Trend Study 21B-13-08

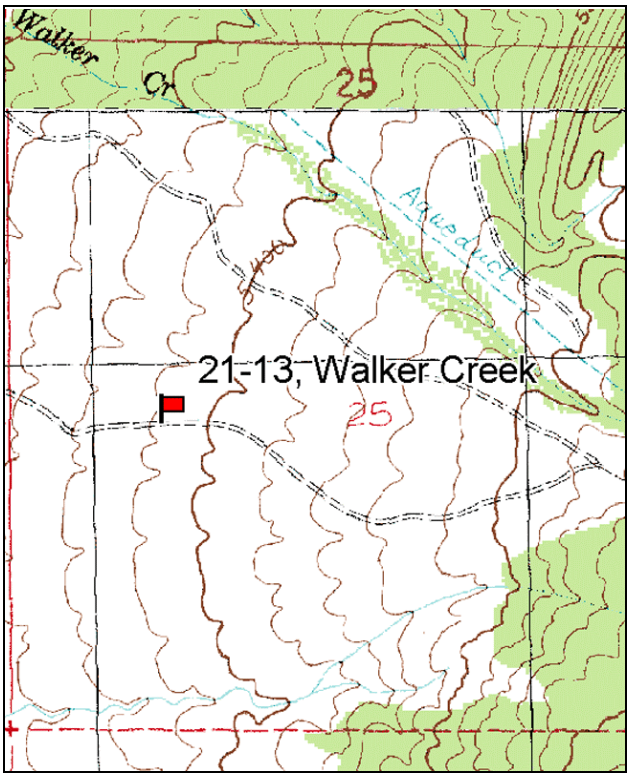
Study site name: Walker Creek . Vegetation type: Chained P-J .

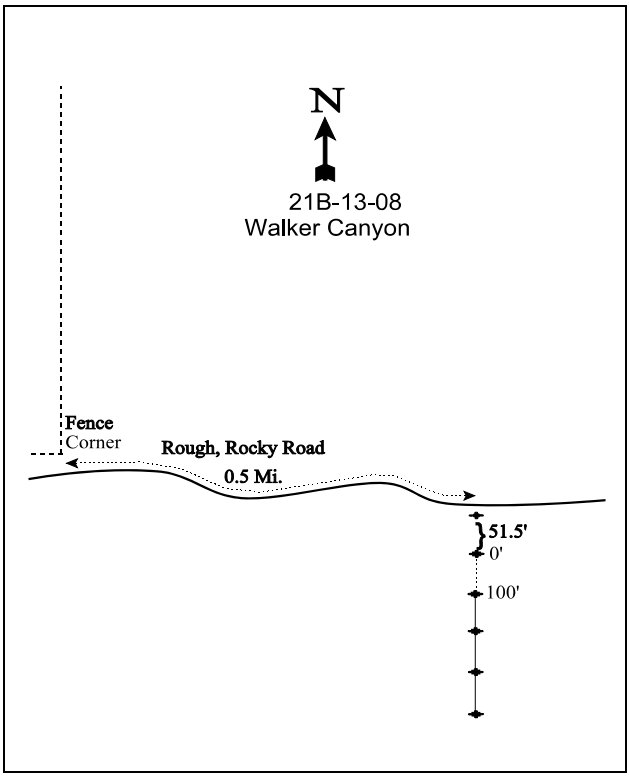
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 2 on 3ft, belt 3 on 6ft, belt 4 on 1ft, and belt 5 on 6ft.

LOCATION DESCRIPTION

Go south from Meadow (southwest of Fillmore) on SR 133 to mile marker 6. Go approximately 0.05 miles further south on SR 133 and turn east on a gravel road (4400 S). Go east 0.8 miles to a junction. Turn right and follow this road (2600 W) for 1 mile around several bends until the main road turns back to the south. Instead of turning south, continue straight east for 0.1 miles to a fork. Keep right and go 0.15 miles to a concrete aqueduct. Continue on the road 0.25 miles to a fence corner on the left, and travel another 0.5 miles to a cairn on the right side of the road. The 0-foot baseline stake is 51.5 feet south of the rebar and rock cairn. The 0-foot stake is a 2 ½ foot tall rebar tagged #7074. A 4X4 vehicle is advisable for the rough roads.





