

Trend Study 6-9-06

Study site name: North Oakley Bench .

Vegetation type: Mountain brush .

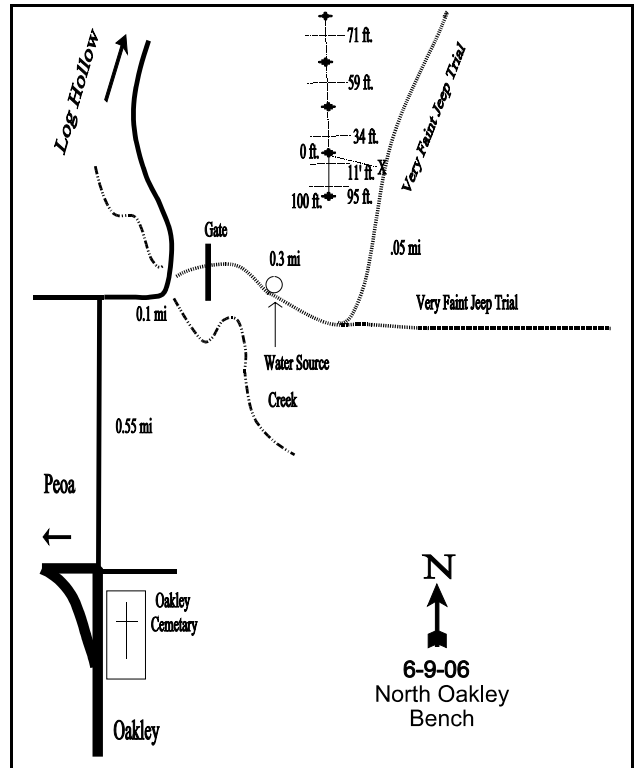
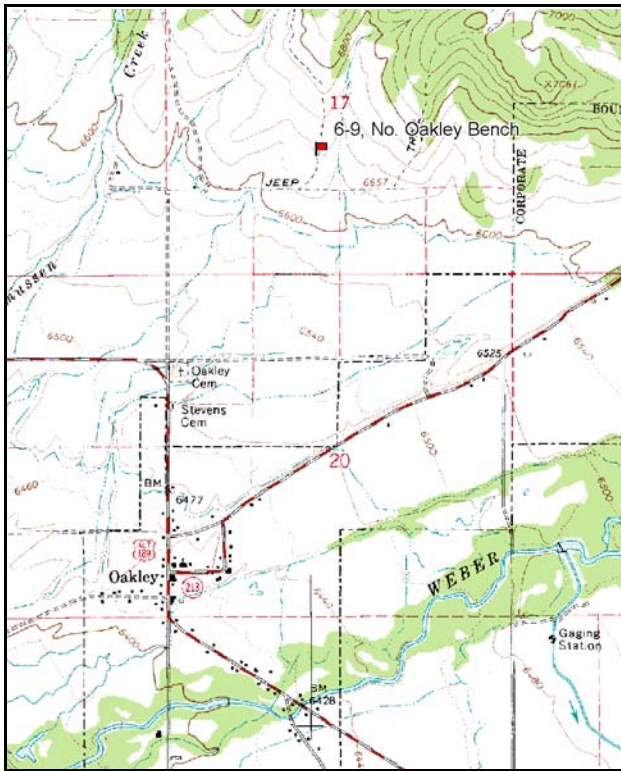
Compass bearing: frequency baseline 180 degrees magnetic.

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

Rebar on belt 1 is at 10 ft.

LOCATION DESCRIPTION

From the Oakley cemetery, just north of Oakley, proceed north 0.55 miles to an intersection and turn right. Proceed east 0.1 miles to a gate, pass through gate (private land; key needed) with creek on immediate right. Continue on a faint road for 0.3 miles to a fork. Turn left and proceed 0.05 miles to a witness post. From the witness post walk 7 paces at 248 degrees magnetic to the 0-foot baseline stake. The first 100 feet of the baseline runs 180 degrees magnetic. The remaining 300 feet run off the 0-foot baseline stake at 343 degrees magnetic.



