

Trend Study 16C-39-07

Study site name: Cove Creek.

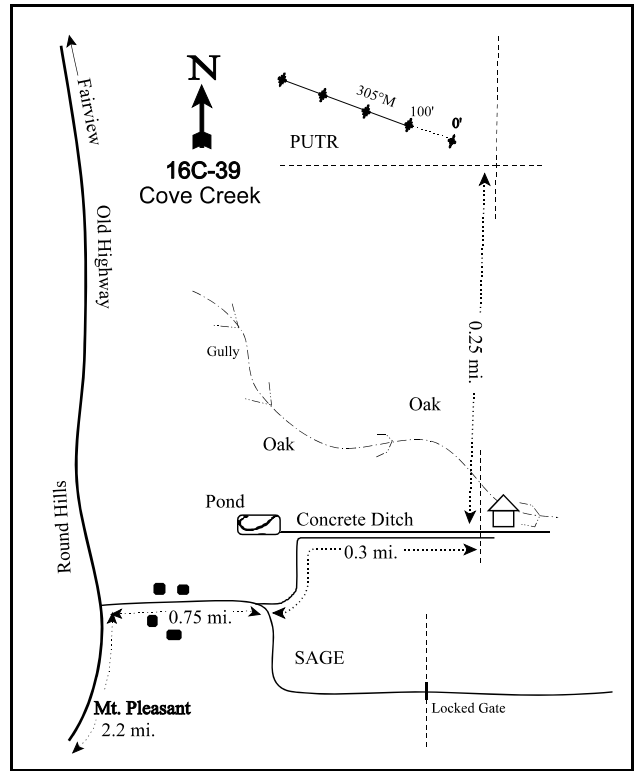
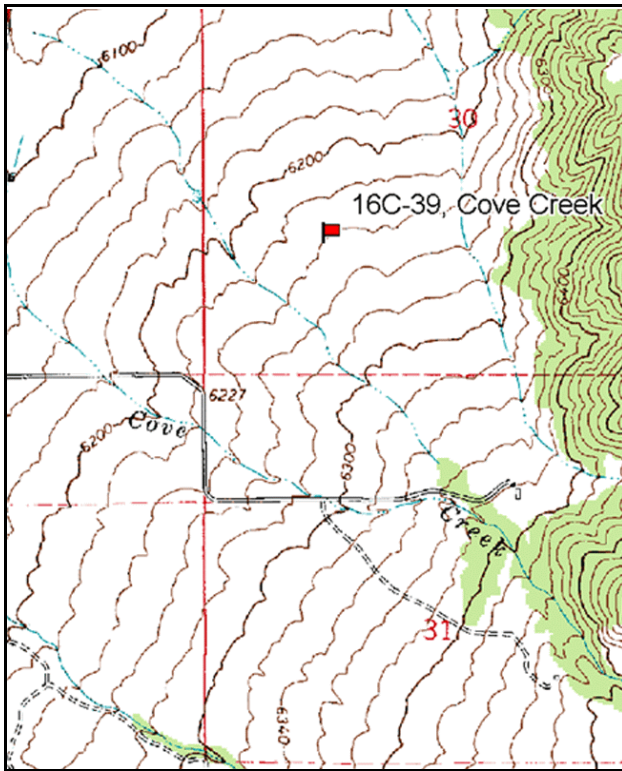
Vegetation type: Bitterbrush.

Compass bearing: frequency baseline 305 degrees magnetic.

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

LOCATION DESCRIPTION

From State Street (Highway 89) and 200 North in Mt. Pleasant, proceed east on 200 North which curves northward and becomes the old highway to Fairview. Follow this road for 2.2 miles, then turn east on a gravel road for 0.75 miles to an intersection at the first curve in the road. Turn left and drive (~0.3 miles) to a fence. Park here. Walk north across the ditch and along the fence until the road ends or a place where 3 fences intersect and the road ends (about 0.25 miles). The 0-foot baseline stake, which is red, is 12 paces west of the fence corner. The 100-foot baseline stake is rebar.



Map Name: Mount Pleasant.