Map Name: Fillmore

Diagrammatic Sketch

Township 22S , Range 24W , Section 17

GPS: NAD 83, UTM 12S 381088 E, 4303068 N

DISCUSSION

Walker Creek - Trend Study No. 21B-13

Study Information

This study is located on the foothills below the Pahvant Range southeast of Meadow [elevation: 5,370 feet (1,637 m), slope: 2%, aspect: west]. In 1966, about 270 acres (109 ha) in the Walker Creek area, which is administered by the BLM, were treated by bulldozing individual Utah juniper trees (*Juniperus osteosperma*) and leaving all other desirable browse species. The project was done primarily to benefit wildlife. Big game pellet groups were abundant and well-distributed throughout the area in 1985. Pellet group data estimated deer use at 100 days use/acre (247 ddu/ha) in 1991, 94 days use/acre (232 ddu/ha) in 1998, 124 days use/acre (306 ddu/ha) in 2003, and 114 days use/acre (281 ddu/ha) in 2008. Most of the pellet groups sampled were from winter use. Additionally, two deer carcasses were found on the site in 1991, and one was found in 2008. Resting and escape cover is widely available. Water is available in Meadow Creek about 0.5 miles (0.8 km) to the north. Grazing was permitted in the past, but the area received very little cattle use. There has been no evidence of cattle use since 1998.

Soil

The soil is classified within the Donnardo series (USDA-NRCS 2008). This series consists of very deep, well-drained, moderately permeable soils that formed in alluvium from sandstone, limestone, and shale. The soil is a sandy clay loam with a slightly acidic reaction (pH 6.4). Relative combined vegetation and litter cover has ranged from 81% to 90% since 1998, and relative combined rock and pavement cover was 10%-15%. The soil erosion condition was classified as stable in 2003 and 2008.

Browse

Preferred browse is provided by big sagebrush (*Artemisia tridentata spp.*) and Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*). Although the big sagebrush was classified as basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), some of the plants are hybrids with mountain big sagebrush (*A. tridentata* ssp. *vaseyana*). Sagebrush provided 16% quadrat cover in 1998, 19% in 2003, and 12% in 2008. Density decreased from 2,560 plants/acre in 1998 to 2,060 plants/acre in 2003 and 2008. Decadence decreased from 32% of the population in 1985 to 22% in 1998, then increased to 49% by 2008. Young plants comprised 14%-15% of the population in 1985 and 1991, then decreased to 0%-2% in 1998-2008. Average annual leader growth was 1.3 inches (3.3 cm) in 2003 and 1.0 inch (2.5 cm) in 2008.

Cliffrose quadrat cover was 7% in 1998, 3% in 2003, and 4% in 2008. Density has ranged from 520 plants/acre to 580 plants/acre since 1998. Decadence increased from 0% of the population in 1985 to 14% in 1991, decreased to 3% in 1998, increased to 46% in 2003, and decreased to 22% in 2008. Young recruitment decreased from 29% of the population in 1985 to 7% in 1998, then remained relatively similar until 2008. Annual leader growth averaged 3.4 inches (8.6 cm) in 2003 and 5.1 inches (13.0 cm) in 2008.

Juniper provided 4% canopy cover in 1998, and 7%-8% in 2003 and 2008. Point-centered quarter data estimated juniper density at 95 trees/acrein 2003 and 81 trees/acre in 2008. Average trunk diameter was 4.2 inches (10.6 cm) in 2003 and 7.7 inches (19.4 cm) in 2008. In both years, the majority of the sampled trees were 1-8 feet (0.3-2.4 m) in height, although 32% of the trees were greater than 12 feet (3.7 m) in height in 2003.

Herbaceous Understory

The herbaceous understory has been largely dominated by annuals. Total grass cover was 36% in 1998 and 20% in 2003 in 2008. Cheatgrass (*Bromus tectorum*) provided 89% of the total grass cover in 1998, 49% in 2003, and 68% in 2008. Sandberg bluegrass (*Poa secunda*) was also abundant in 2003 and 2008, providing 41% and 23% of the total grass cover, respectively. Bottlebrush squirreltail (*Sitanion hystrix*), crested

wheatgrass (*Agropyron cristatum*), purple three-awn (*Aristida purpurea*), and bluebunch wheatgrass (*Agropyron spicatum*) have also been sampled, but contributed little cover.

