

BROAD HOLLOW - TREND STUDY NO. 1-14-11

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: [Mountain Gravelly Loam \(Mountain Big Sagebrush\), R025XY412UT](#)

Land Ownership: USFS

Elevation: 6,500 ft. (1,981 m)

Aspect: Southwest

Slope: 12%

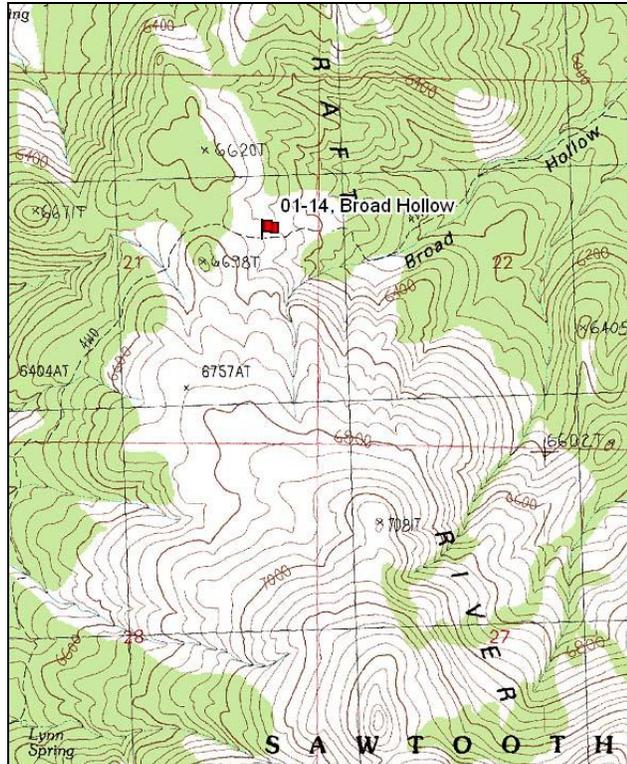
Transect bearing: 160° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft). Rebar: belt 5 on 5ft.

Directions:

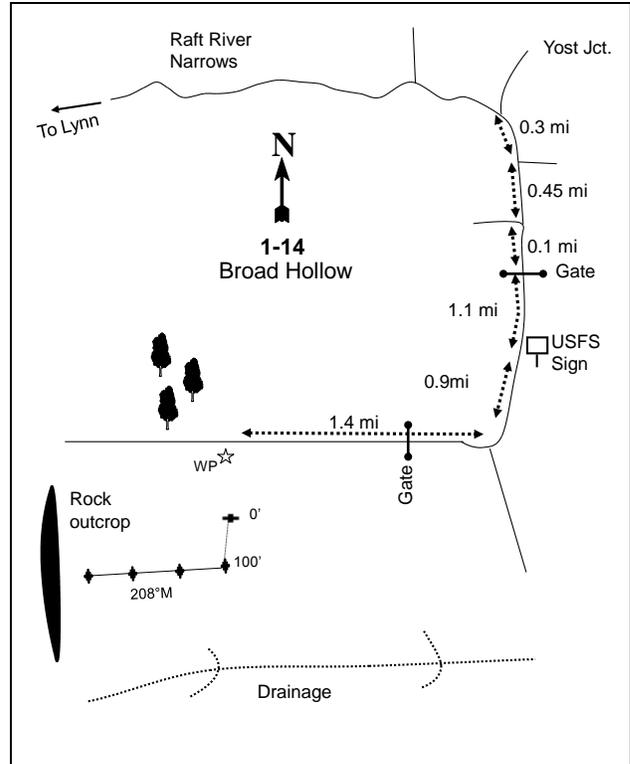
From the junction of U-30 and the Morris Ranch Road, proceed 29.2 miles to the Yost junction, passing through Lynn and crossing the Raft River. Turn right and proceed past the creek and the cattleguard for 0.3 miles. Turn right and proceed 0.45 miles and take the left fork (right fork leads to a bridge). Proceed 0.1 miles and pass through the gate, continue 1.1 miles to the Forest Service fence and sign. Continue 0.9 miles, turn right and proceed 1.4 miles to a witness post on left (road is steep, winding and rough). From the rock pile, walk five paces at a bearing of 137 degrees magnetic to the 0-foot stake of the baseline marked by browse tag #7916. Bearing of the baseline is 160 degrees magnetic. From the 100-foot baseline stake, the baseline doglegs and runs 208 degrees magnetic.