Map Name: Kamas

Diagrammatic Sketch

Township 1S, Range 6E, Section 17

UTM NAD 27, UTM 12T 4508895 N 475394 E

DISCUSSION

North Oakley Bench - Trend Study No. 6-9

Study Information

This study lies on a relatively uniform mountain big sagebrush-grass/mountain brush community north of Oakley (elevation: 6,700 feet, slope: 8%, aspect: south). Due to its location, this area has a high potential for residential home development. There is very little useful escape or thermal cover in the immediate area. It is on privately owned land that is managed by the Oakley Cattlemen's Association, which means that the winter range is also used by domestic livestock most of the year. It is very representative of the south-facing slopes north of Oakley. Based on the pellet group frequencies and forage utilization, the level of use from both game and livestock varies from moderate to heavy. Pellet group quadrat frequency data has indicated light to moderate use by deer, elk, and cattle. The pellet group transect data in 2001 estimated 29 elk days use/acre (73 edu/ha), 19 deer days use/acre (48 ddu/ha), and 22 cow days use/acre (54 cdu/ha). Cattle were on the study when it was monitored in 2001. The 2006 pellet group data estimates were 59 elk, 46 deer, 13 cow, 2 sheep, and 3 horse days use/acre (146 edu/ha, 112 ddu/ha, 32 cdu/ha, 5 sdu/ha, and 7 hdu/ha). A moose pellet group was identified in 2006, but not sampled within the pellet group transect. Ants were extremely abundant in 2001 and 2006.

Soil

The soil is in the Ayoub series, which consists of moderately deep, well drained, moderately slowly permeable soils that formed in colluvium and residuum from andesite. They are found on mountain slopes and foothills (USDA-NRCS 2006). The effective rooting depth was estimated at nearly 10 inches with a clay loam soil texture and a neutral soil reaction (7.0 pH). During the height of the 1987-1990 drought, some trampling damage and soil compaction were evident from livestock, but have been less evident as vegetation recovered. Protective ground cover is adequate to prevent most soil loss. Erosion is minimal, primarily because of the gentle terrain and high cover contributed by the herbaceous understory. The soil erosion condition class assessment completed in 2001 and 2006 determined the soil to be stable.

Browse

The preferred browse species are mountain big sagebrush, serviceberry, and antelope bitterbrush. The most abundant key browse is mountain big sagebrush, which provided 6% cover in 1996 and 2006 and 9% in 2001. When the study was established in 1984, mountain big sagebrush was decadent in appearance and heavily browsed. Sagebrush is in much poorer condition at this location than over most of the surrounding area. Use on big sagebrush has been moderate to heavy in all years. Sagebrush density has consistently decreased from 2,180 plants/acre in 1996 to 1,180 plants/acre in 2006 and decadence has increased from 9% of the population in 1996 to 47% in 2006. Plants classified as dying has increased from none in 1996 to 8% of the population in 2001 and 27% in 2006. This increase in dying and decadent individuals in 2006 is likely due to an infestation of the sagebrush defoliator moth (*Aroga websterii*), which caused defoliation and drying of leaves on approximately 540 plants/acre. The high decadence and percent dying classifications are likely a product of defoliated sagebrush plants. Young plants made up 17% of the population in 1996 and 2006 and 11% in 2001. Until 2006, recruitment from young individuals was higher than that of dying individuals.

Snowberry, serviceberry, and bitterbrush have combined to provide about one-third of the browse cover. Serviceberry and bitterbrush have showed moderate to heavy use, good vigor, and low decadence since 1996. Snowberry displayed moderate to heavy use in 1996, but light use in 2001 and 2006. Vigor has been normal and decadence low. Annual leader growth for mountain big sagebrush averaged less than 2 inches in 2001, while bitterbrush and serviceberry averaged 2 inches; leader growth was similar in 2006 for each species. Other browse species sampled include stickyleaf low rabbitbrush, broom snakeweed, gray horsebrush, and prickly pear cactus.

Herbaceous Understory

Grass and forb composition is diverse but includes many biennial and perennial weeds or species of poor forage value. Many also act as indicators of heavy livestock use. Thistle, aster, western yarrow, common dandelion, bulbous bluegrass, Letterman needlegrass, yellow salsify, flannel mullein, death camas, and wild onion are all examples of increaser species with heavy livestock use. Overall, the sum of nested frequency for perennial grasses has increased since 1984. Perennial forbs have decreased in sum of nested frequency each year since 1990, very slightly some years. Grasses have provided most of the herbaceous cover and nearly half of the total cover since 1996. There have been over 50 species of forbs sampled since 1984. Grass species with good forage value include bluebunch wheatgrass, crested wheatgrass, thickspike, and Sandberg bluegrass. The dominant grasses are crested wheatgrass, bulbous bluegrass, and Letterman needlegrass. Bulbous bluegrass is the most abundant and provided 6% cover in 1996, 12% in 2001, and 10% in 2006.