The forb component has been sparse. Total forb cover was less than 1% in 1998 and 2008, and 3% in 2003. The most common forbs include blue-eyed Mary (*Collinsia parviflora*), storksbill (*Erodium cicutarium*), holosteum (*Holosteum umbellatum*), and slender phlox (*Microsteris gracilis*).

1991 TREND ASSESSMENT

The browse trend is stable. Sagebrush density decreased slightly from 1,866 plants/acre to 1,732 plants/acre. Decadence decreased from 32% of the population to 27%, and young recruitment remained stable at 15% of the population. Plants displaying poor vigor increased from 4% of the population to 12%. Cliffrose density remained stable at 465 plants/acre, but decadence increased from 0% of the population to 14%. Young recruitment decreased from 29% of the population to 14%, and vigor remained good throughout the population. The trend for grass is stable. The sum of nested frequency for perennial grasses increased slightly. The trend for forbs is stable. Very few perennial forbs were sampled.

browse - stable (0) grass - stable (0) forb - stable (0)

1998 TREND ASSESSMENT

The browse trend is stable. Density changes may have been related to the larger sample area in 1998, therefore, the trend was determined using other parameters. Sagebrush decadence decreased slightly from 27% of the population to 22%, and young recruitment also decreased from 15% of the population to 2%. Plants exhibiting poor vigor decreased from 12% of the population to 7%. Cliffrose decadence decreased from 14% of the population to 3%, and young recruitment decreased from 14% of the population to 7%. Vigor remained excellent. The trend for grass is slightly up. The sum of nested frequency for perennial grasses increased 55%, and bottlebrush squirreltail increased significantly in nested frequency. The trend for forbs is stable. Few perennial forbs were sampled. The winter range condition, determined by the Desirable Components Index (DCI), was rated as very poor due to low perennial herbaceous cover and high annual grass cover, despite favorable preferred browse cover.

winter range condition (DCI) - very poor (30) Mid-level potential scale
browse - stable (0) grass - slightly up (+1) forb - stable (0)

2003 TREND ASSESSMENT

The browse trend is slightly down. Sagebrush density decreased 20%, and decadence increased from 22% of the population to 32%. Young recruitment decreased slightly from 2% of the population to 0%, and plants displaying poor vigor increased from 7% of the population to 11%. Cliffrose density decreased 10%, and decadence greatly increased from 3% of the population to 46% of the population. Young recruitment remained stable at 8% of the population, and plants displaying poor vigor were sampled for the first time at 4% of the population. The trend for grass is up. The sum of nested frequency for perennial grasses increased 70%. Sandberg bluegrass increased significantly in nested frequency, while that for cheatgrass decreased significantly. The trend for forbs is stable. Few perennial forbs were sampled. The DCI rating slightly improved to poor due to an increase in perennial grass cover and a decrease in annual grass cover.

winter range condition (DCI) - poor (47) Mid-level potential scale
browse - slightly down (-1) grass - up (+2) forb - stable (0)

2008 TREND ASSESSMENT

The browse trend is stable. Sagebrush density remained at 2,060 plants/acre, and decadence continued to increase from 32% of the population to 49%. Young recruitment increased slightly from 0% of the population to 2%, and plants displaying poor vigor also increased from 11% of the population to 13%. Cliffrose density

increased slightly to 540 plants/acre. Decadence decreased from 46% of the population to 22%, and young recruitment decreased slightly from 8% of the population to 4%. Plants displaying poor vigor slightly increased from 4% of the population to 7%. The trend for grass is slightly down. The sum of nested frequency for perennial grasses decreased 19%. Sandberg bluegrass decreased significantly in nested frequency, while that for cheatgrass increased significantly. The trend for forbs is stable. Few perennial forbs were sampled. The DCI rating declined to very poor due to decreases in preferred browse and perennial grass cover and an increase in annual grass cover.

winter range condition (DCI) - very poor (27) Mid-level potential scale
browse - stable (0) grass - slightly down (-1) forb - stable (0)