Map Name: Buck Hollow, Utah-Idaho



Township: 14N Range: 16W Section: 21

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 277577 E 4644920 N

BROAD HOLLOW - TREND STUDY NO. 1-14

Site Information

Site Description: This study is located on Forest Service land northeast of Lynn in upper Broad Hollow. The vegetation is dominated by a mix of mountain brush species. Utah juniper (*Juniperus osteosperma*) may have been more dominant prior to 1984, when the study was established. Prior to 1984, there is evidence of a fire that reduced juniper in the area. After the study was sampled in 1996, another fire, likely the McMillan fire, burned the upper half of the transect. The Forest Service manages the area as part of the Broad Hollow pasture of the West End allotment. Deer pellet groups have been sampled in moderate to moderately high abundance since 2001. Occupancy by other wildlife appears to be minimal. Sampled cattle sign has been low since 2001 (Table - Pellet Group Data).

Browse: The browse component is a mixture of mountain brush species, several of which are preferred species. The key browse species are mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*), and Utah serviceberry (*Amelanchier utahensis*). The sagebrush on the site is a moderately dense population that has displayed mostly light to moderate use. Density of sagebrush has steadily decreased since 1996. Decadence of sagebrush has been somewhat moderate, but vigor has been good. Recruitment of young sagebrush plants was excellent in the early sample years, but has been poor since 2006. Bitterbrush has a smaller density, but has received moderate to heavy use. Decadence has remained low and vigor has been good. Serviceberry occurs in relatively low numbers, with mostly light to moderate use. Mountain snowberry (*Symphoricarpos oreophilus*) is also very abundant, but is not a preferred browse species and receives little use. Snowberry density increased after the fire, as this species is fire tolerant and can resprout. Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) is an abundant increaser shrub. The density of low rabbitbrush has decreased at each reading, but remains prevalent on the site (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory has a diverse composition, which also provides substantial ground cover. Among perennial grasses, the most prevalent are thickspike wheatgrass (*Agropyron dasystachyum*) and Sandberg bluegrass (*Poa secunda*). Other grasses include Indian ricegrass (*Oryzopsis hymenoides*), bottlebrush squirreltail (*Sitanion hystrix*), bluebunch wheatgrass (*Agropyron spicatum*), needle-and-thread (*Stipa comata*), and occasional clumps of Great Basin wildrye (*Elymus cinereus*). The annual species cheatgrass (*Bromus tectorum*) is prevalent on the site and has dominated the herbaceous understory through much of the study, but has decreased substantially since 1996. Forbs are also productive and include several desirable species. Important forbs include arrowleaf balsamroot (*Balsamorhiza sagittata*), narrowleaf lomatium (*Lomatium triternatum*), cryptantha (*Cryptantha* sp.), sulfur eriogonum (*Eriogonum umbellatum*), and tapertip hawksbeard (*Crepis acuminata*). Arrowleaf balsamroot is the dominant forb, making up most of the forb cover for each sampling period (Table - Herbaceous Trends).

Soil: The soil is in the Parkay-Broad Canyon families association, which occurs on mountain slopes. Parent material consists of colluvium derived from quartzite, schist, and gneiss (Soil Survey Staff 2011). The soil has a sandy loam texture, and a neutral soil reaction (pH 7.2) (Table - Soil Analysis Data). The soil surface is quite rocky in places. Vegetation and litter cover is good with the exception of some of the larger shrub interspaces where bare soil can be found (Table - Basic Cover). The erosion condition was classified as stable in 2001 and 2011, but was slight in 2006.

