

DANISH BENCH - TREND STUDY NO. 16C-36-09

Vegetation Type: Chained, Seeded P-J

Range Type: Crucial Deer Winter, Substantial Elk Winter

NRCS Ecological Site Description: Semidesert Bouldery Loam (Shadscale), R034XY202UT

Land Ownership: SITLA

Elevation: 6,530 ft (1,990 m)

Aspect: Southeast

Slope: 4%-5%

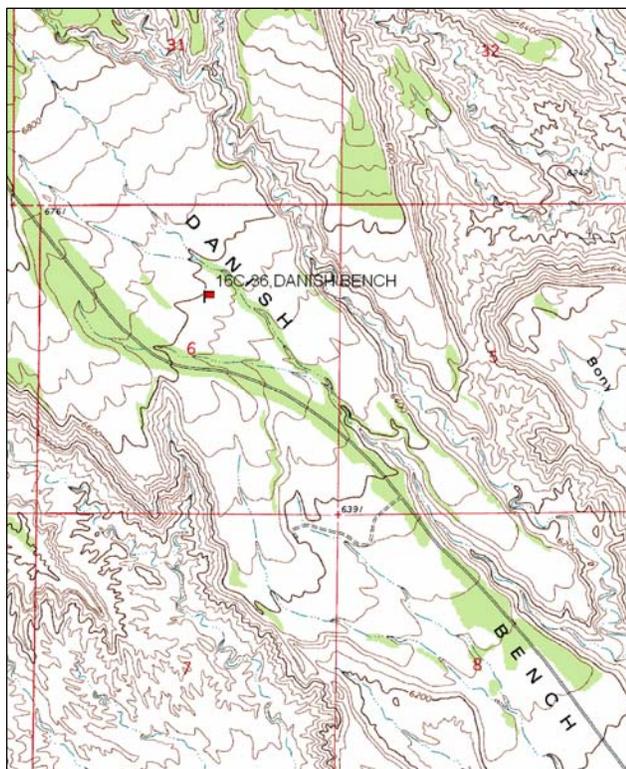
Transect bearing: 95 degrees magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft)

Directions:

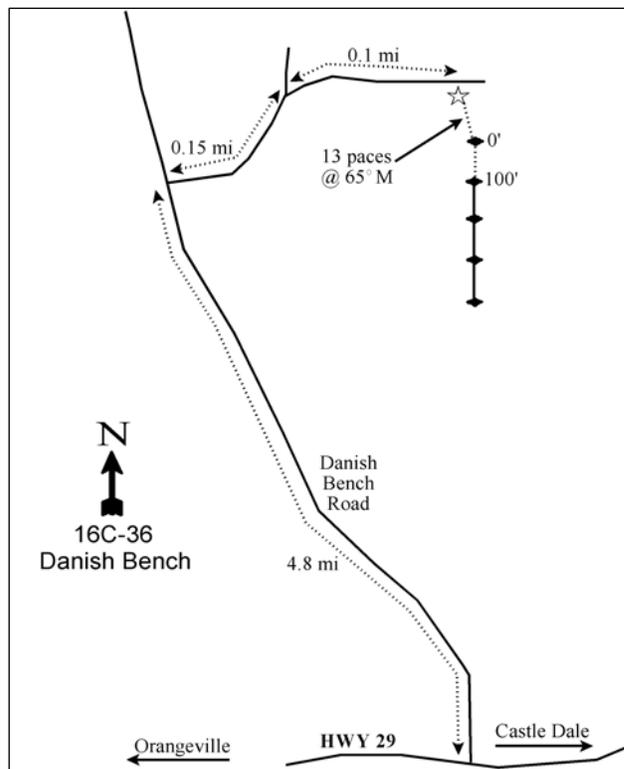
From Highway 29 between Orangeville and Castle Dale, travel up Danish Bench Road (550 West) 4.8 miles. Turn right and proceed 0.15 miles to a fork in the road. Take the right fork and travel 0.1 mile to a witness post on the right hand side of the road. From the witness post to the 0-foot baseline stake, walk 13 paces at 65°M.

Map Name: Red Point



Township: 18S, Range: 8E, Section: 6

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 494321 E 4348806 N

## DANISH BENCH - TREND STUDY NO. 16C-36

### Site Information

Site Description: This study samples a seeded pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining representative of important big game winter range in the area. The area is on land administered by the BLM and lies within the Wilberg grazing allotment. The area was retreated as part of the Danish Bench Lop and Scatter Watershed Restoration Initiative project ([project # 1390](#)) in 2009, prior to the sample, to remove pinyon and juniper trees that had reestablished on the site. Pellet group data estimated heavy elk use in 1999 and 2009, with more moderate use in 2004. Estimated deer use was light in 1999 and 2004, but was more moderate in 2009. Estimated cattle use has been very light since 1999 (Table - Pellet Group Data).

