

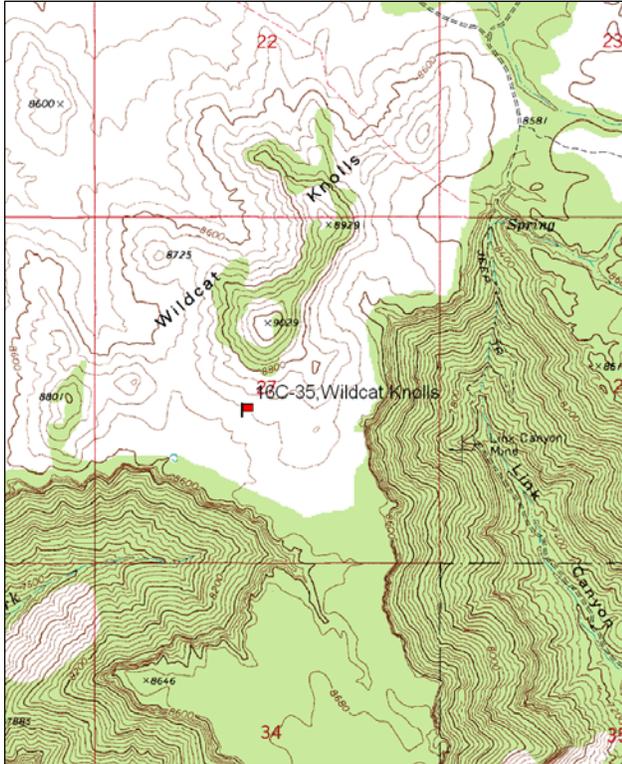
WILDCAT KNOLL - TREND STUDY NO. 16C-35-09

Vegetation Type: Mountain Big Sagebrush  
Range Type: Crucial Deer Winter, Substantial Elk Winter  
NRCS Ecological Site Description: Not Available  
Land Ownership: USFS  
Elevation: 8,700 ft (2,652 m)  
Aspect: South  
Slope: 3%-5%  
Transect bearing: 95 degrees magnetic  
Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft)

Directions:

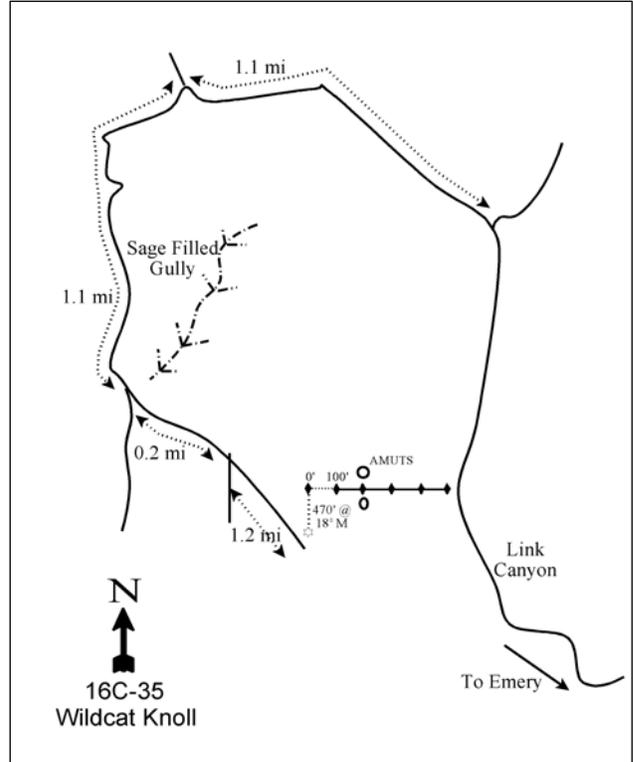
From Center St. in Emery, travel west 1.2 miles. Turn right onto a dirt road and proceed for 0.6 miles. Turn left and travel 8.7 miles (1.7 miles from turnoff to site 16C-31). Bear left at the fork and travel 1.1 miles to another fork. Stay left on F.S. #344 for 1.1 miles to another fork (at 0.1 miles on F.S. #344, go left at the fork). At the fork, bear left and travel 0.2 miles to another fork. At the fork, go left and travel 1.2 miles to the witness post. From the witness post to the 0 ft baseline stake, walk 470 ft at a bearing of 18°M. The 0 ft stake has browse tag #485 attached.