Trend Assessments

Browse:

- **1984 to 1990 - slightly down (-1):** The density of sagebrush decreased 9% from 1,465 plants/acre to 1,331 plants/acre, and decadence increased from 5% to 20%. Bitterbrush density decreased 33% from

998 plants/acre to 665 plants/acre, but decadence also decreased from 20% to 10%. Recruitment of young plants remained very good for both species.

- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence of sagebrush decreased to 5%. Recruitment of young sagebrush plants decreased from 45% to 19%, but is still considered to be good. Decadence of bitterbrush decreased to 2%. Recruitment of young bitterbrush plants decreased from 40% to 11%, but is still considered to be good.
- **1996 to 2001 - down (-2):** The density of both sagebrush and bitterbrush decreased due to the fire that burned the upper half of the transect in 1996. Density of sagebrush decreased 51% from 2,880 plants/acre to 1,400 plants/acre, and cover decreased slightly from 10% to 8%. Decadence of sagebrush increased to 11%. Density of bitterbrush decreased by 40% from 900 plants/acre to 540 plants/acre, but cover remained similar. Decadence increased from 2% to 11%.
- **2001 to 2006 - slightly down (-1):** The density of sagebrush decreased by 20% to 1,120 plants/acre, though cover remained similar at 7%. Decadence increased to 23%, but poor vigor remained low at 2%. Recruitment of young sagebrush plants decreased from 17% to 9%. Density of bitterbrush remained similar at 560 plants/acre, and cover increased slightly from 4% to 5%. Decadence decreased to 7%, and poor vigor decreased to 4%. Recruitment of young bitterbrush decreased from 15% to 4%.
- **2006 to 2011 - slightly down (-1):** Sagebrush density decreased by 14% to 960 plants/acre, and cover decreased slightly to 6%. Decadence remained similar at 21%, and poor vigor increased to 17%. Recruitment of young sagebrush plants decreased to 6% of the population. The bitterbrush population remained similar.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency of perennial grasses increased 36%, with a significant increase in the nested frequency of Sandberg bluegrass.
- **1990 to 1996 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 10%. Cheatgrass dominated, but data was not collected for annual species in past readings.
- **1996 to 2001 - up (+2):** There was a 27% increase in the sum of nested frequency of perennial grasses, and cover increased 7% to 15%. Cheatgrass decreased significantly in nested frequency, and cover decreased from 12% to 6%.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 18%, and cover decreased to 11%. Cheatgrass nested frequency and cover remained similar.
- **2006 to 2011 - stable (0):** The sum of nested frequency of perennial grasses decreased by 9%, and cover decreased to 8%. However, there was a significant decrease in the nested frequency of cheatgrass, and cover decreased from 7% to 3%.

Forb:

- **1984 to 1990 - stable (0):** The perennial forb sum of nested frequency remained similar.
- **1990 to 1996 - up (+2):** The sum of nested frequency of perennial forbs increased 79%.
- **1996 to 2001 - down (-2):** There was a 61% decrease in the sum of nested frequency of perennial forbs, though cover remained similar at 6%. The sum of nested frequency of annual forbs and cover increased substantially.
- **2001 to 2006 - up (+2):** The sum of nested frequency of perennial forbs increased three-fold, and cover increased to 8%.
- **2006 to 2011 - down (-2):** The perennial forb sum of nested frequency decreased by 41%, and cover decreased to 4%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

