

Trend Study 22-10-08

Study site name: Doubleup Hollow .

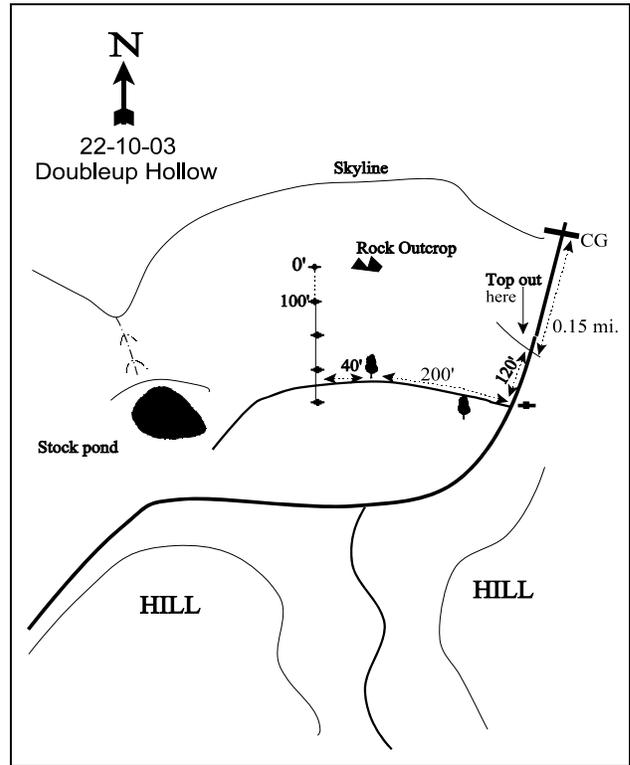
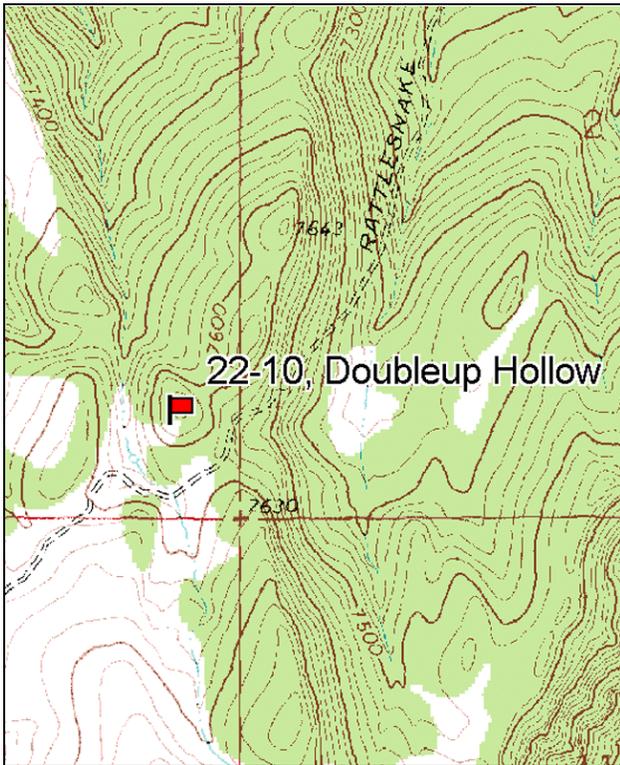
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 168 degrees magnetic.

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

LOCATION DESCRIPTION

Start from the cattleguard in front of the Chevron Station on the west side of the I-15 interchange at the south end of Beaver. Turn left onto the frontage road (2550 S) and go 0.7 miles south, then 1.6 miles west. Go past the turnoff to the Beaver International Airport 0.2 mile to a corner then 0.2 miles south to an intersection. Turn right, paralleling a fenceline and proceed 1.7 miles west to an intersection. Turn left onto a major dirt road and follow this main road (also known as the Rattlesnake Trail) for 6.7 miles, keeping to the right at all forks. From the junction, go 1.65 miles to the cattleguard. Continue 0.15 miles to a half high fencepost marked by a rock pile From the half high to the 0' stake, go 72 paces at 310 degrees.. The 300 ft stake is rebar tagged #7075.