Map Name: Emery West



Township: 21S, Range: 5E, Section: 27

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 470033 E 4312361 N

## WILDCAT KNOLL - TREND STUDY NO. 16C-35

### Site Information

Site Description: The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), black sagebrush (*A. nova*) and grass community which is considered important for elk. There is little escape or thermal cover on the site, but about half mile away there is good cover provided by Ponderosa pine (*Pinus ponderosa*) trees. This area is managed by the Forest Service as part of the Emery allotment. Water is limited here with guzzlers about three-quarters of a mile from the site. Pellet group data has indicated very heavy use by elk and light use by deer since 1999. Estimated cattle use has been light to moderate since 1999 (Table - Pellet Group Data).

Browse: There are several species of palatable browse on the site including Utah serviceberry (*Amelanchier utahensis*), black sagebrush, and mountain big sagebrush. Individual serviceberry plants are large, highlined, and mostly unavailable to browsing. Utilization of serviceberry has been mostly moderate over the study years. Mountain big sagebrush dominates the drainage corridors while black sagebrush, dwarf rabbitbrush (*Chrysothamnus depressus*), and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) dominate the drier areas. It appears that there have been problems identifying dwarf rabbitbrush and stickyleaf low rabbitbrush. Because of the identification problems, dwarf rabbitbrush was not included in the Desirable Components Index. Data since 1999 has classified most of the rabbitbrush as stickyleaf low rabbitbrush. There was a slight die-off of black and mountain big sagebrush between the 1999 and 2004 sample years that is attributed to drought conditions in the years prior to 2004. Even with the decrease in density over those years, both sagebrush populations have remained healthy with low decadence, good vigor, and good recruitment of young plants. Utilization of the two sagebrush species was moderate in 1994 and 1999, but has been mostly light since 2004. Other browse species that occur infrequently include antelope bitterbrush (*Purshia tridentata*), Wood's rose (*Rosa woodsii*), and snowberry (*Symphoricarpos oreophilus*) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and abundant on the site providing an average cover of 15% since 1994. The dominant species are mutton bluegrass (*Poa fendleriana*), Letterman needlegrass (*Stipa lettermani*), and Salina wildrye (*Elymus salina*). Forbs are diverse, but have steadily decreased in sum of nested frequency since 1994. However, perennial forb cover has remained fairly high and has averaged about 3% since 1994 (Table - Herbaceous Trends).

Soil: The soil has a sandy clay loam texture with a slightly acid pH (Table - Soil Analysis Data). The parent material is limestone. Bare ground cover has fluctuated over the sample years with shifts in litter and vegetation cover, but has been mostly moderately low (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

### Trend Assessments

#### Browse:

- **1994 to 1999 - slightly up (+1):** There was a 69% increase in the density of black sagebrush from 4,740 plant/acre to 8,020 plants/acre. Most of the increase in density was due to a large increase in the recruitment of young black sagebrush plants from 1% to 30% of the population. There was little change in the mountain big sagebrush density, but recruitment of young plants increased from 1% to 33% of the population. The density of mature mountain big sagebrush plants actually decreased substantially.
- **1999 to 2004 - down (-2):** The density of both black and mountain big sagebrush decreased by more than 50% with large decreases in cover. Recruitment of young plants decreased to 3% of the population for black sagebrush and to 19% for mountain big sagebrush.

- **2004 to 2009 - up (+2):** There was nearly a three-fold increase in the density of both black and mountain big sagebrush. Almost all of the increase came from an increase in the density of young plants. Cover of both species increased, but did not return to 1999 levels.