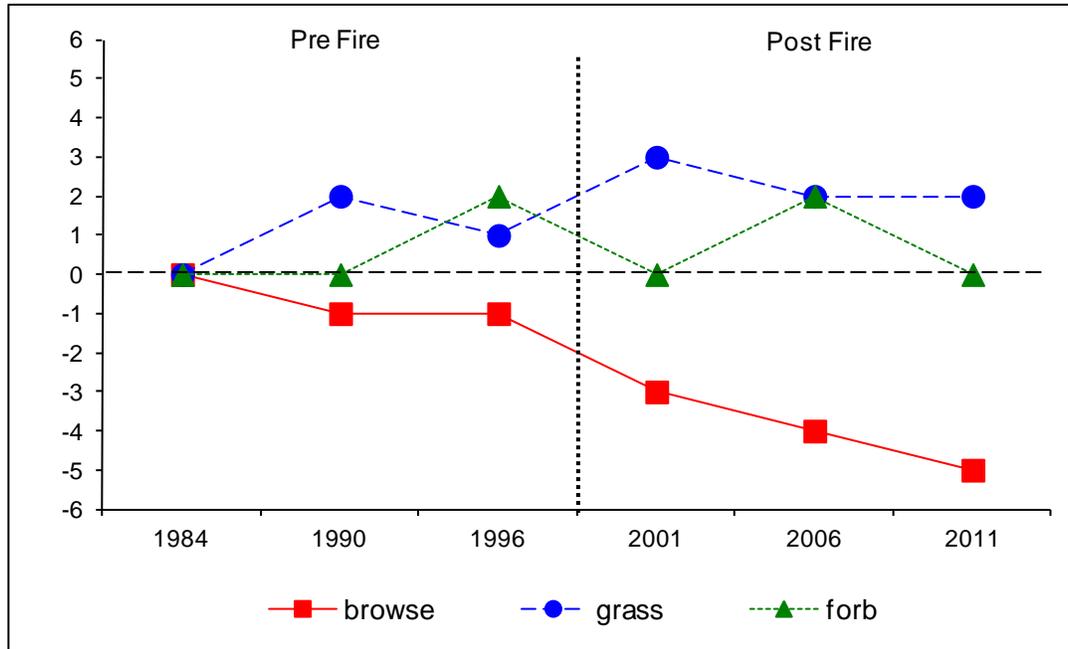
Management unit 1, study no: 14

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	21.2	13.9	7.2	13.0	-9.2	10.0	0.0	56.0	Fair
01	17.6	12.2	10.0	30.0	-4.8	10.0	0.0	74.9	Good
06	21.2	9.8	2.9	22.2	-5.0	10.0	0.0	61.0	Fair
11	16.4	11.6	1.4	15.9	-2.4	7.9	0.0	50.9	Poor-Fair

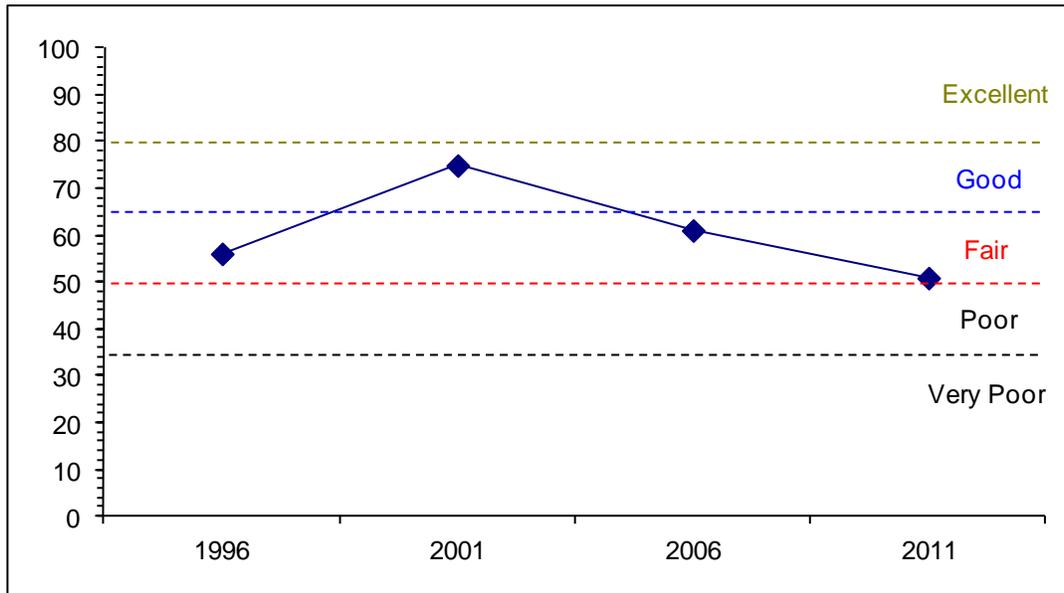
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 1, Study no: 14