HERBACEOUS TRENDS --
Management unit 21B, Study no: 13

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
G	Agropyron cristatum	$_{a}$1	$_{ab}$2	$_{b}$17	$_{ab}$10	$_{ab}$11	.80	.22	.45
G	Agropyron spicatum	-	-	1	4	4	.00	.15	.06
G	Aristida purpurea	4	1	1	10	5	.15	.83	.60
G	Bromus tectorum (a)	-	-	$_{c}$374	$_{a}$287	$_{b}$358	32.18	10.02	13.51
G	Poa secunda	$_{a}$74	$_{a}$101	$_{a}$111	$_{c}$229	$_{b}$189	2.03	8.33	4.65
G	Sitanion hystrix	$_{a}$3	$_{a}$7	$_{b}$42	$_{b}$40	$_{b}$29	.72	.89	.68
G	Vulpia octoflora (a)	-	-	$_{b}$29	$_{a}$1	$_{a}$-	.46	.00	-
Total for Annual Grasses		0	0	403	288	358	32.64	10.03	13.51
Total for Perennial Grasses		82	111	172	293	238	3.71	10.43	6.45
Total for Grasses		82	111	575	581	596	36.36	20.47	19.96
F	Alyssum alyssoides (a)	-	-	$_{a}$2	$_{a}$2	$_{b}$26	.00	.00	.10
F	Asclepias asperula	2	-	-	-	-	-	-	-
F	Collinsia parviflora (a)	-	-	$_{ab}$24	$_{b}$44	$_{a}$5	.08	1.52	.01
F	Draba sp. (a)	-	-	$_{b}$14	$_{a}$-	$_{a}$-	.03	-	-
F	Eriogonum cernuum (a)	-	-	-	3	-	-	.15	-
F	Erodium cicutarium (a)	-	-	$_{a}$1	$_{b}$34	$_{b}$50	.03	.94	.29
F	Eriogonum racemosum	2	-	-	-	-	-	-	-
F	Helianthus annuus (a)	2	-	-	-	-	-	-	-
F	Holosteum umbellatum (a)	-	-	$_{b}$19	$_{b}$30	$_{a}$-	.06	.07	-
F	Lactuca serriola	-	-	2	-	-	.00	-	-
F	Microsteris gracilis (a)	-	-	$_{b}$38	$_{a}$5	$_{a}$-	.14	.01	-
F	Phlox longifolia	-	-	8	-	-	.07	-	-
F	Ranunculus testiculatus (a)	-	-	$_{b}$18	$_{ab}$10	$_{a}$-	.08	.02	-
F	Zigadenus paniculatus	6	1	7	5	5	.07	.02	.31
Total for Annual Forbs		2	0	116	128	81	0.44	2.74	0.41
Total for Perennial Forbs		10	1	17	5	5	0.14	0.01	0.31

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
Total for Forbs		12	1	133	133	86	0.58	2.75	0.72

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

BROWSE TRENDS --
Management unit 21B, Study no: 13

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	Artemisia tridentata tridentata	78	63	61	15.96	18.90	12.10
B	Cowania mexicana stansburiana	27	24	25	7.35	3.42	3.54
B	Gutierrezia sarothrae	35	7	11	1.35	.30	.33
B	Juniperus osteosperma	4	5	5	4.09	6.76	2.59
B	Opuntia sp.	2	0	1	.30	-	.00
B	Purshia tridentata	0	1	0	-	.00	-
Total for Browse		146	100	103	29.06	29.39	18.58

CANOPY COVER, LINE INTERCEPT --
Management unit 21B, Study no: 13

Species	Percent Cover		
	'98	'03	'08
Artemisia tridentata tridentata	-	19.63	20.10
Cowania mexicana stansburiana	-	5.98	6.40
Gutierrezia sarothrae	-	.65	.81
Juniperus osteosperma	4.19	8.46	7.01
Purshia tridentata	-	.08	-

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 21B, Study no: 13

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata tridentata	1.3	1.0
Cowania mexicana stansburiana	3.4	5.1