Diagrammatic Sketch

Township 14 S, Range 5E, Section 30

GPS: NAD 83, UTM 12S 464817 E 4380050 N

DISCUSSION

Cove Creek - Trend Study No. 16C-39

Study Information

This study samples an antelope bitterbrush (*Purshia tridentata*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) community in the foothills between Fairview and Mt. Pleasant [elevation: 6,230 feet (1,898 m), slope: 0%-6%, aspect: west]. There is a canal and a stock pond 0.25 miles (0.4 km) to the south, both of which had water in 2002 and 2007. All of the area is privately owned. Domestic sheep graze the area in winter and/or spring, and there have been a few cattle in the large pasture. One fawn carcass from winter was found in 1989. In 2007, five deer carcasses were found. This number of dead deer seemed abnormally high for such a small area. It is likely that deer use the area as cover during the day, and forage in nearby agricultural fields at night. From the pellet group transect, deer use was estimated at 35 days use/acre (88 ddu/ha) in 2002 and 92 days use/acre (227 ddu/ha) in 2007. Elk were estimated at 8 days use/acre (20 edu/ha) in 2002 and 12 days use/acre (30 edu/ha) in 2007. Cattle use was estimated at 1 day use/acre (2 cdu/ha) in 2002. Rabbits and small rodents are fairly common.

Soil

The soil is in the Mountainville series that consists of very deep, well-drained soils that formed in alluvium. These soils are on alluvial fans (USDA-NRCS 2007). The soil has sandy loam and a neutral to slightly acidic reactivity (pH of 6.6). The relative bare ground cover has been 3%-7% since 1997. Relative vegetation and litter cover has been high at 92%-95%, and adequately protects the soil from erosion. The erosion condition was classified as stable in 2002 and 2007. There are many game trails that may become flow patterns with intense precipitation events. There was also a road and four-wheeler paths through the area.

Browse

The preferred browse species that is most heavily used is antelope bitterbrush. Many of the plants have a tall growth form. However, there are also prostrate forms, often looking distorted due to severe hedging. Bitterbrush canopy cover was 13% in both 2002 and 2007. It had a density of 832 plants/acre (2,055 plants/ha) in 1989, 960 plants/acre (2,371 plants/ha) in 1997, 940 plants/acre (2,321 plants/ha) in 2002, and 800 plants/acre (1,976 plants/ha) in 2007. Young plants were abundant in 1989, comprising 48% of the population, but have made up 5% or less of the population since 1997, and decadence has been 8%-13%. Plants classified with poor vigor have steadily increased from 0% of the population in 1989 to 15% by 2007. Browse use has been mostly moderate-heavy. The average annual leader growth of antelope bitterbrush was 3.5 inches (8.9 cm) in 2002 and 2.6 inches (6.5 cm) in 2007.

Canopy cover of basin big sagebrush increased from 15% in 2002 to 17% in 2007. Basin big sagebrush had a density of 1,266 plants/acre (3,127 plants/ha) in 1989, 2,400 plants/acre (5,982 plants/ha) in 1997, 2,940 plants/acre (7,262 plants/ha) in 2002, and 1,560 plants/acre (3,853 plants/ha) in 2007. The recruitment of young decreased from 92% of the population in 1989 to 22% in 1997 and 2002, and 10% in 2007. Decadence steadily increased from 0% in of the population in 1989 to 15% by 2007. Plants classified with poor vigor have comprised 0%-17% of the population, and browse use was light-moderate. The average annual leader growth was 3.2 inches (8.1 cm) in 2002 and 2.4 inches (6.0 cm) in 2007.

There have been tall oak (*Quercus gambelii*) clones scattered around the study. It was first sampled in 1997, when the transect was extended, and the sample area increased. Canopy cover of oak increased from 1% in 2002 to 2% in 2007. It had a density of 940 stems/acre (2,322 stems/ha) in 1997, 1,640 stems/acre (4,051 stems/ha) in 2002, and 440 stems/acre (1,087 stems/ha) in 2007. The recruitment of young has remained relatively stable at 16%-18% of the population, however decadence has fluctuated from 0% in 1997, increasing to 44% in 2002, and decreasing to 5% in 2007. Plants showing poor vigor has been low at 5% or less of the population, and browse use has been light-moderate.