1990 TREND ASSESSMENT

Mountain big sagebrush density decreased between 1984 and 1990, most of which were mature plants. Currently, there are abundant seedlings and young sagebrush. The majority of the sagebrush are lightly hedged and have good vigor and fair growth. The other browse have stable or increased numbers. The only shrubs to be uniformly and heavily utilized are the large bitterbrush plants. They are browsed year-round, but still display good vigor. Low rabbitbrush increased on the density plots due to an increase in young in the population. It is the most abundant browse species. The seeded and native grasses had a high nested frequency. The nested frequency of crested wheatgrass increased significantly, while bluebunch wheatgrass decreased. Several new forbs were sampled in 1990, but the most common species remain hoary aster, thistle, and yarrow; all increasers responding to heavy grazing.

browse - down (-2)

grass - up (+2)

forb - up (+2)

1996 TREND ASSESSMENT

The trend for browse is stable. Sagebrush density increased and decadence decreased, but this is likely due to the increased browse sample size taken beginning in 1996. The increased sample size provides better estimates for patchy browse distributions. The densities of other key browse species changed little. The grass trend is stable. The nested frequency of perennial grasses, excluding bulbous bluegrass, decreased slightly, but this is likely a product of different sampling areas in 1996. Bulbous bluegrass and cheatgrass were sampled for the first time in 1996. The forb trend is slightly down. The nested frequency of perennial forbs decreased 27%, but some of this decrease is likely caused by the change in sample locations in 1996. The forb composition continues to be poor. The Desirable Components Index score is good due to moderate browse cover, low browse decadence, excellent perennial grass cover, low annual grass cover, and excellent perennial forb cover.

winter range condition (DC Index) - good (76) Mid-level potential scale

browse - stable (0)

grass - stable (0)

forb - slightly down (-1)

2001 TREND ASSESSMENT

Trend for browse is slightly down. Sagebrush density decreased 27%, but sagebrush cover increased slightly and the height and crown measurements increased. Although the density has decreased substantially, the plants are bigger on average. The population of sagebrush also increased in plants classified with poor vigor and decadence. Utilization on sagebrush remained moderate to heavy. Snowberry, which was moderately to heavy utilized in past years, decreased to nearly half of the 1996 density; most of the density losses were in the mature age class. Serviceberry and bitterbrush densities remained stable, vigor remained normal, and decadence remained low. The grass trend is stable. The nested frequency of perennial grasses, excluding bulbous bluegrass, remained stable. The nested frequencies of thickspike wheatgrass, Sandberg bluegrass, and Letterman needlegrass increased significantly and bluebunch wheatgrass decreased significantly. The nested frequency of bulbous bluegrass increased significantly, and that of cheatgrass did not change. The forb trend is stable. The nested frequency of perennial forbs remained unchanged and forb composition remained poor.

The DCI score improved to excellent due to an increase in browse cover.

winter range condition (DC Index) - excellent (81) Mid-level potential scale
browse - slightly down (-1) grass - stable (0) forb - stable (0)

2006 TREND ASSESSMENT

The browse trend is down. Sagebrush, the key browse species, density decreased 26%, decadence increased to 47%, and plants with poor vigor increased to 63% of the population. As well, plants classified as dying increased to 27% of the population. This increase in poor vigor is likely caused by the sagebrush defoliator moth infestation. The densities of the other key browse species snowberry, serviceberry, and bitterbrush either remained unchanged or increased. The grass trend is slightly down. The nested frequency of perennial grasses, excluding bulbous bluegrass, decreased 10%. The nested frequency of Sandberg bluegrass decreased significantly. The forb trend is slightly down. The nested frequency of perennial forbs did not change substantially from 2001 to 2006, but has decreased slightly since 1996. The forb composition continues to be poor. The DCI score decreased to good due to a decrease in browse cover and increase in browse decadence.

winter range condition (DC Index) - good (75) Mid-level potential scale
browse - down (-2) grass - slightly down (-1) forb - slightly down (-1)

