

Trend Study 1-14-06

Study site name: Broad Hollow .

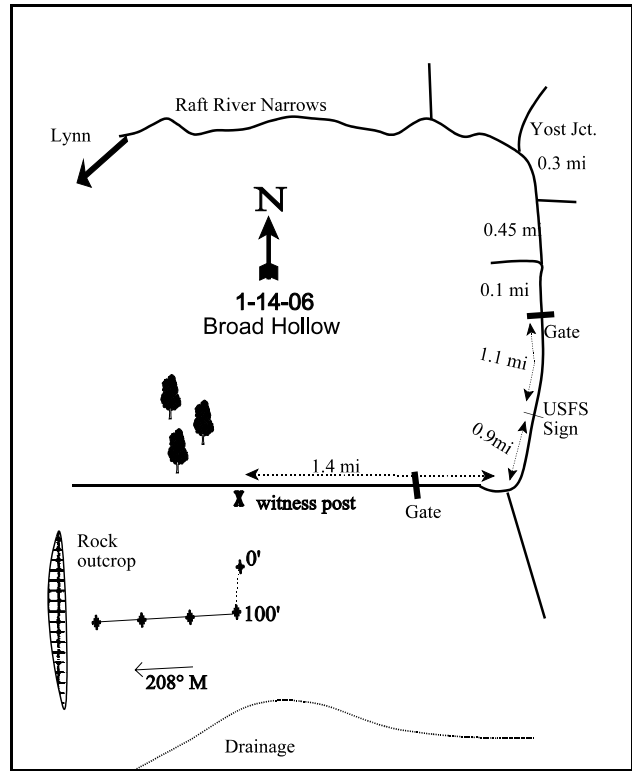
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 160 degrees magnetic.

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

LOCATION DESCRIPTION

From the junction of U-30 and the Morris Ranch Road, proceed 29.2 miles to 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 travel 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

Diagrammatic Sketch

Township 14N, Range 16W, Section 21

UTM NAD 27, UTM 12T 4644711 N, 277642 E

DISCUSSION

Broad Hollow - Trend Study No. 1-14

Study Information

This study is located on Forest Service land northeast of Lynn on preferred winter range in upper Broad Hollow (elevation: 6,500 feet, slope: 10-20%, aspect: southeast). The vegetation is dominated by a mix of mountain brush species. Utah junipers may have been more dominant prior to 1984 when the study was established. There is evidence of a fire prior to that time, which reduced junipers in the area. Another fire burned the upper half of the transect sometime in late 1996 or 1997. The area is grazed by 933 cows and calves in the Broad Hollow pasture of the West End allotment. In 2006 it was grazed from July 7-17. A pellet group transect in 2001 estimated 29 deer days use/acre (71 deer days use/ha) and 11 cow days use/acre (27 cow days use/ha). One pellet group was thought to be from an elk. In 2006, 31 deer days use/acre (76 ddu/ha) and 1 cow day use/acre (2 cdu/ha) were estimated.

Soil

The Parkay soil series consists of deep and very deep, well drained soils that formed in alluvium, colluvium, or residuum derived from intermediate and basic igneous rocks (USDA-NRCS 2006). The effective rooting depth is almost 16 inches. It has a sandy loam texture and a neutral soil reaction (7.2 pH). Phosphorus is marginal at 9.1 ppm, which may limit normal plant growth and development (Tiedemann and Lopez 2004). The soil surface is quite rocky in places. Vegetation and litter cover are adequate to protect the soil from erosion except in some of the larger shrub interspaces where bare soil can be found. The erosion condition was classified as stable in 2001, but was slight in 2006. Surface litter movement and pedestalling were noted in 2006.

Browse

As is typical of mountain brush types, browse composition consists of several preferred forage species. The key browse species are antelope bitterbrush, serviceberry, and mountain big sagebrush. Serviceberry occurs in relatively low numbers. Cover has averaged about 2%. Utilization was extremely heavy in 1990, mostly moderate in 1996, light in 2001, and light to moderate in 2006. Bitterbrush cover has averaged about 4% since 1996. Density was 900 plants/acre in 1996, but declined to 540 plants/acre in 2001 after a fire burned about half of the study area. Density was 560 plants/acre in 2006. Utilization has been mostly moderate, with some heavy use. Decadence has remained low and vigor good.