Herbaceous Understory

Due in part to the long history of grazing, increaser species dominate the herbaceous understory. These weedy species contribute a high proportion of the total vegetative cover. Most of the preferred perennial grasses are protected by shrubs or cactus. Cheatgrass (*Bromus tectorum*) and bulbous bluegrass (*Poa bulbosa*) are common in the interspaces. Bulbous bluegrass is the most abundant perennial grass. It is a short-lived perennial, with low forage value, and a life cycle similar to that of cheatgrass (Stewart and Hull 1949). It provided 14% of the total ground cover in 1997, 47% in 2002, and 33% in 2007. More desirable perennial grasses are present in relatively low abundance and include bluebunch wheatgrass (*Agropyron spicatum*), Indian ricegrass (*Oryzopsis hymenoides*), Sandberg bluegrass (*Poa secunda*), needle-and-thread (*Stipa comata*), and sand dropseed (*Sporobolus cryptandrus*). Cheatgrass provided 16% of the total ground cover in 1997, 5% in 2002, and 8% in 2007.

The forb component is comprised of weedy species, including the noxious species field bindweed (*Convolvulus arvensis*), musk thistle (*Carduus nutans*), and houndstongue (*Cynoglossum officinale*). Bindweed is the dominant forb. It provided 12% of the total ground cover in 1997, and 3%-4% in 2002 and 2007. Additionally, storksbill (*Erodium cicutarium*) and bur buttercup (*Ranunculus testiculatus*), both of which are allelopathic annuals (Kimball and Schiffman 2003, Buchanan et al. 1978) have been sampled.

1997 TREND ASSESSMENT

The browse trend is slightly up. The density of basin big sagebrush increased nearly two-fold. This increase was due in part to the increased sample area. The recruitment of young decreased from 92% of the population to 22%, and decadence changed little, increasing from 0% to 1%. Plant vigor remained excellent, and browse use was light. The density of antelope bitterbrush increased 15%. The recruitment of young decreased from 48% of the population to 4%, and decadence increased from 8% to 13%. Plants classified with poor vigor remained low at 2% of the population. Browse use shifted from moderate-heavy to heavy, and heavily browsed plants increased from 56% of the population to 90%. The grass trend is stable. Excluding bulbous bluegrass, the sum of nested frequency of perennial grass changed little. Bulbous bluegrass was sampled for the first time and provided 14% average cover. Cheatgrass was also sampled for the first time and provided 16% cover. The forb trend is stable. The sum of nested frequency for perennial forbs decreased 16%. However, if noxious weeds are excluded, the sum of nested frequency of perennial forbs changed little, decreasing 2%. The nested frequency of storksbill increased significantly. Houndstongue was not sampled, but musk thistle was, and bindweed changed little in nested frequency. The Desirable Components Index (DCI) score was very poor due to low recruitment, high annual grass cover, and noxious weeds.

winter range condition (DCI) - very poor (31) Mid-level potential scale

browse - slightly up (+1)

grass - stable (0)

forb - stable (0)

2002 TREND ASSESSMENT

The browse trend is slightly up. The density of basin big sagebrush increased 23%. The recruitment of young, decadence, vigor, and browse use changed little. The density of antelope bitterbrush changed little. There were no young, and decadence decreased to 9% of the population. Plants classified with poor vigor increased to 6%. Browse use was moderate-heavy. The grass trend is up. Excluding bulbous bluegrass, the sum of nested frequency for perennial grasses, increased 79%. The nested frequencies of Sandberg bluegrass and needle-and-thread increased significantly. The sum of nested frequency for bulbous bluegrass increased 42%, and its average cover increased from 14% to 47%. However, the increase in bulbous bluegrass was offset by a decrease in annual grasses. The sum of nested frequency for annual grass decreased 37%. The nested frequency for cheatgrass decreased 46%, and its average cover decreased from 16% to 5%. The forb trend is slightly down. The sum of nested frequency for perennial forbs decreased 34%. If noxious weeds are excluded, the sum of nested frequency of perennial forbs decreased 65%, but non-noxious, perennial species abundance had already been low. However, the sum of nested frequency for annual forbs decreased 62%. Bur buttercup, bindweed, and storksbill all decreased significantly in nested frequency. Musk thistle was not

sampled, and bindweed was the only noxious weed present. The DCI score improved to fair due to increased browse cover, increased perennial grass cover, and decreased annual grass cover.

