plants/acre. With the increase in mature plants the average sagebrush crown diameter increased from 9 inches to 13 inches, and average sagebrush cover increased from 1% to 2%. Decadence within the sagebrush population was maintained at 0%. Poor vigor increased slightly to 2%. Recruitment of young sagebrush decreased to 6% of the overall population. The density of forage kochia decreased 4% to 11,500 plants/acre, and cover decreased from 8% to 4%. Decadence and poor vigor was not observed within the kochia population.
- **2001 to 2006 - down (-2):** The density for mountain big sagebrush decreased 14% to 2,160 plants/acre. Decadence within the sagebrush population increased to 8%. Recruitment of young sagebrush increased to 9% of the overall population. The average sagebrush crown diameter increased to 17 inches. The density for forage kochia decreased 48% to 5,980 plants/acre. Decadence and poor vigor change was negligible at less than 1%, respectively.
- **2006 to 2011 - down (-2):** The density for mountain big sagebrush decreased 17% for 1,800 plants/acre. Decadence and poor vigor within the sagebrush population was maintained at 8% and 3%, respectively. The average sagebrush crown diameter increased to 22 inches, and average sagebrush cover increased from 2% to 4%. The density for forage kochia decreased 54% to 2,740 plants/acre and cover decreased to 2%.

### Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 56%. The perennial species Sandberg bluegrass was the most dominant grass, and had a significant increase in nested frequency.
- **1990 to 1996 - down (-2):** The sum of nested frequency for perennial grasses decreased 24%. Sandberg bluegrass had a significant decrease in nested frequency, and provided 2% cover. However as a seeded species after the fire, crested wheatgrass became the dominant perennial species, and had a cover of 5%. Annual species were measured for the first time, and cheatgrass occurred most frequently of all the grass species, and had a cover of 6%.
- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial grasses increased 96%. Sandberg bluegrass had a significant increase in nested frequency, and increased in cover to 6%. Crested wheatgrass increased significantly in nested frequency, and increased in cover to 16%. Intermediate wheatgrass increased significantly in nested frequency, and increased in cover from 2% to 3%. The

weedy annual species cheatgrass had a significant decrease in nested frequency, and decreased in cover to less than 1%.

- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial grasses increased 8%. Crested wheatgrass had a significant increase in nested frequency, and increased in cover to 21%. No other notable significant changes were observed.
- **2006 to 2011 - slightly up (+1):** The sum of nested frequency for perennial grasses increased 17%. The weedy perennial species bulbous bluegrass (*Poa bulbosa*) had a significant increase in nested frequency, and increased in cover from less than 1% to 3%. The annual species cheatgrass decreased significantly in nested frequency, and decreased in cover to less than 1%.

Forb:

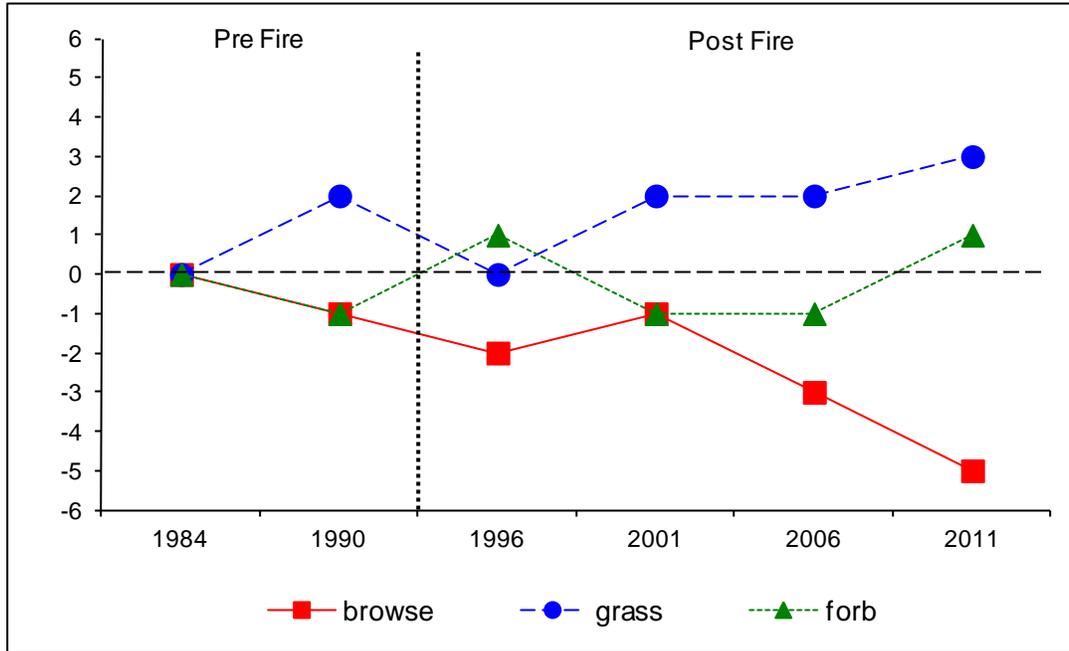
- **1984 to 1990 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 41%, but perennial forbs were already rare.
- **1990 to 1996 - up (+2):** The sum of nested frequency for perennial forbs increased over four-fold. The perennial species longstalk springparsley (*Cymopterus longipes*), longleaf phlox (*Phlox longifolia*), alfalfa, and small burnet increased significantly in nested frequency. Alfalfa and small burnet each provided 1% cover.
- **1996 to 2001 - down (-2):** The sum of nested frequency for perennial forbs decreased 35%. The seeded species small burnet had a significant decrease in nested frequency, and decreased in cover to less than 1%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial forb species remained similar. No notable significant changes were observed, and perennial forbs remain rare.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial forb species increased 95%. Tapertip onion (*Allium acuminatum*) had a significant increase in nested frequency, and increased in cover from less than 1% to 1%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --  
Management unit 5, study no: 4

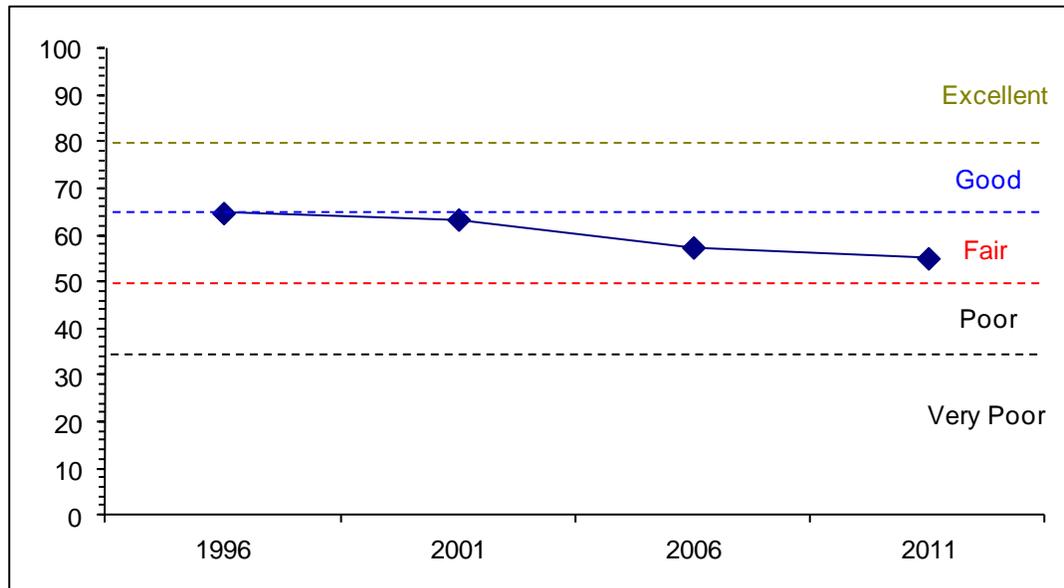
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	12.8	15.0	15.0	20.4	-4.8	6.3	0.0	<b>64.8</b>	Fair-Good
01	8.9	15.0	6.0	30.0	-0.2	3.7	0.0	<b>63.4</b>	Fair-Good
06	5.6	13.7	6.1	30.0	-0.2	2.1	0.0	<b>57.4</b>	Fair
11	6.3	13.0	2.0	30.0	-0.1	3.7	0.0	<b>55.1</b>	Fair