POINT-QUARTER TREE DATA --
Management unit 21B, Study no: 13

Species	Trees per Acre		
	'98	'03	'08
Juniperus osteosperma	145	95	81

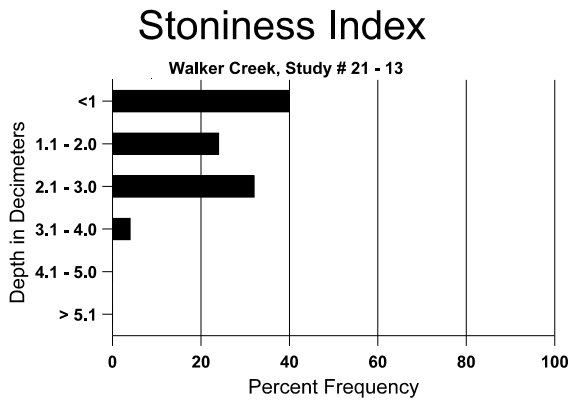
Average diameter (in)		
'98	'03	'08
2.9	4.2	7.7

BASIC COVER --
Management unit 21B, Study no: 13

Cover Type	Average Cover %				
	'85	'91	'98	'03	'08
Vegetation	1.75	1.00	58.23	54.36	43.36
Rock	7.50	12.25	13.37	15.63	11.08
Pavement	3.75	4.25	3.85	2.12	.58
Litter	65.50	64.50	70.77	46.40	65.00
Cryptogams	0	0	.69	.00	.14
Bare Ground	21.50	18.00	3.53	5.86	.50

SOIL ANALYSIS DATA --
Management unit 21, Study no: 13, Study Name: Walker Creek

Effective rooting depth (in)	Temp °F (depth)	pH	sandy clay loam			%0M	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
11.5	80.5 (7.0)	6.4	60.0	17.4	22.6	2.5	9.0	108.8	0.9



PELLET GROUP DATA --
Management unit 21B, Study no: 13

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	20	7	21
Deer	44	39	43

Days use per acre (ha)		
'98	'03	'08
-	-	-
94 (232)	124 (306)	114 (281)

BROWSE CHARACTERISTICS --
Management unit 21B, Study no: 13

		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)
Artemisia tridentata tridentata												
85	**1864**	133	266	999	599	-	39	14	32	1	4	23/29
91	**1731**	-	266	999	466	-	12	4	27	3	12	25/32
98	**2560**	-	40	1960	560	580	2	0	22	7	7	29/38
03	**2060**	-	-	1400	660	440	36	5	32	11	11	30/40
08	**2060**	20	40	1020	1000	660	17	24	49	13	13	30/44
Cowania mexicana stansburiana												
85	**466**	-	133	333	-	-	57	0	0	-	0	43/42
91	**465**	-	66	333	66	-	57	29	14	-	0	49/45
98	**580**	40	40	520	20	40	69	0	3	-	0	62/66
03	**520**	20	40	240	240	20	19	50	46	4	4	61/72
08	**540**	-	20	400	120	20	52	26	22	7	7	63/62
Gutierrezia sarothrae												
85	**1999**	599	266	1733	-	-	0	0	0	-	0	9/10
91	**2864**	266	399	2266	199	-	0	0	7	1	19	11/12
98	**2080**	80	340	1700	40	120	0	0	2	2	2	8/11
03	**260**	-	-	260	-	-	0	0	0	-	0	8/10
08	**500**	-	-	460	40	-	0	0	8	4	4	10/14
Juniperus osteosperma												
85	**798**	133	399	399	-	-	0	0	-	-	8	69/56
91	**999**	-	666	333	-	-	33	0	-	-	0	75/49
98	**80**	-	40	40	-	100	0	0	-	-	0	-/-
03	**100**	-	40	60	-	-	0	0	-	-	0	-/-
08	**100**	-	20	80	-	20	0	0	-	-	20	-/-
Opuntia sp.												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
98	**40**	-	-	40	-	-	0	0	-	-	0	7/17
03	**0**	-	-	-	-	-	0	0	-	-	0	6/18
08	**20**	-	-	20	-	-	0	0	-	-	0	6/21

		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)
Purshia tridentata												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	-	0	-/-
03	**20**	-	-	20	-	-	0	100	-	-	0	8/12
08	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Quercus gambelii												
85	**0**	66	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	-	0	-/-
08	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Rhus trilobata												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	-	0	55/98
08	**0**	-	-	-	-	-	0	0	-	-	0	58/61