Map Name: Greenville Bench

Diagrammatic Sketch

Township 31S, Range 8W, Section 3

GPS: NAD 83, UTM 12S 347594 E, 4222016 N

DISCUSSION

Doubleup Hollow - Trend Study No. 22-10

Study Information

Doubleup Hollow is located on BLM administered land southwest of Beaver [elevation: 7,600 feet (2,316m), slope: 10-15%, aspect: south]. This study samples a moderately high deer winter range on the north end of the Black Mountains. This area could have year round use by resident deer, depending on the weather. This area burned in 2007 as part of the Greenville Bench prescribed fire that went out of control. Prior to the fire the site was dominated by a mixture of open patches of sagebrush (*Artemisia tridentata* ssp. *vaseyana*) interspersed with pinyon (*Pinus edulis*), juniper (*Juniperus osteosperma*), and curleaf mountain mahogany (*Cercocarpus ledifolius*). This site receives light use with only 18 deer days use/acre (44 ddu/ha) estimated in 1998 and 29 deer days use/acre (71 ddu/ha) estimated from pellet group transect data collected in 2003. After the wildfire burned over the site in 2007, the 2008 pellet group transect found no pellet groups.

Soil

The site is within the Rypod soil series (USDA-NRCS 2007) which consists of very deep, well drained soils that formed in alluvium and colluvium derived from mixed igneous rocks. Large rock outcrops and the high percentage of rocks and pavement on the surface indicates the rockiness of the subsurface soil horizons. The upper soil is grayish brown, fine-textured, and loosely compacted. Soil analysis indicates a clay loam texture with a neutral pH (6.6). Phosphorous levels in the soil profile measure are low 7.1 ppm and may be marginal for plant growth and development (Tiedemann and Lopez 2004). Vegetation and litter cover aid in soil stabilization and keep erosion to a minimum. Bare soil has been very low in all years except after the wildfire where bare soil was 20%. Rock-pavement cover has increased from 24% to 81% after the fire. The soils were rated stable from an erosion condition class index in 2003. Surprisingly it was classified as stable in 2008. However, it appears that some soil movement had already taken place in the year since the wildfire as rock-pavement cover has escalated to over 80%.

Browse

In 2008, after the fire shrubs were removed from the community. Prior to the fire, the browse component dominated this site and the herbaceous understory was sparse. Mountain big sagebrush and bitterbrush were the most common species. Pinyon pine was also encroaching. Pinyon cover had reached about 11% in 2003, while juniper cover was about 2%. Tree density was 28 Utah juniper trees/acre and 132 pinyon trees/acre in 2003. Sagebrush cover had decreased from 24% in 1998 to 17% in 2003. Percent decadence had increased. Bitterbrush cover had averaged about 12% cover.

Herbaceous Understory

The herbaceous understory has fair diversity yet poor production. Bottlebrush squirreltail (*Sitanion hystrix*) has been the most abundant perennial species in all years, but it has also declined with each reading. Most of the perennial herbaceous plants were found growing under the protection of shrubs. In 2008, less than one growing season after the fire, it was too early to determine what effect the fire had on the understory.

Fire Rehabilitation

In the fall of 2007 the seed mix listed below was flown onto the burn. At this location there was no mechanical treatment done to bury the seed.

Greenville Bench Seed Mix

Kind of Seed	Bulk Pounds/Acre
Alfalfa 'Ladak'†	1.00
Antelope Bitterbrush*	0.04
Arriba Western Wheatgrass*	0.41
Bannock Thickspike Wheatgrass*	0.62
Blue Flax*	0.02
Bluebunch WG 'P7'*	0.05
Bluebunch WG 'P-7'†	0.57
Bottlebrush Squirreltail*	0.02
Canby Bluegrass 'Canbar'†	0.10
Crested Wheatgrass 'Nordan'†	1.01
Fourwing Saltbush*	0.05
Fourwing Saltbush*	0.01
Gooseberryleaf Globemallow*	0.01
Indian Ricegrass*	0.35
Ladak Alfalfa*	0.13
Luna Pubescent Wheatgrass *	0.66
Orchardgrass 'Paiute'†	0.19
Palmer Penstemon*	0.02
Palmer Penstemon*	0.02
Pubescent Wheatgrass†	0.64
Rimrock Indian Ricegrass*	0.18
Rush Intermediate Wheatgrass*	0.39
Russian Wildrye*	0.04
Sand Dropseed*	0.01
SITLA MIX**	0.15
Small Burnet*	0.32
Western Wheatgrass 'Arriba'†	0.58
Western Yarrow*	0.03
Yellow Sweet Clover*	0.41
Yellow Sweetclover†	0.15
Yellow Sweetclover†	0.83
	9.02
* Seed provided by BLM and mixed by GBRC	
** Seed provided by SITLA and mixed by GBRC	
† Seed provided by DWR to augment BLM/SITLA seed mix	