Browse: The dominant browse on the site consists of a small statured population of black sagebrush (*Artemisia nova*) that occurs at moderately low density. Density has generally increased since 1994, with slight increases in cover. The black sagebrush population is healthy with low decadence, good vigor, and good recruitment over the sample years. Utilization of black sagebrush was light in 1994, but has been moderate to heavy since 1999. Small numbers of other desirable shrubs also occur on the site. These include true mountain mahogany (*Cercocarpus montanus*), green ephedra (*Ephedra veridis*), Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*), and antelope bitterbrush (*Purshia tridentata*). Mahogany and bitterbrush are heavily browsed, while use of cliffrose and ephedra has been moderate to heavy (Table - Browse Characteristics).

Juniper and pinyon trees had reestablished at moderate densities prior to the lop and scatter treatment in 2009. Following the treatment, the densities of pinyon and juniper did not decrease much, but the average diameter of the trees had decreased (Table - Point-Quarter Tree Data). Most of the trees sampled in 2009, following the treatment, were cut trees that still had live branches that will likely survive.

Herbaceous Understory: Grasses are comprised primarily by three species, crested wheatgrass (*Agropyron cristatum*), Salina wildrye (*Elymus salina*), and Indian ricegrass (*Oryzopsis hymenoides*), none of which is abundant. Crested wheatgrass dominated the site early in the study, but decreased significantly between 1999 and 2004 and is not overly common. Forbs are rare, though perennial species such as golden cryptantha (*Cryptantha confertiflora*) and hoary townsendia (*Townsendia incana*) have provided some cover in past sample years (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a slightly alkaline pH. Organic matter is limited at only 1.8% (Table - Soil Analysis Data). Litter cover and vegetation cover are relatively low and there is a considerable amount of unprotected bare ground cover on the site (Table - Basic Cover). There is some localized soil movement noticeable and the soil erosion condition was classified as slight in 2004, but was stable in 2009.

### Trend Assessments

Browse:

- **1994 to 1999 - slightly up (+1):** The density of black sagebrush increased by 10% from 1,540 plants/acre to 1,700 plants/acre, and the density of green ephedra increased substantially from 60 plants/acre to 340 plants/acre. Cover remained similar for both species. Recruitment of young black sagebrush plants increased from 14% to 22%.
- **1999 to 2004 - slightly up (+1):** Black sagebrush density increased 9% to 1,860 plants/acre and green ephedra density increased 70% to 580 plants/acre. Cover of black sagebrush also increased slightly, however, recruitment of young sagebrush plants decreased.
- **2004 to 2009 - up (+2):** Black sagebrush density increased by 61% to 3,000 plants/acre with a large increase in the recruitment of young plants. There was little change in the ephedra population.

Grass:

- **1994 to 1999 - stable (0):** Perennial grass sum of nested frequency changed little, though cover decreased slightly.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased by 67% with a significant decrease in the nested frequency of the dominant grass, crested wheatgrass. Indian ricegrass increased significantly in nested frequency. Cover of perennial grasses decreased from 7% to 4%.
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.

Forb:

- **1994 to 1999 - up (+2):** The sum of nested frequency of perennial forbs increased by 43%, but there was little change in cover.
- **1999 to 2004 - up (+2):** Perennial forb sum of nested frequency increased by 37% and cover increased from 1% to 4%. Most of the increase was due to an increase in hoary townsendia.
- **2004 to 2009 - down (-2):** There was a 69% decrease in the sum of nested frequency of perennial forbs and cover decreased to less than 1%. Forbs are now rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