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 1, Study no: 14



HERBACEOUS TRENDS--
 Management unit 01, Study no: 14

Type	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron dasystachyum	a152	a135	a131	b194	a146	a113	1.80	6.03	1.59	1.39
G	Agropyron spicatum	9	-	21	14	11	12	.47	.18	.51	.36
G	Bromus tectorum (a)	-	-	c363	b290	b302	a262	12.29	6.40	6.71	3.21
G	Elymus cinereus	3	-	1	1	4	-	.03	.15	.24	.15
G	Melica bulbosa	-	-	-	3	4	-	-	.03	.01	-
G	Oryzopsis hymenoides	a1	a4	b15	a-	a3	a2	.54	.01	.03	.03
G	Poa fendleriana	b27	ab20	a2	a-	a3	a3	.00	-	.03	.00
G	Poa secunda	a55	b174	bc150	bc204	bc173	c186	3.32	8.05	8.18	5.97
G	Sitanion hystrix	4	1	9	-	-	4	.02	-	-	.03
G	Stipa comata	ab26	b42	a10	a16	a9	a-	.28	.56	.48	-
G	Vulpia octoflora (a)	-	-	3	-	-	-	.00	-	-	-
Total for Annual Grasses		0	0	366	290	302	262	12.30	6.40	6.71	3.21
Total for Perennial Grasses		277	376	339	432	353	320	6.48	15.02	11.08	7.94
Total for Grasses		277	376	705	722	655	582	18.78	21.43	17.79	11.15
F	Agoseris glauca	ab39	a12	b52	a10	b45	ab29	.11	.03	.21	.40
F	Alyssum alyssoides (a)	-	-	a10	b51	a21	b71	.02	.26	.04	.64
F	Arabis sp.	a3	a4	b27	a4	a5	a4	.08	.03	.03	.03
F	Astragalus beckwithii	5	3	3	-	1	6	.18	-	.00	.01
F	Astragalus utahensis	-	2	-	-	-	-	-	-	-	-
F	Balsamorhiza sagittata	a9	a11	b35	ab28	b33	b40	3.65	4.26	5.84	2.75
F	Calochortus nuttallii	-	3	-	-	-	3	-	-	-	.00
F	Chaenactis douglasii	6	6	4	-	2	-	.01	-	.00	-
F	Chenopodium leptophyllum(a)	-	-	-	-	8	7	-	-	.03	.02

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	<i>Collinsia parviflora</i> (a)	-	-	a155	b221	a191	b254	.47	2.85	.88	2.61
F	<i>Collomia linearis</i> (a)	-	-	2	6	-	-	.00	.01	-	-
F	<i>Comandra pallida</i>	-	-	5	3	3	6	.01	.00	.00	.04
F	<i>Crepis acuminata</i>	54	66	43	39	34	50	.51	1.16	.73	.40
F	<i>Cryptantha</i> sp.	a-	a-	b55	a-	c123	a3	.15	-	.43	.00
F	<i>Descurainia pinnata</i> (a)	-	-	a4	ab9	a3	b21	.01	.17	.01	.05
F	<i>Eriogonum umbellatum</i>	b12	ab7	a1	a3	a3	a-	.03	.03	.00	-
F	<i>Galium bifolium</i> (a)	-	-	-	-	6	3	-	-	.01	.00
F	<i>Gayophytum ramosissimum</i> (a)	-	-	a1	a4	b31	a7	.00	.01	.06	.01
F	<i>Hackelia patens</i>	a3	ab17	ab18	a3	b31	ab17	1.07	.07	1.09	.19
F	<i>Lappula occidentalis</i> (a)	-	-	a10	ab27	ab16	b30	.02	.11	.04	.10
F	<i>Lathyrus brachycalyx</i>	-	-	-	1	-	-	-	.00	-	-
F	<i>Lepidium</i> sp. (a)	-	-	3	-	-	-	.00	-	-	-
F	<i>Lithospermum ruderales</i>	-	-	-	-	3	4	-	-	.01	.06
F	<i>Lomatium triternatum</i>	3	2	-	4	-	2	-	.03	-	.03
F	<i>Machaeranthera canescens</i>	-	-	3	-	2	4	.03	-	.00	.01
F	<i>Microsteris gracilis</i> (a)	-	-	a-	b9	b13	b18	-	.02	.05	.08
F	<i>Navarretia intertextata</i> (a)	-	-	-	1	-	-	-	.00	-	-
F	<i>Phlox hoodii</i>	b5	a1	a-	a-	a-	a-	-	-	-	-
F	<i>Phlox longifolia</i>	12	5	7	3	4	-	.01	.01	.01	-
F	<i>Polygonum douglasii</i> (a)	-	-	b5	a-	c43	a-	.01	-	.08	-
F	<i>Ranunculus testiculatus</i> (a)	-	-	a3	a3	a6	b37	.00	.01	.03	.07
F	<i>Senecio multilobatus</i>	-	3	1	-	-	3	.15	-	-	.01
F	<i>Tragopogon dubius</i> (a)	b18	a3	a-	a2	a-	a1	-	.00	-	.00
Total for Annual Forbs		18	3	193	333	338	449	0.55	3.46	1.25	3.60
Total for Perennial Forbs		151	142	254	98	289	171	6.02	5.65	8.39	3.95
Total for Forbs		169	145	447	431	627	620	6.58	9.11	9.64	7.56