1991 TREND ASSESSMENT

Browse trend for the key species is slightly down. Sagebrush and bitterbrush experienced losses in their respective populations with corresponding increases in their decadence rate. The proportion of the plants displaying poor vigor increased for both species, and percent young declined. Sum of nested frequency for perennial grasses was slightly down. However, for this elevation there are very few perennial grasses, as it contributes very little forage. At this elevation one would expect much more production from the perennial grasses and forbs. The perennial forbs are also slightly down, and they provide very little forage for the site.

browse - slightly down (-1)

grass - stable (0)

forb - slightly down (-1)

1998 TREND ASSESSMENT

The browse trend is stable. The difference in bitterbrush density is most likely because of the larger sample size giving more accurate estimates of shrub densities which characteristically have discontinuous and/or clumped distributions. Decadence and the percentage of plants exhibiting good vigor have improved since 1991 for both bitterbrush and sagebrush. Sagebrush cover for sagebrush is high at an estimated 24% and may negatively affect the herbaceous understory production. The perennial grass sum of nested frequency is slightly down, but contributes to less than 3% cover. Perennial grasses provide very little source of forage. Trend for perennial grasses is slightly down and forb trend is stable. Perennial forb sum of nested frequency is slightly up, however, it contributes little useful forage.

Winter Range Condition (DCI) - poor-fair (51) mid-level potential scale

browse - stable (0)

grass - slightly down (-1)

forb - stable (0)

2003 TREND ASSESSMENT

Trend for browse is stable. Mountain big sagebrush and bitterbrush have fairly stable populations. Use remains light to moderate for both. Percent decadence increased for both species, but the proportion of the population displaying poor vigor remains about the same as in 1998. Sagebrush may decline in the future unless reproduction improves as there is a moderate amount of decadent, dying plants in the population. Trend for perennial grasses is slightly down. Most species of concern decreased in abundance, but none were significant. Perennial grass species continue to be sparsely represented in the understory. The perennial forbs trend is also slightly down and still contributes to very little cover. The abundance of browse, including the increasing density of pinyon and juniper trees, coupled with periods of drought have negatively impacted the herbaceous component.

Winter Range Condition (DCI) - poor (42) mid-level potential scale

browse - stable (0)

grass - slightly down (-1)

forb - slightly down (-1)

2008 TREND ASSESSMENT

Trend for browse is down as the wildfire destroyed all preferred forms of browse. Density and cover for mountain big sagebrush and bitterbrush were lost to fire. Trend for the herbaceous understory cannot be determined at this time.

Winter Range Condition (DCI) - very poor (0) mid-level potential scale

browse - down (-2)

grass - N/A

forb - N/A

HERBACEOUS TRENDS --

Management unit 22 , Study no: 10

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
G	Agropyron spicatum	ab6	ab11	b18	ab7	a-	.35	.16	-
G	Bouteloua gracilis	ab6	b12	ab6	a-	a1	.01	-	.03
G	Bromus tectorum (a)	-	-	c96	b65	a6	1.78	.68	.06
G	Carex sp.	ab6	ab6	b17	ab12	a-	.26	.21	-
G	Koeleria cristata	8	6	3	11	1	.00	.07	.03