Grass:

- **1994 to 1999 - slightly down (-1):** Perennial grass sum of nested frequency decreased by 15%, but cover increased from 11% to 16%. Letterman needlegrass decreased significantly in nested frequency.
- **1999 to 2004 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 19% and cover decreased to 13%. Mutton bluegrass decreased significantly in nested frequency.
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased to 20%.

Forb:

- **1994 to 1999 - down (-2):** Perennial forb sum of nested frequency decreased by 22%, but cover increased from 2% to 4%.
- **1999 to 2004 - down (-2):** Perennial forb sum of nested frequency decreased by 20% and annual forb sum of nested frequency increased substantially. The increase in annual forbs was due primarily to a large increase in frequency and cover of a goosefoot (*Chenopodium sp.*)
- **2004 to 2009 - down (-2):** The sum of nested frequency decreased by 52% and forbs were fairly rare on the site. Cover of perennial forbs decreased, but stayed fairly high at near 2%. Annual forbs also decreased in sum of nested frequency and cover.

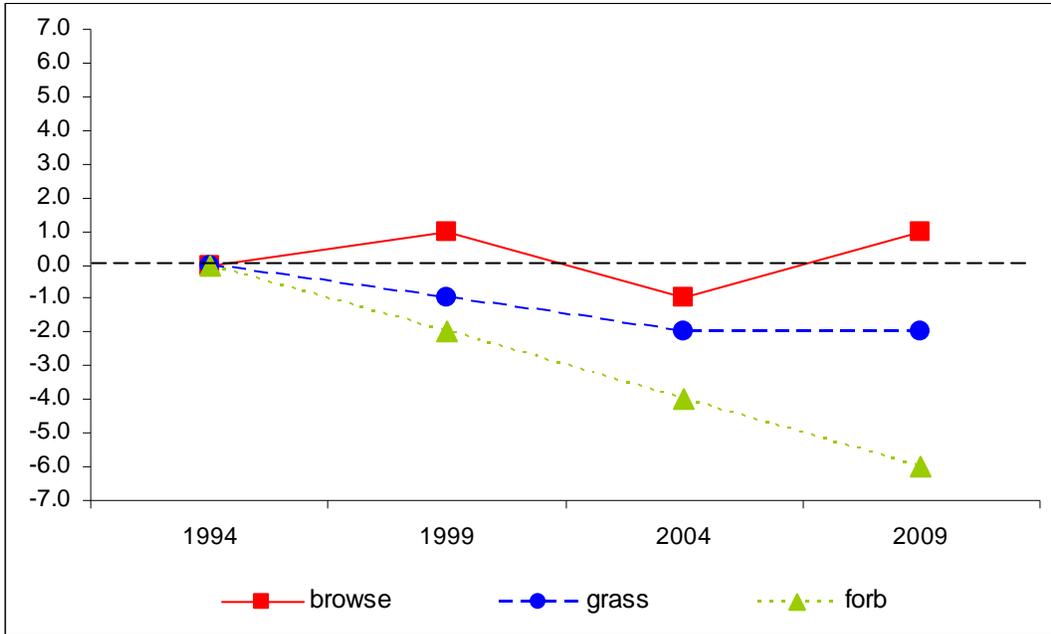
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 16C, study no: 35