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 5, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--  
 Management unit 5, Study no: 4



HERBACEOUS TRENDS--  
Management unit 05, Study no: 4

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	a-	a-	b103	c192	d232	d248	5.33	16.42	20.63	18.48
G	Agropyron dasystachyum	-	-	-	3	-	-	-	.03	-	-
G	Agropyron intermedium	a-	a-	b24	c79	c85	c104	1.51	3.19	3.20	4.63
G	Agropyron spicatum	bc25	c27	c35	abc12	a10	ab11	1.13	.81	.68	.36
G	Bromus tectorum (a)	-	-	c315	ab55	b81	a24	6.34	.28	.23	.09
G	Dactylis glomerata	a-	a-	b11	a1	a3	a-	.21	.03	.03	-
G	Festuca ovina	-	-	2	-	-	-	.00	-	-	-
G	Poa bulbosa	a-	a-	a1	a4	a19	b86	.03	.01	.22	3.31
G	Poa secunda	b187	d307	a92	c235	bc218	bc216	2.00	5.69	5.72	6.44
G	Sitanion hystrix	b15	b21	a1	a1	a-	a-	.00	.01	-	-
Total for Annual Grasses		0	0	315	55	81	24	6.34	0.28	0.23	0.08
Total for Perennial Grasses		227	355	269	527	567	665	10.24	26.19	30.50	33.23
Total for Grasses		227	355	584	582	648	689	16.58	26.47	30.73	33.32
F	Allium acuminatum	ab25	a5	a-	ab16	b40	c138	-	.03	.20	1.21
F	Alyssum alyssoides (a)	-	-	c188	b141	a91	c199	1.45	.63	.21	.62
F	Antennaria rosea	6	5	-	-	-	-	-	-	-	-
F	Arabis sp.	-	3	-	-	2	-	-	-	.03	-
F	Astragalus beckwithii	-	-	-	-	-	-	-	-	-	.01
F	Astragalus cibarius	a-	a-	a1	ab3	b8	a1	.00	.18	.11	.03
F	Astragalus convallarius	-	-	-	4	-	-	-	.01	-	-
F	Astragalus utahensis	7	1	11	-	-	-	.21	-	-	-
F	Cirsium sp.	-	-	3	-	-	-	.00	-	-	-
F	Collinsia parviflora (a)	-	-	a3	b76	c130	b92	.01	.32	.48	1.24
F	Collomia linearis (a)	-	-	1	2	-	3	.00	.00	-	.00
F	Comandra pallida	-	-	-	4	-	-	-	.03	-	-
F	Crepis acuminata	-	2	-	1	-	1	-	.15	-	.00
F	Cryptantha sp.	6	-	-	-	-	-	-	-	-	-
F	Cymopterus longipes	a-	a10	c54	b32	ab28	ab23	.49	.21	.25	.27
F	Draba sp. (a)	-	-	a-	b105	c168	c210	-	.41	.79	.88
F	Epilobium brachycarpum (a)	-	-	-	2	6	-	-	.00	.01	-
F	Erigeron pumilus	2	3	1	-	-	2	.03	-	-	.01
F	Erodium cicutarium (a)	-	-	-	1	-	-	-	.03	-	-
F	Gayophytum ramosissimum(a)	-	-	b14	a-	a4	a-	.03	-	.03	-
F	Holosteum umbellatum (a)	-	-	b213	b185	a136	b206	1.45	.76	.53	1.33
F	Lactuca serriola (a)	-	-	-	-	-	1	-	-	-	.03
F	Lupinus argenteus	-	-	-	5	-	-	-	.18	-	-
F	Medicago sativa	a-	a-	b18	ab10	a-	a1	.82	.95	.44	.30
F	Microsteris gracilis (a)	-	-	-	3	7	3	-	.03	.01	.03
F	Orobancha sp.	-	-	-	-	-	2	-	-	-	.00
F	Penstemon sp.	3	-	-	-	-	-	-	-	-	-
F	Phlox longifolia	a-	a-	b25	ab10	ab9	a2	.29	.07	.01	.00
F	Polygonum douglasii (a)	-	-	3	-	1	-	.00	-	.00	-
F	Ranunculus testiculatus (a)	-	-	c267	b217	c264	a139	2.44	2.87	2.50	.95