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

BROWSE TRENDS--

Management unit 01, Study no: 14

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Amelanchier utahensis	5	11	5	4	2.00	1.87	2.84	2.46
B	Artemisia tridentata vaseyana	70	35	35	33	9.48	7.55	7.53	5.71
B	Chrysothamnus nauseosus consimilis	0	0	0	3	-	-	.15	.21
B	Chrysothamnus viscidiflorus viscidiflorus	78	78	77	54	6.49	7.71	9.85	2.92
B	Eriogonum microthecum	1	2	2	1	.03	-	-	-
B	Juniperus osteosperma	0	0	0	1	-	-	-	-
B	Leptodactylon pungens	4	4	2	2	.30	.18	.30	.36
B	Opuntia sp.	53	58	57	60	4.37	2.50	3.59	3.65
B	Purshia tridentata	28	21	17	16	4.19	3.54	5.03	3.74
B	Symphoricarpos oreophilus	35	35	41	38	7.39	9.31	8.52	6.10
B	Yucca sp.	-	-	-	-	-	-	-	.15
Total for Browse		274	244	236	212	34.27	32.70	37.84	25.32

CANOPY COVER, LINE INTERCEPT--

Management unit 01, Study no: 14

Species	Percent Cover	
	'06	'11
Amelanchier utahensis	2.91	3.13
Artemisia tridentata vaseyana	7.75	9.19
Chrysothamnus nauseosus consimilis	-	.11
Chrysothamnus viscidiflorus viscidiflorus	11.28	3.59
Opuntia sp.	2.54	3.50
Purshia tridentata	5.33	3.79
Symphoricarpos oreophilus	19.31	11.26

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 01, Study no: 14

Species	Average leader growth (in)		
	'01	'06	'11
Amelanchier utahensis	2.7	3.1	0.5
Artemisia tridentata vaseyana	1.5	0.9	0.6
Purshia tridentata	1.2	0.8	0.3

BASIC COVER--

Management unit 01, Study no: 14

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	2.00	13.00	49.77	56.67	55.03	43.54
Rock	7.00	6.50	2.10	1.54	2.07	1.29
Pavement	1.00	1.00	1.33	.85	2.25	.39
Litter	62.50	46.25	62.24	50.53	38.86	48.22
Cryptogams	1.00	2.50	1.36	1.20	1.83	1.41
Bare Ground	26.50	30.75	10.75	15.88	20.92	19.55

SOIL ANALYSIS DATA --

Management unit 01, Study no: 14, Study Name: Broad Hollow

Effective rooting depth (in)	pH	Sandy-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.5	7.2	63.7	19.0	17.3	1.6	9.1	121.6	0.5