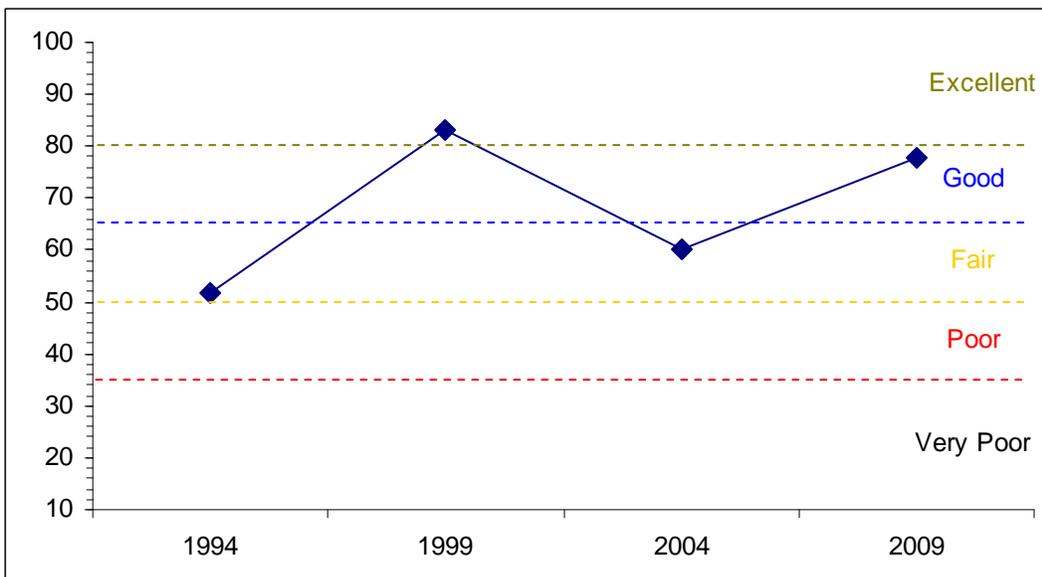
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	13.0	12.5	0.4	22.1	0.0	4.0	0.0	<b>51.9</b>	Poor-Fair
99	20.5	11.4	13.3	30.0	0.0	7.8	0.0	<b>83.1</b>	Excellent
04	11.3	13.4	3.9	26.6	0.0	5.1	0.0	<b>60.2</b>	Fair
09	16.1	13.5	15.0	30.0	0.0	3.2	0.0	<b>77.8</b>	Good

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 16C Study no: 35



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL  
 Management unit 16C, Study no: 35



HERBACEOUS TRENDS--

Management unit 16C, Study no: 35

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron smithii	a42	ab36	bc74	c103	.13	.34	1.91	3.80
G	Agropyron spicatum	a3	a4	b26	ab15	.03	.03	.32	.48
G	Carex sp.	b99	b105	b91	a16	.21	.67	.94	.18
G	Elymus salina	b253	a144	a116	a154	4.10	5.76	4.52	9.26
G	Oryzopsis hymenoides	ab20	a11	b23	a8	.25	.04	.19	.30
G	Poa fendleriana	bc177	c231	a111	ab157	1.85	5.41	2.23	3.68
G	Sitanion hystrix	11	3	12	3	.02	.04	.16	.01
G	Stipa comata	a-	b23	a8	a5	-	.56	.36	.00
G	Stipa lettermani	b225	a145	a111	a109	4.43	3.38	2.62	2.57
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		830	702	572	570	11.04	16.26	13.28	20.31
Total for Grasses		830	702	572	570	11.04	16.26	13.28	20.31
F	Agoseris glauca	-	8	2	2	-	.09	.00	.03
F	Antennaria rosea	4	11	-	5	.06	.36	-	.03
F	Astragalus convallarius	b17	a8	a-	a1	.12	.01	.25	.03
F	Astragalus miser	b35	b38	a9	a1	.57	.93	.19	.03
F	Astragalus sp.	5	9	9	3	.16	.66	.51	.15
F	Calochortus nuttallii	a2	a6	b29	a-	.00	.01	.09	-
F	Castilleja linariaefolia	b38	b24	a1	a3	.10	.14	.00	.03
F	Chaenactis douglasii	3	-	4	-	.00	-	.00	-
F	Chenopodium sp. (a)	a-	a-	c267	b13	-	-	5.41	.10
F	Cirsium sp.	1	-	-	-	.00	-	-	-
F	Crepis acuminata	b40	a-	ab17	a6	.14	-	.21	.01
F	Erigeron eatonii	b44	a16	a8	a8	.12	.09	.04	.04
F	Eriogonum alatum	-	3	-	-	-	.03	-	-
F	Eriogonum racemosum	44	38	32	26	.14	.41	.47	.26
F	Eriogonum umbellatum	38	23	28	19	.40	.51	.26	.63
F	Gayophytum ramosissimum(a)	-	-	5	-	-	-	.01	-
F	Lappula occidentalis (a)	a-	a-	b16	a-	-	-	.20	-
F	Linum lewisii	-	6	4	-	-	.04	.01	-
F	Lomatium sp.	-	1	-	-	-	.00	-	-
F	Lupinus argenteus	1	10	-	-	.01	.25	-	-
F	Lygodesmia sp.	-	1	6	-	-	.03	.06	-
F	Machaeranthera canescens	6	9	3	-	.03	.04	.01	-
F	Machaeranthera grindelioides	-	1	-	-	-	.03	-	-
F	Mertensia sp.	8	-	-	-	.09	-	-	-
F	Penstemon carnosus	1	1	-	-	.03	.01	-	-
F	Penstemon sp.	-	8	5	8	-	.19	.31	.33
F	Polygonum douglasii (a)	a-	a-	b59	a9	-	-	.12	.04
F	Senecio multilobatus	-	2	2	-	-	.03	.00	-
F	Taraxacum officinale	-	3	3	-	-	.01	.00	-
F	Townsendia sp.	-	-	3	-	-	-	.00	-
F	Zigadenus paniculatus	a4	a-	b17	a5	.00	.00	.06	.01