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Sanguisorba minor	a <sup>-</sup>	a <sup>-</sup>	b <sup>16</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	1.29	-	-	-
F	Schoenrambe linifolia	-	-	3	1	-	-	.03	.00	-	-
F	Sisymbrium altissimum (a)	-	-	1	-	-	-	.03	-	-	-
F	Tragopogon dubius (a)	4	-	3	5	-	-	.03	.03	-	-
Total for Annual Forbs		4	0	693	737	807	853	5.47	5.10	4.59	5.10
Total for Perennial Forbs		49	29	132	86	87	170	3.17	1.83	1.05	1.86
Total for Forbs		53	29	825	823	894	1023	8.65	6.94	5.64	6.97

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

#### BROWSE TRENDS--

Management unit 05, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata vaseyana	-	-	-	-	1.08	2.00	2.19	3.84
B	Chrysothamnus nauseosus albicaulis	3	3	1	0	-	.03	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	27	27	32	24	2.05	1.51	1.23	.57
B	Gutierrezia sarothrae	1	3	1	0	-	.15	-	-
B	Kochia prostrata	95	95	79	54	7.61	4.27	1.92	1.03
B	Opuntia sp.	3	3	3	3	.15	-	.41	.41
B	Tetradymia canescens	1	1	2	1	-	-	-	-
Total for Browse		130	132	118	82	10.89	7.97	5.76	5.86

#### CANOPY COVER, LINE INTERCEPT--

Management unit 05, Study no: 4

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	2.70	5.19
Chrysothamnus viscidiflorus viscidiflorus	1.08	.70
Kochia prostrata	2.33	1.20
Opuntia sp.	.16	.13
Tetradymia canescens	.28	.35

#### KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 05, Study no: 4

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	1.9	1.4	1.9

**BASIC COVER--**

Management unit 05, Study no: 4

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	3.00	15.75	37.70	44.98	38.54	43.72
Rock	9.00	9.00	11.57	9.17	10.86	10.65
Pavement	16.25	14.75	3.39	2.23	5.23	1.34
Litter	64.00	41.00	44.87	27.26	36.85	42.92
Cryptogams	.25	5.25	.47	.86	1.64	.28
Bare Ground	7.50	14.25	11.60	24.70	21.86	12.26

**SOIL ANALYSIS DATA --**

Management unit 05, Study no: 4, Study Name: Wanship

Effective rooting depth (in)	pH	Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.2	6.6	44.9	28.7	23.4	2.7	15.4	185.6	0.5

**PELLET GROUP DATA--**

Management unit 05, Study no: 4

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Sheep	2	-	-	-	-	-	-
Rabbit	10	-	8	11	-	-	-
Elk	3	9	22	27	24 (60)	14 (35)	39 (96)
Deer	36	34	43	24	67 (165)	96 (236)	27 (66)
Cattle	1	1	2	-	13 (32)	-	-