PELLET GROUP DATA--

Management unit 01, Study no: 14

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	17	6	50	10	-	-	-
Elk	-	-	1	2	1 (2)	-	-
Deer	32	17	10	13	29 (71)	31 (76)	47 (116)
Cattle	3	2	3	2	11 (27)	1 (2)	-

BROWSE CHARACTERISTICS--

Management unit 01, Study no: 14

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Amelanchier utahensis										
84	133	0	100	0	-	100	0	0	31/32	
90	66	0	100	0	-	0	100	100	33/28	
96	100	0	100	0	-	80	0	0	43/62	
01	340	71	29	0	140	6	0	0	50/55	
06	100	0	80	20	-	40	0	20	50/57	
11	80	0	100	0	-	25	0	0	48/60	
Artemisia tridentata vaseyana										
84	1465	45	50	5	733	50	5	0	14/19	
90	1331	45	35	20	-	35	15	0	16/17	
96	2880	19	76	5	140	10	0	0	21/32	
01	1400	17	71	11	-	9	3	4	22/33	
06	1120	9	68	23	60	25	5	2	24/39	
11	960	6	73	21	-	21	6	17	23/37	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Chrysothamnus nauseosus consimilis										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	0	0	0	0	-	0	0	0	21/30	
01	0	0	0	0	-	0	0	0	31/43	
06	0	0	0	0	-	0	0	0	31/39	
11	60	0	33	67	-	100	0	67	21/30	
Chrysothamnus viscidiflorus viscidiflorus										
84	7064	17	69	14	599	16	0	8	17/26	
90	5598	19	37	44	66	18	6	5	16/14	
96	4700	14	82	4	-	4	0	0	16/22	
01	4100	2	93	5	-	0	0	0	14/19	
06	3420	2	87	11	240	.58	.58	4	15/23	
11	2180	4	55	41	-	29	6	37	15/20	
Eriogonum microthecum										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	0	100	-	-	0	0	0	5/9	
01	60	0	100	-	-	0	0	0	9/14	
06	40	0	100	-	-	0	0	0	7/17	
11	20	0	100	-	-	0	0	0	11/22	
Juniperus osteosperma										
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	20	100	0	-	-	0	0	0	-/-	
Leptodactylon pungens										
84	865	23	77	0	-	0	0	0	10/12	
90	665	10	80	10	-	0	0	10	5/9	
96	140	0	100	0	-	0	0	0	11/13	
01	120	0	100	0	-	0	0	0	8/9	
06	80	50	25	25	140	0	0	0	7/11	
11	40	0	100	0	-	0	0	0	8/15	
Opuntia sp.										
84	999	0	100	0	-	0	0	0	3/8	
90	1864	32	64	4	-	0	0	18	4/17	
96	2520	6	84	10	-	0	0	4	4/17	
01	4340	14	78	8	-	0	0	6	4/13	
06	2660	1	98	2	-	0	0	2	4/17	
11	3020	2	98	0	-	0	.66	5	4/20	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Purshia tridentata										
84	998	27	53	20	-	53	27	7	20/31	
90	665	40	50	10	66	60	30	0	19/20	
96	900	11	87	2	20	31	24	0	23/43	
01	540	15	74	11	-	56	22	7	24/53	
06	560	4	89	7	60	36	32	4	27/51	
11	540	0	96	4	-	78	15	7	34/63	
Symphoricarpos oreophilus										
84	2532	29	71	0	-	18	0	0	23/23	
90	1798	15	63	22	66	4	4	4	19/29	
96	1420	17	79	4	60	3	0	1	27/47	
01	1820	24	76	0	80	0	0	0	26/45	
06	1960	14	81	5	-	2	0	0	25/46	
11	1800	24	68	8	-	3	1	16	23/41	
Tetradymia canescens										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	14/36	
01	0	0	0	-	-	0	0	0	17/35	
06	0	0	0	-	-	0	0	0	12/33	
11	0	0	0	-	-	0	0	0	11/23	