winter range condition (DCI) - fair (62) Mid-level potential scale
browse - slightly up (+1) grass - up (+2) forb - stable (0)

2007 TREND ASSESSMENT

The browse trend is down. The density of basin big sagebrush decreased 47%. The recruitment of young decreased to 10% of the population, and decadence increased to 15%. Plants classified with poor vigor increased to 17% of the population, and the sagebrush defoliator moth (*Aroga websteri*) had infested 41% of the population. Browse use increased to light-moderate. The density of antelope bitterbrush decreased 15%. The recruitment of young increased to 5% of the population, and decadence increased to 13%. Plants classified as having poor vigor increased to 15% of the population, and browse use was mostly moderate-heavy. The grass trend is down. Excluding bulbous bluegrass, the sum of nested frequency for perennial grasses decreased 49%. The nested frequency for bulbous bluegrass changed little, but its average cover decreased to 33%. The sum of nested frequency for annual grass increased 47%. The nested frequency of cheatgrass increased significantly, and its average cover increased from 5% to 8%. The forb trend is stable. The sum of nested frequency for perennial forbs changed little. The sum of nested frequency for annual forbs increased 35%. However, this was mostly due to the 53% increase in the nested frequency of pale alyssum (*Alyssum alyssoides*). The DCI score declined to poor with results similar to 1997 measurements.

winter range condition (DCI) - poor (36) Mid-level potential scale
browse - down (-2) grass - down (-2) forb - stable (0)

HERBACEOUS TRENDS --
Management unit 16C, Study no: 39

T y p e	Species	Nested Frequency				Average Cover %		
		'89	'97	'02	'07	'97	'02	'07
G	Agropyron intermedium	-	-	a9	a5	-	.19	.03
G	Agropyron spicatum	a15	a17	a10	a21	.77	.36	.95
G	Bromus japonicus (a)	-	a2	b30	a15	.03	.07	.02
G	Bromus tectorum (a)	-	c302	a162	b258	15.94	4.80	8.43
G	Oryzopsis hymenoides	a1	a-	a5	-	.00	.18	-
G	Poa bulbosa	-	a214	b303	b332	14.45	47.29	32.80
G	Poa fendleriana	-	a9	-	a4	.07	-	.04
G	Poa pratensis	b19	ab18	a3	-	.25	.03	-
G	Poa secunda	a23	a32	b67	a24	1.11	1.14	.22
G	Sporobolus cryptandrus	a22	a15	a33	a12	.13	.83	.36
G	Stipa comata	ab27	a13	b59	b29	.71	7.05	1.64
G	Vulpia octoflora (a)	-	-	-	9	-	-	.04
Total for Annual Grasses		0	304	192	282	15.97	4.87	8.49
Total for Perennial Grasses		107	318	489	427	17.52	57.09	36.06
Total for Grasses		107	622	681	709	33.49	61.95	44.56