Mountain big sagebrush cover was over 9% in 1996, but dropped after the fire to about 7.5% in both 2001 and 2006. Sagebrush density was 2,880 plants/acre in 1996, which dropped by about half to 1,400 plants/acre in 2001. In 2006, sagebrush density again declined by 20% to 1,120 plants/acre. Recruitment declined and decadence increased from 11% to 23%. Utilization has been mostly light.

Stickyleaf low rabbitbrush is an abundant increaser shrub. The density has declined at each reading, but was still abundant in 2006 with nearly 10% cover, which was highest for any shrub species. Mountain snowberry is also very abundant. Cover has averaged about 8% from 1996-2006. Snowberry density increased after the fire, as this species is fire tolerant and resprouts.

Herbaceous Understory

The herbaceous understory has a diverse composition which provides substantial ground cover. Unfortunately, annual cheatgrass was the most abundant species. The nested frequency value for cheatgrass significantly declined after 1996 and cover declined from 12% to about 6%. It is widely distributed across the area as 97% of the quadrats sampled cheatgrass in 2006. Among perennial grasses, the most prevalent are thickspike wheatgrass and Sandberg bluegrass. Other grasses include: Indian ricegrass, bottlebrush squirreltail, bluebunch wheatgrass, needle-and-thread, and occasional clumps of Great Basin wildrye. Forbs are also productive and include several desirable species. Important forbs include: arrowleaf balsamroot,

narrowleaf lomatium, cryptantha, sulfur eriogonum, and tapertip hawksbeard. Arrowleaf balsamroot is the dominant forb, making up most of the forb cover each sampling period. Utilization of grasses and forbs is light.

1990 TREND ASSESSMENT

The key browse species, sagebrush, bitterbrush, and serviceberry, show evidence of moderate to heavy hedging. Vigor is good, but the populations of these shrubs all appear to be slightly decreasing. Snowberry and low rabbitbrush densities have also declined slightly. Overall, trend for browse is considered slightly down. The herbaceous understory has a high species diversity with six species of perennial grasses and 15 species of perennial forbs encountered. The grass trend is up. The increase of Sandberg bluegrass was very large. Sum of nested frequency of forbs declined slightly, but only yellow salsify had a significant decline. The forb trend is stable.

browse -slightly down (-1) grass - up (+2) forb - stable (0)

1996 TREND ASSESSMENT

The browse trend is slightly up with increased densities and decreases in percent decadence for the key browse species, serviceberry, mountain big sagebrush, and antelope bitterbrush. Utilization is mostly light to moderate. The changes in density and basic ground cover characteristics may also be due to changes in methodology. The trend for grasses is stable. There was a slight decline of sum of nested frequency of perennial grasses, but this may be due to the increased sampling area. Annual cheatgrass dominates, but no prior data was collected for annual species. The forb trend is slightly up as perennial forbs were much more abundant. The DCI score is fair. High amounts of cheatgrass are detrimental to this site.

winter range condition (DC Index) - fair (58) Mid-level potential scale
browse - slightly up (+1) grass - stable (0) forb - slightly up (+1)

2001 TREND ASSESSMENT

The browse trend is down with decreases in density for both sagebrush and bitterbrush after the fire. Percent decadence also increased for both of these species. Cover for sagebrush and bitterbrush also declined. Snowberry density increased after the fire. Trend for grasses is up. Thickspike wheatgrass, a rhizomatous species, responded well to the fire and significantly increased in nested frequency. All other perennials remained unchanged. Cheatgrass sum of nested frequency declined significantly. Forbs are down. Three perennial forbs were significantly less abundant and annual forb sum of nested frequency increased by 72%. The DCI score increased despite the loss of some preferred browse cover. Cheatgrass cover was lower and perennial grass cover increased.