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
	Total for Annual Forbs	0	0	347	22	0	0	5.74	0.14
	Total for Perennial Forbs	291	226	182	87	2.00	3.91	2.53	1.58
	Total for Forbs	291	226	529	109	2.00	3.91	8.27	1.73

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 35

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	1	2	2	1	1.76	2.29	2.96	2.97
B	Artemisia frigida	1	1	1	0				
B	Artemisia nova	58	67	56	60	3.20	6.18	2.37	4.69
B	Artemisia tridentata vaseyana	56	55	42	56	4.34	6.98	2.93	4.64
B	Chrysothamnus depressus	80	5	1	0	2.73	-	-	-
B	Chrysothamnus nauseosus hololeucus	2	0	4	5	-	-	.03	.01
B	Chrysothamnus viscidiflorus viscidiflorus	13	88	82	88	.41	3.90	7.35	4.64
B	Eriogonum corymbosum	4	5	5	7	.03	-	.06	.18
B	Leptodactylon pungens	0	0	0	1				
B	Opuntia sp.	3	0	1	2	.18	.00	.01	.01
B	Purshia tridentata	1	0	2	0	.63	.38	.15	-
B	Rosa woodsii	0	2	1	0	.00	.06	.03	-
B	Symphoricarpos oreophilus	6	1	1	4	.60	.15	.03	.16
B	Tetradymia canescens	4	4	3	5	.03	-	.03	.03
	Total for Browse	229	230	201	229	13.94	19.96	15.98	17.34

#### CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 35

Species	Percent Cover		
	'99	'04	'09
Amelanchier utahensis	3.20	2.79	3.83
Artemisia nova	-	4.00	4.84
Artemisia tridentata vaseyana	-	4.28	5.61
Chrysothamnus viscidiflorus viscidiflorus	-	9.05	5.31
Eriogonum corymbosum	-	.18	.38
Tetradymia canescens	-	.13	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16C, Study no: 35

Species	Average leader growth (in)	
	'04	'09
Amelanchier utahensis	3.0	1.7
Artemisia tridentata vaseyana	2.2	1.0
Purshia tridentata	4.3	1.5