HERBACEOUS TRENDS --
 Management unit 06 , Study no: 9

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron cristatum	b132	c216	a71	a82	a92	2.39	4.20	4.93
G	Agropyron dasystachyum	b80	a17	b72	c124	bc94	.74	2.00	1.24
G	Agropyron intermedium	-	-	2	-	-	.15	-	-
G	Agropyron spicatum	b47	a14	b68	a15	a14	1.48	.60	.29
G	Bromus brizaeformis (a)	-	-	-	3	-	-	.03	-
G	Bromus inermis	-	13	7	6	6	.18	.18	.06
G	Bromus tectorum (a)	-	-	18	18	8	.22	.06	.04
G	Koeleria cristata	a-	a-	a4	ab16	b21	.03	.39	.19
G	Poa bulbosa	a-	a-	b135	c230	c233	6.46	11.66	9.93
G	Poa fendleriana	a-	ab4	ab8	b10	ab9	.21	.18	.09
G	Poa pratensis	b116	c182	c182	ab81	a59	4.97	2.01	1.74
G	Poa secunda	a10	a25	a17	b58	a36	.42	.89	1.54
G	Sitanion hystrix	-	-	-	5	6	-	.18	.07
G	Stipa columbiana	b133	c221	a18	a6	a3	.27	.06	.15
G	Stipa comata	-	-	-	6	-	-	.06	-
G	Stipa lettermani	a-	a-	b165	b176	b184	5.61	3.22	6.03
Total for Annual Grasses		0	0	18	21	8	0.22	0.09	0.03
Total for Perennial Grasses		518	692	749	815	757	22.95	25.68	26.29
Total for Grasses		518	692	767	836	765	23.18	25.77	26.33

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Achillea millefolium</i>	52	46	30	30	47	.29	.46	1.02
F	<i>Agoseris glauca</i>	-	-	7	-	2	.01	-	.00
F	<i>Allium acuminatum</i>	_a 29	_a 6	_a 14	_b 42	_b 55	.08	.13	.15
F	<i>Alyssum alyssoides</i> (a)	-	-	_a 6	_b 29	_c 62	.01	.14	.32
F	<i>Arabis</i> sp.	_a -	_b 13	_{ab} 7	_a -	_{ab} 5	.01	-	.04
F	<i>Astragalus beckwithii</i>	-	-	2	1	-	.03	.00	-
F	<i>Aster chilensis</i>	_a 9	_b 34	_a 9	_a 13	_a 6	.18	.42	.04
F	<i>Astragalus convallarius</i>	_{ab} 13	_{ab} 12	_a 5	_b 34	_c 59	.04	.60	.83
F	<i>Balsamorhiza sagittata</i>	-	-	-	-	-	-	.00	-
F	<i>Camelina microcarpa</i> (a)	-	-	-	-	2	-	-	.03
F	<i>Calochortus nuttallii</i>	3	11	13	17	9	.04	.20	.02
F	<i>Chenopodium fremontii</i> (a)	-	-	-	3	-	-	.00	-
F	<i>Cirsium undulatum</i>	_c 137	_b 73	_a 38	_a 24	_a 17	.61	.55	.10
F	<i>Collomia linearis</i> (a)	-	-	_a -	_b 26	_a -	-	.06	-
F	<i>Comandra pallida</i>	_a 15	_a 22	_b 50	_{ab} 30	_{ab} 28	.38	.15	.61
F	<i>Collinsia parviflora</i> (a)	-	-	_a -	_b 35	_b 52	-	.06	.10
F	<i>Cordylanthus ramosus</i> (a)	-	-	_a 5	_b 30	_b 29	.06	.35	.32
F	<i>Crepis acuminata</i>	6	-	-	-	5	-	-	.04
F	Cruciferae	-	2	-	-	-	-	-	-
F	<i>Cryptantha</i> sp.	4	-	-	-	-	-	-	-
F	<i>Cynoglossum officinale</i>	-	2	2	-	-	.03	-	-
F	<i>Delphinium nuttallianum</i>	-	-	3	-	-	.00	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	-	-	2	-	-	.00
F	<i>Epilobium brachycarpum</i> (a)	-	-	_a -	_b 12	_c 36	-	.05	.37
F	<i>Erigeron pumilus</i>	_a 2	_c 34	_c 41	_{bc} 29	_{ab} 10	.30	.09	.07
F	<i>Eriogonum racemosum</i>	4	15	5	3	5	.01	.01	.01
F	<i>Eriogonum umbellatum</i>	-	-	3	-	-	.01	-	-
F	<i>Gayophytum ramosissimum</i> (a)	-	-	_b 15	_a -	_b 18	.05	-	.05
F	<i>Hackelia patens</i>	-	-	6	1	-	.30	.00	-
F	<i>Holosteum umbellatum</i> (a)	-	-	_a 6	_b 40	_a 3	.01	.21	.00
F	<i>Ipomopsis aggregata</i>	-	2	1	-	-	.03	-	-
F	<i>Lactuca serriola</i>	-	3	-	-	-	-	-	-
F	<i>Lithospermum ruderale</i>	-	2	4	3	2	.03	.03	.69
F	<i>Lupinus argenteus</i>	_a 2	_a 4	_{ab} 22	_{bc} 40	_c 37	.74	1.28	1.71
F	<i>Machaeranthera canescens</i>	_{bc} 70	_d 128	_c 74	_{ab} 19	_a 14	.51	.12	.09
F	<i>Machaeranthera grindelioides</i>	-	-	-	1	-	-	.00	-