**BROWSE CHARACTERISTICS--**

Management unit 05, Study no: 4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier alnifolia</b>									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	0	0	0	-	-	0	0	0	24/28
01	0	0	0	-	-	0	0	0	-/-
06	0	0	0	-	-	0	0	0	23/28
11	0	0	0	-	-	0	0	0	26/35
<b>Artemisia tridentata vaseyana</b>									
84	3531	8	42	50	833	36	61	10	33/43
90	3065	8	30	62	133	53	25	25	26/36
96	2880	98	2	0	40	0	0	0	9/9
01	2500	6	94	0	-	38	55	2	11/13
06	2160	9	82	8	-	33	28	3	12/17
11	1800	3	89	8	-	77	9	3	16/22

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Atriplex canescens</i>									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	0	0	0	-	-	0	0	0	-/-
01	0	0	0	-	-	0	0	0	-/-
06	0	0	0	-	-	0	0	0	-/-
11	0	0	0	-	-	0	0	0	26/43
<i>Chrysothamnus nauseosus albicaulis</i>									
84	0	0	0	0	-	0	0	0	-/-
90	0	0	0	0	-	0	0	0	-/-
96	60	0	100	0	-	0	0	0	13/14
01	60	0	67	33	-	33	0	0	21/17
06	20	0	100	0	-	0	0	0	21/26
11	0	0	0	0	-	0	0	0	19/27
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
84	599	56	44	0	-	0	0	0	13/12
90	1065	3	72	25	-	16	3	63	11/12
96	820	0	100	0	-	0	0	0	12/22
01	720	6	78	17	-	3	0	3	12/22
06	800	8	80	13	-	3	3	5	12/17
11	680	6	91	3	-	0	0	3	11/14
<i>Gutierrezia sarothrae</i>									
84	0	0	0	0	-	0	0	0	-/-
90	0	0	0	0	-	0	0	0	-/-
96	20	0	100	0	-	0	0	0	8/11
01	100	0	80	20	-	0	0	20	7/11
06	40	50	50	0	-	0	0	0	5/6
11	0	0	0	0	-	0	0	0	11/23
<i>Kochia prostrata</i>									
84	0	0	0	0	-	0	0	0	-/-
90	0	0	0	0	-	0	0	0	-/-
96	11980	28	72	0	40	9	0	.16	7/11
01	11500	15	84	0	60	56	10	0	6/9
06	5980	16	84	0	780	31	19	.33	7/9
11	2740	8	91	1	60	14	0	2	7/9
<i>Opuntia sp.</i>									
84	33	100	0	0	-	0	0	0	-/-
90	365	18	45	36	-	0	0	36	3/10
96	120	33	67	0	-	0	0	0	4/8
01	80	25	75	0	-	0	0	0	5/11
06	100	20	80	0	-	0	0	0	5/15
11	80	0	100	0	-	0	0	0	5/20

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
84	<b>133</b>	0	100	0	-	0	100	0	29/40	
90	<b>33</b>	0	0	100	-	0	100	100	-/-	
96	<b>0</b>	0	0	0	-	0	0	0	-/-	
01	<b>0</b>	0	0	0	-	0	0	0	-/-	
06	<b>0</b>	0	0	0	-	0	0	0	-/-	
11	<b>0</b>	0	0	0	-	0	0	0	-/-	
<i>Tetradymia canescens</i>										
84	<b>0</b>	0	0	-	-	0	0	0	-/-	
90	<b>0</b>	0	0	-	-	0	0	0	-/-	
96	<b>20</b>	0	100	-	-	0	0	0	11/18	
01	<b>20</b>	0	100	-	-	0	0	0	12/34	
06	<b>40</b>	0	100	-	-	0	0	0	17/18	
11	<b>20</b>	0	100	-	-	0	0	0	13/28	