winter range condition (DC Index) - good-excellent (79) Mid-level potential scale
browse - down (-2) grass - up (+2) forb - down (-2)

2006 TREND ASSESSMENT

The browse trend is slightly down. Mountain big sagebrush density declined 20% (1,400 to 1,120 plant/acre). Decadence increased (11% to 23%) and the percentage of young plants in the population declined. Bitterbrush density was virtually unchanged (540 to 560 plants/acre) and decadence decreased from 11% to 7%. The grass trend is slightly down. Thickspike wheatgrass nested frequency declined significantly to a similar abundance to 1996. No other species had a significant change. The forb trend is up. Perennial forb nested frequency was nearly three times higher than in 2001. The DCI score declined to fair. Shrub decadence increased, while recruitment and perennial grass cover decreased.

winter range condition (DC Index) - fair (63) Mid-level potential scale
browse - slightly down (-1) grass - slightly down (-1) forb - up (+2)

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

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	<i>Agropyron dasystachyum</i>	a152	a135	a131	b194	a146	1.80	6.03	1.59
G	<i>Agropyron spicatum</i>	ab9	a-	b21	b14	b11	.47	.18	.51
G	<i>Bromus tectorum</i> (a)	-	-	b363	a290	a302	12.29	6.40	6.71
G	<i>Elymus cinereus</i>	3	-	1	1	4	.03	.15	.24
G	<i>Melica bulbosa</i>	-	-	-	3	4	-	.03	.01
G	<i>Oryzopsis hymenoides</i>	a1	ab4	b15	a-	ab3	.54	.01	.03
G	<i>Poa fendleriana</i>	b27	ab20	a2	a-	a3	.00	-	.03
G	<i>Poa secunda</i>	a55	b174	b150	b204	b173	3.32	8.05	8.18
G	<i>Sitanion hystrix</i>	4	1	9	-	-	.02	-	-
G	<i>Stipa comata</i>	ab26	b42	a10	a16	a9	.28	.56	.48
G	<i>Vulpia octoflora</i> (a)	-	-	3	-	-	.00	-	-
Total for Annual Grasses		0	0	366	290	302	12.30	6.40	6.71
Total for Perennial Grasses		277	376	339	432	353	6.48	15.02	11.08
Total for Grasses		277	376	705	722	655	18.78	21.43	17.79
F	<i>Agoseris glauca</i>	ab39	a12	b52	a10	b45	.11	.03	.21
F	<i>Alyssum alyssoides</i> (a)	-	-	a10	b51	a21	.02	.26	.04
F	<i>Arabis</i> sp.	A3	a4	b27	a4	a5	.08	.03	.03
F	<i>Astragalus beckwithii</i>	5	3	3	-	1	.18	-	.00
F	<i>Astragalus utahensis</i>	-	2	-	-	-	-	-	-
F	<i>Balsamorhiza sagittata</i>	a9	ab11	c35	bc28	c33	3.65	4.26	5.84
F	<i>Calochortus nuttallii</i>	-	3	-	-	-	-	-	-
F	<i>Chaenactis douglasii</i>	6	6	4	-	2	.01	-	.00
F	<i>Chenopodium leptophyllum</i> (a)	-	-	a-	a-	b8	-	-	.03
F	<i>Collomia linearis</i> (a)	-	-	2	6	-	.00	.01	-
F	<i>Comandra pallida</i>	-	-	5	3	3	.01	.00	.00
F	<i>Collinsia parviflora</i> (a)	-	-	a155	b221	ab191	.47	2.85	.88
F	<i>Crepis acuminata</i>	ab54	b66	ab43	ab39	a34	.51	1.16	.73
F	<i>Cryptantha</i> sp.	a-	a-	b55	a-	c123	.15	-	.43
F	<i>Descurainia pinnata</i> (a)	-	-	4	9	3	.01	.17	.01
F	<i>Eriogonum umbellatum</i>	b12	ab7	a1	a3	a3	.03	.03	.00
F	<i>Galium bifolium</i> (a)	-	-	-	-	6	-	-	.01
F	<i>Gayophytum ramosissimum</i> (a)	-	-	a1	a4	b31	.00	.01	.06
F	<i>Hackelia patens</i>	a3	ab17	ab18	a3	b31	1.07	.07	1.09
F	<i>Lathyrus brachycalyx</i>	-	-	-	1	-	-	.00	-
F	<i>Lappula occidentalis</i> (a)	-	-	a10	b27	ab16	.02	.11	.04