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
G	<i>Oryzopsis hymenoides</i>	9	7	10	-	-	.02	-	-
G	<i>Poa fendleriana</i>	1	5	9	4	2	.30	.06	.00
G	<i>Poa secunda</i>	-	-	-	-	-	-	.00	-
G	<i>Sitanion hystrix</i>	_c 140	_{cd} 113	_{bc} 78	_b 70	_a -	1.53	1.01	-
Total for Annual Grasses		0	0	96	65	6	1.78	0.68	0.06
Total for Perennial Grasses		176	160	141	104	4	2.49	1.53	0.06
Total for Grasses		176	160	237	169	10	4.27	2.21	0.12
F	<i>Arabis demissa</i>	_{ab} 1	_{ab} 6	_b 12	_{ab} 3	_a -	.05	.00	-
F	<i>Astragalus</i> sp.	2	-	1	1	-	.00	.00	-
F	<i>Calochortus nuttallii</i>	-	-	-	-	3	-	-	.03
F	<i>Chenopodium album</i> (a)	-	-	-	-	1	-	-	.00
F	<i>Chaenactis douglasii</i>	_b 23	_a 7	_{ab} 6	_a -	_a -	.07	-	-
F	<i>Collinsia parviflora</i> (a)	-	-	-	-	6	-	-	.01
F	<i>Cryptantha</i> sp.	12	11	12	1	-	.08	.00	-
F	<i>Cymopterus</i> sp.	-	-	7	4	-	.01	.03	.00
F	<i>Descurainia pinnata</i> (a)	-	-	3	9	-	.00	.19	-
F	<i>Epilobium brachycarpum</i> (a)	-	-	_b 9	_a -	_a -	.05	-	-
F	<i>Erigeron pumilus</i>	4	-	4	-	-	.06	-	-
F	<i>Eriogonum umbellatum</i>	-	-	-	3	-	-	.03	-
F	<i>Gayophytum ramosissimum</i> (a)	-	-	_a -	_b 35	_a -	-	.09	-
F	<i>Lupinus argenteus</i>	_a -	_a -	_b 21	_a -	_a -	1.44	-	.01
F	<i>Lygodesmia spinosa</i>	1	4	-	2	-	-	.00	-
F	<i>Machaeranthera canescens</i>	_b 10	_a -	_a 4	_a -	_a -	.01	-	-
F	<i>Microsteris gracilis</i> (a)	-	-	6	-	-	.01	-	-
F	<i>Penstemon</i> sp.	4	-	4	6	4	.04	.21	.01
F	<i>Petradoria pumila</i>	-	-	4	1	-	.38	.03	-
F	<i>Phlox longifolia</i>	3	2	2	3	1	.01	.03	.00
F	<i>Senecio multilobatus</i>	1	2	-	-	1	-	-	.03
Total for Annual Forbs		0	0	18	44	7	0.06	0.28	0.01
Total for Perennial Forbs		61	32	77	24	9	2.18	0.36	0.09
Total for Forbs		61	32	95	68	16	2.25	0.64	0.11

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

BROWSE TRENDS --

Management unit 22 , Study no: 10

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	Artemisia nova	3	0	0	.03	-	-
B	Artemisia tridentata vaseyana	87	82	0	23.73	16.68	-
B	Cercocarpus ledifolius	1	2	0	.41	.41	-
B	Gutierrezia sarothrae	1	3	0	.00	.00	.00
B	Juniperus osteosperma	2	2	0	1.70	.38	-
B	Mahonia repens	1	3	4	.01	.03	-
B	Opuntia sp.	3	3	3	.00	.00	.15
B	Pediocactus simpsonii	0	1	0	-	.00	-
B	Pinus edulis	2	4	0	6.09	11.06	-
B	Purshia tridentata	50	47	0	13.92	11.08	-
B	Symphoricarpos oreophilus	5	5	3	1.29	1.16	.03
Total for Browse		155	152	10	47.20	40.82	0.18

CANOPY COVER, LINE INTERCEPT --

Management unit 22 , Study no: 10

Species	Percent Cover		
	'98	'03	'08
Artemisia tridentata vaseyana	-	13.88	-
Cercocarpus ledifolius	-	.35	-
Juniperus osteosperma	2.40	2.09	-
Pinus edulis	8.39	11.30	-
Purshia tridentata	-	11.96	-
Symphoricarpos oreophilus	-	1.25	-

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 22 , Study no: 10

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata vaseyana	1.6	-
Purshia tridentata	1.6	-

POINT-QUARTER TREE DATA --
 Management unit 22 , Study no: 10

Species	Trees per Acre		
	'98	'03	'08
Juniperus osteosperma	26	28	<18
Pinus edulis	125	132	<18

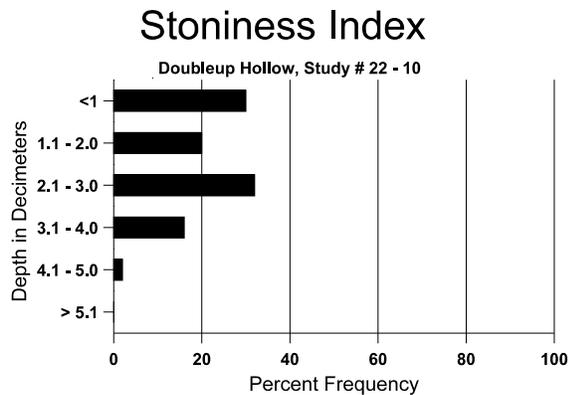
Average diameter (in)		
'98	'03	'08
4.5	5.4	-
4.3	5.4	-