Type	Species	Nested Frequency				Average Cover %		
		'89	'97	'02	'07	'97	'02	'07
F	<i>Alyssum alyssoides</i> (a)	-	-	_a 76	_b 116	-	.99	1.03
F	<i>Allium</i> sp.	-	10	-	-	.09	-	-
F	<i>Artemisia ludoviciana</i>	3	-	-	-	-	-	-
F	<i>Carduus nutans</i> (a)	-	10	-	-	.40	-	-
F	<i>Cirsium</i> sp.	_a 1	_a 7	-	-	.21	-	-
F	<i>Convolvulus arvensis</i>	_b 234	_b 202	_a 148	_a 145	12.14	3.55	3.08
F	<i>Collinsia parviflora</i> (a)	-	-	_a 1	_a 3	-	.00	.01
F	<i>Cryptantha</i> sp.	-	4	-	-	.01	-	-
F	<i>Cynoglossum officinale</i>	16	-	-	-	-	-	-
F	<i>Epilobium brachycarpum</i> (a)	-	_a 11	_a 5	-	.03	.01	-
F	<i>Erodium cicutarium</i> (a)	_b 127	_c 221	_a 9	_a 32	3.83	.02	.45
F	<i>Eriogonum racemosum</i>	_a 9	_a 8	_a 7	_a 4	.16	.04	.01
F	<i>Galium aparine</i> (a)	-	-	-	3	-	-	.15
F	<i>Hackelia patens</i>	-	-	-	4	-	-	.03
F	<i>Lactuca serriola</i>	9	-	-	-	-	-	-
F	<i>Lepidium</i> sp. (a)	-	_b 55	_a 31	_{ab} 34	.92	.39	.74
F	<i>Lithospermum ruderale</i>	4	-	-	-	-	-	-
F	<i>Machaeranthera canescens</i>	_b 23	_{ab} 10	_a 2	_a 3	.03	.03	.15
F	<i>Phlox longifolia</i>	_a 3	_a 3	_a 5	-	.01	.01	-
F	<i>Polygonum douglasii</i> (a)	-	_b 38	_a 11	-	.13	.03	-
F	<i>Ranunculus testiculatus</i> (a)	-	_b 54	_a 11	_a 8	.25	.05	.04
F	<i>Sisymbrium altissimum</i> (a)	_a 6	_a -	_a 3	_a 2	.00	.00	.03
F	<i>Sphaeralcea coccinea</i>	-	_a 2	_a 4	_a 3	.15	.03	.03
F	<i>Taraxacum officinale</i>	-	3	-	-	.03	-	-
F	<i>Tragopogon dubius</i>	-	3	-	-	.00	-	-
F	<i>Viguiera multiflora</i>	-	1	-	-	.03	-	-
Total for Annual Forbs		133	389	147	198	5.57	1.50	2.48
Total for Perennial Forbs		302	253	166	159	12.87	3.67	3.30
Total for Forbs		435	642	313	357	18.44	5.18	5.78

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

BROWSE TRENDS --

Management unit 16C, Study no: 39

Type	Species	Strip Frequency			Average Cover %		
		'97	'02	'07	'97	'02	'07
B	Artemisia tridentata tridentata	47	48	48	5.71	11.89	10.59
B	Gutierrezia sarothrae	4	1	5	.03	.00	.00
B	Opuntia sp.	67	65	49	5.97	3.95	4.00
B	Purshia tridentata	37	42	35	10.05	12.92	5.67
B	Quercus gambelii	4	4	4	.53	1.00	1.00
B	Rosa woodsii	1	2	0	-	-	-
Total for Browse		160	162	141	22.29	29.78	21.28

CANOPY COVER, LINE INTERCEPT --

Management unit 16C, Study no: 39

Species	Percent Cover	
	'02	'07
Artemisia tridentata tridentata	15.19	17.25
Gutierrezia sarothrae	-	.06
Opuntia sp.	2.84	1.38
Purshia tridentata	12.61	13.21
Quercus gambelii	.86	1.78
Rosa woodsii	.05	-

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 16C, Study no: 39

Species	Average leader growth (in)	
	'02	'07
Artemisia tridentata tridentata	3.2	2.4
Purshia tridentata	3.5	2.6