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Lepidium sp. (a)	-	-	3	-	-	.00	-	-
F	Lithospermum ruderales	-	-	-	-	3	-	-	.01
F	Lomatium triternatum	3	2	-	4	-	-	.03	-
F	Machaeranthera canescens	-	-	3	-	2	.03	-	.00
F	Microsteris gracilis (a)	-	-	a-	b ⁹	b ¹³	-	.02	.05
F	Navarretia intertexta (a)	-	-	-	1	-	-	.00	-
F	Phlox hoodii	5	1	-	-	-	-	-	-
F	Phlox longifolia	12	5	7	3	4	.01	.01	.01
F	Polygonum douglasii (a)	-	-	a ⁵	a-	b ⁴³	.01	-	.08
F	Ranunculus testiculatus (a)	-	-	3	3	6	.00	.01	.03
F	Senecio multilobatus	-	3	1	-	-	.15	-	-
F	Tragopogon dubius	b ¹⁸	a ³	a-	a ²	a-	-	.00	-
Total for Annual Forbs		0	0	193	331	338	0.55	3.45	1.25
Total for Perennial Forbs		169	145	254	100	289	6.02	5.65	8.39
Total for Forbs		169	145	447	431	627	6.58	9.11	9.64

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	'96	'01	'06
B	Amelanchier utahensis	5	11	5	2.00	1.87	2.84
B	Artemisia tridentata vaseyana	70	35	35	9.48	7.55	7.53
B	Chrysothamnus nauseosus consimilis	0	0	0	-	-	.15
B	Chrysothamnus viscidiflorus viscidiflorus	78	78	77	6.49	7.71	9.85
B	Eriogonum microthecum	1	2	2	.03	-	-
B	Leptodactylon pungens	4	4	2	.30	.18	.30
B	Opuntia sp.	53	58	57	4.37	2.50	3.59
B	Purshia tridentata	28	21	17	4.19	3.54	5.03
B	Symphoricarpos oreophilus	35	35	41	7.39	9.31	8.52
Total for Browse		274	244	236	34.27	32.70	37.84

CANOPY COVER, LINE INTERCEPT --
Management unit 01 , Study no: 14

Species	Percent Cover
	'06
Amelanchier utahensis	2.91
Artemisia tridentata vaseyana	7.75
Chrysothamnus viscidiflorus viscidiflorus	11.28
Opuntia sp.	2.54
Purshia tridentata	5.33
Symphoricarpos oreophilus	19.31

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 01 , Study no: 14

Species	Average leader growth (in)	
	'01	'06
Amelanchier utahensis	2.7	3.1
Artemisia tridentata wyomingensis	1.5	0.9
Purshia tridentata	1.2	0.8

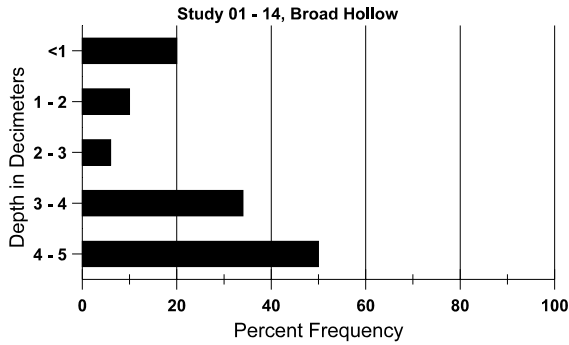
BASIC COVER --
Management unit 01 , Study no: 14