BASIC COVER--

Management unit 16C, Study no: 35

Cover Type	Average Cover %			
	'94	'99	'04	'09
Vegetation	33.81	43.76	37.09	43.60
Rock	.26	.04	.03	.00
Pavement	.12	.13	.80	.23
Litter	47.01	45.68	34.76	43.19
Cryptogams	.00	0	0	0
Bare Ground	30.31	24.97	44.07	27.50

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 35, Study Name: Wildcat Knolls

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11.4	6.4	60	15.4	24.6	2.7	10.9	182.4	0.5

PELLET GROUP DATA--

Management unit 16C, Study no: 35

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	10	4	5	7
Elk	65	51	51	55
Deer	24	5	2	2
Cattle	7	3	6	11

Days use per acre (ha)		
'99	'04	'09
-	-	-
109 (269)	97 (240)	46 (112)
9 (22)	6 (15)	3 (8)
29 (72)	30 (73)	16 (39)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 35

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
94	20	0	100	-	-	100	0	0	74/88
99	40	0	100	-	60	0	50	0	93/115
04	40	0	100	-	-	50	0	0	62/67
09	20	100	0	-	120	0	0	0	59/79
<b>Artemisia frigida</b>									
94	80	0	100	-	-	0	0	0	-/-
99	40	0	100	-	-	0	0	0	-/-
04	40	0	100	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<b>Artemisia nova</b>									
94	4740	1	86	14	680	58	0	6	10/16
99	8020	30	53	17	100	53	23	1	8/15
04	3660	3	89	8	600	5	.54	4	7/11
09	10200	60	37	3	6780	2	2	14	6/15
<b>Artemisia tridentata vaseyana</b>									
94	4520	1	90	9	-	77	0	1	34/36
99	4560	33	55	12	400	46	2	4	19/29
04	2140	19	72	9	1660	7	7	5	21/26
09	6140	53	36	10	3420	13	9	14	16/23
<b>Chrysothamnus depressus</b>									
94	11160	0	98	2	60	0	0	0	3/7
99	120	17	83	0	-	0	0	0	4/7
04	20	0	100	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
<b>Chrysothamnus nauseosus hololeucus</b>									
94	60	0	100	0	-	0	0	0	18/18
99	0	0	0	0	-	0	0	0	-/-
04	120	0	83	17	-	33	0	17	18/19
09	140	14	71	14	-	0	0	14	18/20
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
94	1260	0	98	2	-	0	0	0	7/8
99	13400	14	85	2	180	15	0	0	5/9
04	13400	6	93	1	240	0	0	.14	7/11
09	14780	12	70	19	-	1	0	26	5/9

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Eriogonum corymbosum</i>										
94	100	0	100	0	-	0	0	0	11/16	
99	160	38	50	13	-	13	0	0	14/18	
04	140	0	100	0	-	86	0	0	10/14	
09	140	29	71	0	20	0	0	0	10/19	
<i>Leptodactylon pungens</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	100	20	80	-	-	0	0	0	3/10	
99	0	0	0	-	20	0	0	0	-/-	
04	60	0	100	-	-	0	0	0	2/4	
09	60	0	100	-	-	0	0	0	3/9	
<i>Purshia tridentata</i>										
94	20	0	0	100	-	100	0	0	23/26	
99	0	0	0	0	-	0	0	0	26/69	
04	40	0	100	0	-	0	0	0	25/55	
09	0	0	0	0	-	0	0	0	22/55	
<i>Rosa woodsii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	120	100	0	-	40	0	0	0	-/-	
04	60	100	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	9/4	
<i>Symphoricarpos oreophilus</i>										
94	300	0	100	-	-	27	0	0	13/23	
99	20	0	100	-	-	0	0	0	20/39	
04	20	0	100	-	-	0	0	0	16/29	
09	80	25	75	-	-	0	25	0	18/38	
<i>Tetradymia canescens</i>										
94	140	14	86	0	-	0	0	0	7/9	
99	120	67	33	0	-	0	33	0	6/7	
04	100	0	100	0	-	0	0	0	7/11	
09	100	20	60	20	-	20	0	20	7/9	