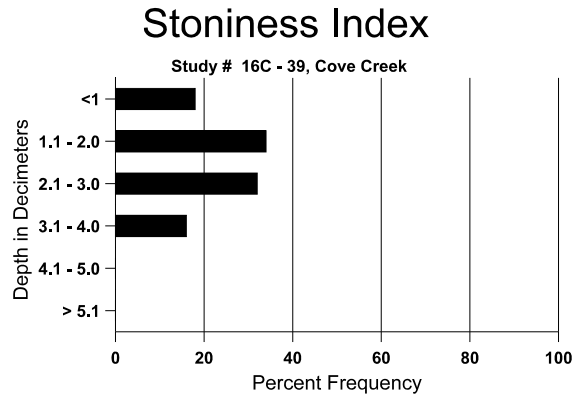
BASIC COVER --

Management unit 16C, Study no: 39

Cover Type	Average Cover %			
	'89	'97	'02	'07
Vegetation	20.50	62.59	80.27	75.54
Rock	3.75	1.16	.66	1.15
Pavement	0	.15	.25	.11
Litter	53.25	49.92	28.67	21.89
Cryptogams	0	.26	.71	.02
Bare Ground	22.50	5.58	3.61	7.94

SOIL ANALYSIS DATA --
Herd Unit 16C, Study no: 39, Cove Creek

Effective rooting depth (in)	Temp °F (depth)	pH	Sandy loam			%OM	ppm P	ppm K	dS/m
			%sand	%silt	%clay				
9.7	65.8 (13.3)	6.6	66.4	19.8	13.8	1.7	30.9	208.0	.5



PELLET GROUP DATA --
Management unit 16C, Study no: 39

Type	Quadrat Frequency		
	'97	'02	'07
Sheep	20	1	3
Rabbit	18	29	35
Horse	-	1	-
Elk	11	3	11
Deer	34	22	13
Cattle	-	2	1

Days use per acre (ha)	
'02	'07
1 (3)	-
-	-
-	-
8 (20)	12 (30)
35 (88)	92 (227)
1 (2)	-

BROWSE CHARACTERISTICS --
Management unit 16C, Study no: 39

Year	Plants per Acre (excluding seedlings)	Age class distribution (plants per acre)					Utilization					Average Height Crown (in)
		Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	
<i>Artemisia tridentata tridentata</i>												
89	1266	600	1166	100	-	-	32	11	0	-	5	28/30
97	2400	60	520	1860	20	80	5	0	1	-	0	34/39
02	2940	100	660	2180	100	80	0	0	3	1	1	31/37
07	1560	180	160	1160	240	100	51	3	15	9	17	38/44

		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 albicaulis												
89	0	-	-	-	-	-	0	0	-	-	0	-/-
97	0	-	-	-	-	-	0	0	-	-	0	-/-
02	0	-	-	-	-	-	0	0	-	-	0	-/-
07	0	-	-	-	-	-	0	0	-	-	0	18/23
Gutierrezia sarothrae												
89	33	-	-	33	-	-	0	0	-	-	0	5/4
97	340	-	-	340	-	-	0	0	-	-	0	16/15
02	20	-	-	20	-	-	0	0	-	-	0	10/13
07	200	-	40	160	-	-	0	0	-	-	0	12/14
Opuntia sp.												
89	732	-	166	433	133	-	0	0	18	-	5	9/52
97	6840	20	-	6460	380	160	0	0	6	5	5	7/21
02	5400	-	240	4660	500	40	0	0	9	2	4	7/15
07	2720	-	40	2620	60	-	4	0	2	.73	1	6/10
Purshia tridentata												
89	832	100	400	366	66	-	28	56	8	-	0	38/53
97	960	-	40	800	120	100	4	90	13	2	2	48/67
02	940	-	-	860	80	-	28	51	9	6	6	37/57
07	800	40	40	660	100	80	38	55	13	5	15	43/56
Quercus gambelii												
89	0	-	-	-	-	-	0	0	0	-	0	-/-
97	940	-	160	780	-	40	57	0	0	-	0	17/17
02	1640	-	260	660	720	-	0	0	44	-	0	25/14
07	440	-	80	340	20	20	55	0	5	5	5	41/18
Rosa woodsii												
89	0	-	-	-	-	-	0	0	-	-	0	-/-
97	80	-	-	80	-	-	0	0	-	-	0	13/12
02	140	-	-	140	-	-	0	0	-	-	0	11/7
07	0	-	-	-	-	-	0	0	-	-	0	-/-