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

SOIL ANALYSIS DATA --
Herd Unit 01, Study no: 14, Broad Hollow

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy loam			%0M	PPM P	PPM K	dS/m
			% sand	% silt	% clay				
15.52	59.0 (3.9)	7.2	63.7	19.0	17.3	1.6	9.1	121.6	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 01 , Study no: 14

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	17	6	50
Elk	-	-	1
Deer	32	17	10
Cattle	3	2	3

Days use per acre (ha)	
'01	'06
-	-
1 (2)	-
29 (71)	31 (76)
11 (27)	1 (2)

BROWSE CHARACTERISTICS --

Management unit 01 , Study no: 14

		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												
84	133	-	-	133	-	-	100	0	0	-	0	31/32
90	66	-	-	66	-	-	0	100	0	-	100	33/28
96	100	-	-	100	-	-	80	0	0	-	0	43/62
01	340	140	240	100	-	20	6	0	0	-	0	50/55
06	100	-	-	80	20	20	40	0	20	20	20	50/57
Artemisia tridentata vaseyana												
84	1465	733	666	733	66	-	50	5	5	-	0	14/19
90	1332	-	600	466	266	-	35	15	20	-	0	16/17
96	2880	140	540	2200	140	220	10	0	5	-	0	21/32
01	1400	-	240	1000	160	840	9	3	11	4	4	22/33
06	1120	60	100	760	260	440	25	5	23	2	2	24/39

		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)
Chrysothamnus nauseosus consimilis												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	21/30
01	0	-	-	-	-	-	0	0	-	-	0	31/43
06	0	-	-	-	-	-	0	0	-	-	0	31/39
Chrysothamnus viscidiflorus viscidiflorus												
84	7066	600	1200	4866	1000	-	16	0	14	1	8	17/26
90	5598	66	1066	2066	2466	-	18	6	44	.71	5	16/14
96	4700	-	680	3840	180	40	4	0	4	-	0	16/22
01	4100	-	100	3800	200	120	0	0	5	-	0	14/19
06	3420	240	80	2960	380	40	.58	.58	11	4	4	15/23
Eriogonum microthecum												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	20	-	-	20	-	-	0	0	-	-	0	5/9
01	60	-	-	60	-	-	0	0	-	-	0	9/14
06	40	-	-	40	-	-	0	0	-	-	0	7/17
Leptodactylon pungens												
84	866	-	200	666	-	-	0	0	0	-	0	10/12
90	665	-	66	533	66	-	0	0	10	-	10	5/9
96	140	-	-	140	-	-	0	0	0	-	0	11/13
01	120	-	-	120	-	-	0	0	0	-	0	8/9
06	80	140	40	20	20	-	0	0	25	-	0	7/11
Opuntia sp.												
84	1000	-	-	1000	-	-	0	0	0	-	0	3/8
90	1866	-	600	1200	66	-	0	0	4	-	18	4/17
96	2520	-	160	2120	240	40	0	0	10	4	4	4/17
01	4340	-	620	3380	340	-	0	0	8	6	6	4/13
06	2660	-	20	2600	40	20	0	0	2	2	2	4/17
Purshia tridentata												
84	999	-	266	533	200	-	53	27	20	2	7	20/31
90	665	66	266	333	66	-	60	30	10	-	0	19/20
96	900	20	100	780	20	20	31	24	2	-	0	23/43
01	540	-	80	400	60	100	56	22	11	7	7	24/53
06	560	60	20	500	40	160	36	32	7	4	4	27/51

		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>Symphoricarpos oreophilus</i>												
84	2533	-	733	1800	-	-	18	0	0	-	0	23/23
90	1799	66	266	1133	400	-	4	4	22	1	4	19/29
96	1420	60	240	1120	60	-	3	0	4	1	1	27/47
01	1820	80	440	1380	-	-	0	0	0	-	0	26/45
06	1960	-	280	1580	100	-	2	0	5	-	0	25/46
<i>Tetradymia canescens</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	14/36
01	0	-	-	-	-	-	0	0	-	-	0	17/35
06	0	-	-	-	-	-	0	0	-	-	0	12/33