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Microsteris gracilis</i> (a)	-	-	a-	c68	b17	-	.28	.04
F	<i>Navarretia intertexta</i> (a)	-	-	-	3	-	-	.00	-
F	<i>Penstemon</i> sp.	-	2	-	-	1	-	-	.00
F	<i>Phlox longifolia</i>	a-	b22	b10	b15	b30	.05	.04	.16
F	<i>Polygonum douglasii</i> (a)	-	-	b81	a28	b80	.22	.08	.43
F	<i>Ranunculus testiculatus</i> (a)	-	-	a3	b22	a-	.00	.09	-
F	<i>Senecio integerrimus</i>	a-	a-	a-	b16	ab9	-	.15	.06
F	<i>Senecio multilobatus</i>	3	-	-	4	7	-	.01	.02
F	<i>Sphaeralcea coccinea</i>	4	18	14	8	4	.31	.06	.18
F	<i>Taraxacum officinale</i>	ab6	c34	bc26	c32	a2	.21	.26	.01
F	<i>Tragopogon dubius</i>	a7	b56	a25	a19	a4	.27	.24	.06
F	Unknown forb-annual (a)	-	-	b12	a-	a-	.07	-	-
F	<i>Verbascum thapsus</i>	11	9	2	-	-	.03	-	-
F	<i>Vicia americana</i>	a-	b15	a-	a-	a-	-	-	-
F	<i>Viguiera multiflora</i>	1	-	-	-	-	-	-	-
F	<i>Zigadenus paniculatus</i>	a-	ab3	ab1	ab8	b12	.03	.15	.18
Total for Annual Forbs		0	0	128	296	301	0.43	1.37	1.69
Total for Perennial Forbs		378	568	414	389	370	4.59	5.02	6.15
Total for Forbs		378	568	542	685	671	5.02	6.40	7.85

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

BROWSE TRENDS --

Management unit 06 , Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Amelanchier alnifolia</i>	13	13	11	.97	1.42	1.47
B	<i>Artemisia tridentata vaseyana</i>	55	43	45	5.86	9.43	5.65
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	85	86	94	3.79	6.31	8.35
B	<i>Mahonia repens</i>	21	17	15	.93	.22	.32
B	<i>Opuntia</i> sp.	4	4	5	.91	.91	.60
B	<i>Purshia tridentata</i>	11	16	11	.30	.89	1.59
B	<i>Symphoricarpos oreophilus</i>	28	25	24	3.65	5.55	4.56
B	<i>Tetradymia canescens</i>	3	2	5	-	.38	.15
Total for Browse		220	206	210	16.44	25.13	22.69

CANOPY COVER, LINE INTERCEPT --
Management unit 06 , Study no: 9

Species	Percent Cover
	'06
Amelanchier alnifolia	1.28
Artemisia tridentata vaseyana	6.43
Chrysothamnus viscidiflorus viscidiflorus	12.25
Mahonia repens	.48
Opuntia sp.	.41
Purshia tridentata	2.21
Symphoricarpos oreophilus	7.53

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 06 , Study no: 9

Species	Average leader growth (in)	
	'01	'06
Amelanchier alnifolia	2.0	2.0
Artemisia tridentata vaseyana	1.6	2.1
Purshia tridentata	2.0	1.6

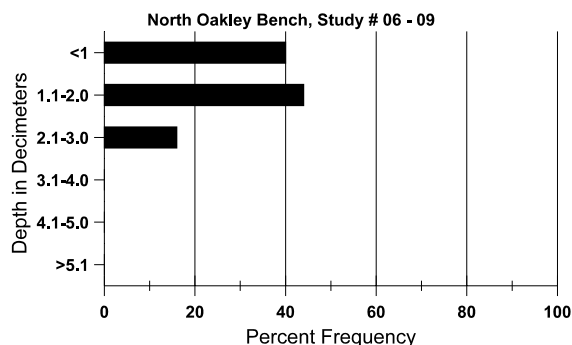
BASIC COVER --
Management unit 06 , Study no: 9