BASIC COVER --
 Management unit 22 , Study no: 10

Cover Type	Average Cover %				
	'85	'91	'98	'03	'08
Vegetation	3.75	3.25	45.72	40.59	.44
Rock	9.75	14.25	12.25	10.68	20.07
Pavement	25.25	20.50	20.12	13.58	61.04
Litter	56.75	53.00	49.04	51.86	6.18
Cryptogams	0	1.00	.19	.45	.88
Bare Ground	4.50	8.00	6.00	7.14	20.52

SOIL ANALYSIS DATA --
 Management unit 22, Study no: 10, Study Name: Doubleup Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	clay loam			%OM	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
12.7	51.2 (13.4)	6.6	44.0	27.4	28.6	2.7	7.1	204.8	0.8



PELLET GROUP DATA --
 Management unit 22 , Study no: 10

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	27	20	9
Elk	2	-	-
Deer	36	8	-
Cattle	-	-	1

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	-	-
18 (44)	29 (71)	-
-	-	-

BROWSE CHARACTERISTICS --
 Management unit 22 , Study no: 10

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia nova</i>												
85	4931	66	599	2733	1599	-	28	1	32	2	18	11/16
91	3265	-	66	1733	1466	-	29	8	45	10	35	8/21
98	120	-	-	60	60	-	0	0	50	33	33	10/13
03	0	-	-	-	-	-	0	0	0	-	0	-/-
08	0	-	-	-	-	-	0	0	0	-	0	-/-
<i>Artemisia tridentata vaseyana</i>												
85	2398	133	266	1133	999	-	53	11	42	.83	6	20/17
91	2265	-	66	1066	1133	-	50	0	50	11	38	20/24
98	3900	220	120	2820	960	1240	22	0	25	9	11	22/30
03	4100	-	40	2400	1660	1620	22	3	40	11	14	24/28
08	0	-	-	-	-	-	0	0	0	-	0	-/-
<i>Cercocarpus ledifolius</i>												
85	0	199	-	-	-	-	0	0	-	-	0	-/-
91	66	-	66	-	-	-	0	0	-	-	0	-/-
98	20	-	-	20	-	-	0	0	-	-	0	48/53
03	40	-	20	20	-	-	0	0	-	-	0	55/52
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Gutierrezia sarothrae</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	333	-	-	333	-	-	0	0	-	-	0	10/8
98	20	-	20	-	-	-	0	0	-	-	0	-/-
03	100	-	-	100	-	-	0	0	-	-	0	9/10
08	0	20	-	-	-	-	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	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
98	40	-	20	20	-	-	0	0	-	-	0	-/-
03	40	-	20	20	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Mahonia repens												
85	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
98	120	-	20	100	-	-	0	0	0	-	0	-/-
03	140	-	-	140	-	-	0	0	0	-	0	3/6
08	120	-	80	-	40	-	0	0	33	-	0	-/-
Opuntia sp.												
85	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
98	80	-	20	60	-	-	0	0	0	-	0	5/14
03	140	-	-	80	60	-	0	0	43	43	43	7/13
08	160	-	60	100	-	-	0	0	0	-	0	5/9
Pediocactus simpsonii												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	20	-	-	20	-	-	0	0	-	-	0	4/4
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Pinus edulis												
85	133	-	133	-	-	-	0	0	-	-	0	-/-
91	133	-	133	-	-	-	0	0	-	-	0	-/-
98	60	-	60	-	-	-	0	0	-	-	0	-/-
03	100	-	60	40	-	20	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Purshia tridentata												
85	4265	466	1266	2933	66	-	39	45	2	-	2	24/26
91	2598	66	333	1799	466	-	64	23	18	2	5	27/51
98	1540	180	200	1260	80	200	32	1	5	1	1	34/45
03	1360	-	120	1020	220	180	28	3	16	6	6	34/50
08	0	20	-	-	-	-	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)
Quercus gambelii												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	34/26
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Symphoricarpos oreophilus												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
98	160	-	-	160	-	-	13	0	-	-	0	12/25
03	260	-	120	140	-	20	38	0	-	-	0	22/43
08	100	-	100	-	-	-	60	0	-	-	0	-/-