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	7.75	12.00	46.85	55.62	55.27
Rock	2.00	1.50	1.37	1.79	2.08
Pavement	.25	1.50	.91	.32	1.07
Litter	60.50	47.00	39.72	38.70	35.50
Cryptogams	1.25	4.25	.97	2.75	.20
Bare Ground	28.25	33.75	21.67	21.97	21.64

SOIL ANALYSIS DATA --
Herd Unit 06, Study no: 09, North Oakley Bench

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
9.6	64.4 (19.7)	7.0	38.9	33.1	28.0	4.2	43.8	217.6	0.7

Stoniness Index



PELLET GROUP DATA --

Management unit 06 , Study no: 9

Type	Quadrat Frequency		
	'96	'01	'06
Sheep	1	-	-
Rabbit	3	3	10
Horse	-	3	2
Elk	5	21	43
Deer	15	11	15
Cattle	6	12	2

Days use per acre (ha)	
'01	'06
-	-
-	-
-	3 (7)
30 (73)	59 (146)
19 (48)	46 (112)
22 (54)	13 (32)

BROWSE CHARACTERISTICS --

Management unit 06 , Study no: 9

		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)
Amelanchier alnifolia												
84	66	-	-	-	66	-	100	0	100	-	0	-/-
90	199	66	133	66	-	-	67	33	0	-	33	25/31
96	280	20	20	260	-	-	29	50	0	-	0	25/30
01	260	-	-	220	40	-	23	77	15	-	0	28/34
06	220	-	60	160	-	-	18	64	0	-	0	29/29
Artemisia tridentata vaseyana												
84	3666	66	1000	1400	1266	-	56	18	35	-	5	13/7
90	1533	2466	533	800	200	-	30	4	13	-	4	14/17
96	2180	140	380	1600	200	880	46	21	9	-	9	20/28
01	1600	40	180	1220	200	240	46	23	13	8	15	22/35
06	1180	40	200	420	560	360	27	12	47	27	63	22/34

		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 viscidiflorus viscidiflorus												
84	6933	-	-	5133	1800	-	0	0	26	-	0	16/15
90	9932	1133	1733	6533	1666	-	27	5	17	.60	21	9/10
96	6660	100	760	5800	100	40	.30	0	2	-	0	11/16
01	7500	-	640	6780	80	20	2	0	1	.26	.26	9/16
06	8640	-	940	7520	180	20	7	0	2	.92	.92	10/21
Mahonia repens												
84	66	-	66	-	-	-	0	0	-	-	0	-/-
90	1933	-	1333	600	-	-	14	0	-	-	0	3/4
96	6340	320	5040	1300	-	-	0	0	-	-	0	3/5
01	3960	-	440	3520	-	-	0	0	-	-	0	2/3
06	5120	20	660	4460	-	-	0	0	-	-	0	2/3
Opuntia sp.												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	66	-	-	-	-	0	0	0	-	0	-/-
96	80	-	-	80	-	-	0	0	0	-	0	7/20
01	80	-	-	60	20	-	0	0	25	-	0	4/19
06	180	-	-	180	-	-	0	0	0	-	0	5/15
Purshia tridentata												
84	266	-	66	200	-	-	50	25	0	-	0	30/34
90	266	-	66	200	-	-	0	100	0	-	0	22/41
96	260	-	-	260	-	-	38	62	0	-	0	14/40
01	320	-	40	260	20	-	31	56	6	-	0	11/36
06	240	-	-	240	-	-	0	100	0	-	0	21/51
Symphoricarpos oreophilus												
84	266	-	-	200	66	-	75	0	25	-	0	11/15
90	465	-	133	266	66	-	57	14	14	4	14	12/14
96	1000	80	140	860	-	80	38	26	0	-	0	24/42
01	560	-	60	480	20	-	7	4	4	-	0	29/49
06	840	-	80	700	60	-	2	0	7	5	17	27/39
Tetradymia canescens												
84	66	-	66	-	-	-	0	0	0	-	0	-/-
90	66	-	-	66	-	-	100	0	0	-	0	13/14
96	60	40	20	40	-	-	100	0	0	-	0	11/19
01	60	20	40	20	-	-	0	0	0	-	0	9/17
06	240	-	60	160	20	-	0	0	8	-	0	9/16