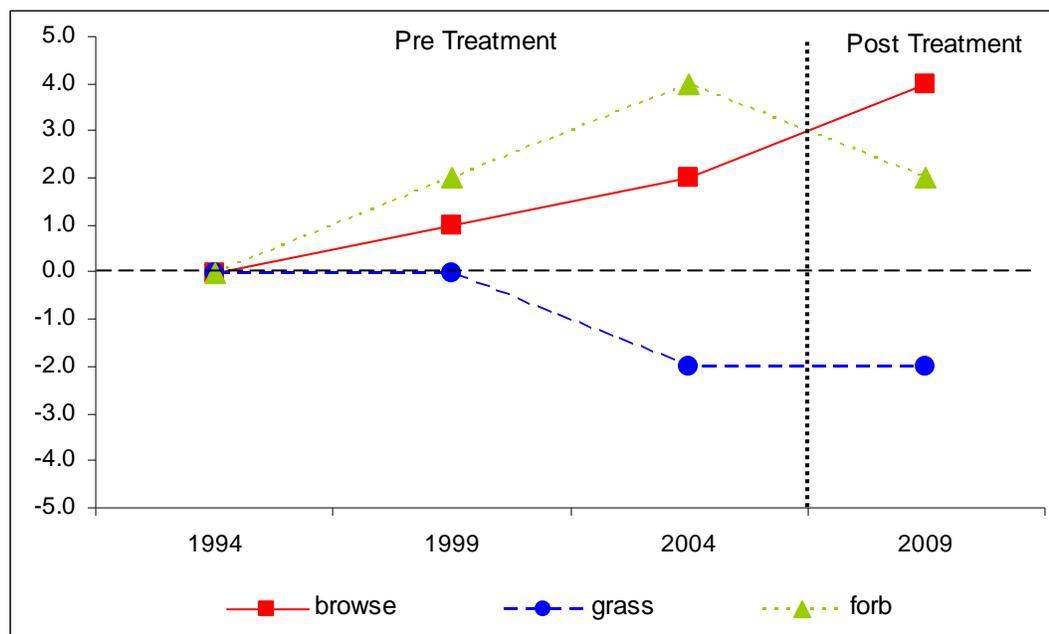
Management unit 16C, study no: 36

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	5.7	0.0	0.0	16.3	0.0	3.0	0.0	<b>24.9</b>	Poor-Fair
99	5.9	0.0	0.0	14.6	0.0	2.6	0.0	<b>23.1</b>	Poor-Fair
04	9.3	9.5	6.9	7.7	0.0	7.5	0.0	<b>40.8</b>	Fair
09	8.0	2.0	6.6	7.2	0.0	1.4	0.0	<b>25.2</b>	Poor-Fair

**Trend Summary**

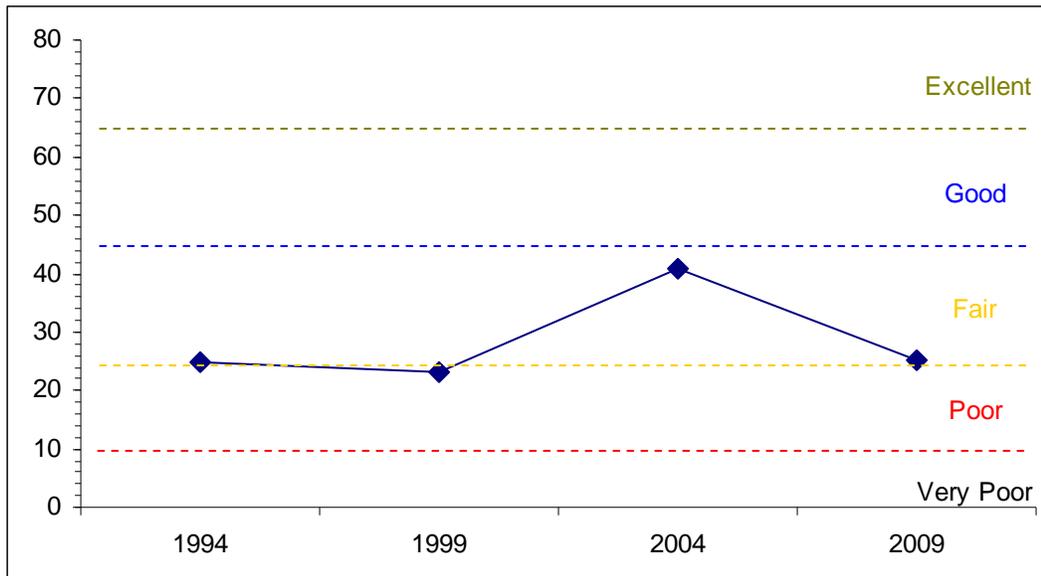
CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 16C Study no: 36



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE

Management unit 16C, Study no: 36



HERBACEOUS TRENDS--

Management unit 16C, Study no: 36

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	b279	b299	a33	a53	5.41	6.72	.68	1.12
G	Agropyron intermedium	3	-	-	-	.00	-	-	-
G	Elymus junceus	5	3	6	4	.00	.15	.06	.03
G	Elymus salina	a2	a-	ab4	b7	.06	-	1.00	.94
G	Oryzopsis hymenoides	ab54	a29	b67	ab48	2.64	.41	2.08	1.52
G	Sitanion hystrix	5	-	-	-	.01	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		348	331	110	112	8.14	7.28	3.84	3.62
Total for Grasses		348	331	110	112	8.14	7.28	3.84	3.62
F	Caulanthus crassicaulis	12	2	1	5	.04	.01	.03	.01
F	Chenopodium fremontii (a)	a-	a-	b25	a2	-	-	.05	.00
F	Cryptantha confertiflora	b53	a15	b38	ab36	1.23	.28	.52	.44
F	Descurainia pinnata (a)	a-	a-	b20	a-	-	-	.09	-
F	Eriogonum alatum	b9	b11	b18	a-	.03	.12	.11	-
F	Euphorbia fendleri	21	15	27	16	.04	.04	.35	.07
F	Gilia sp. (a)	a-	a1	b42	a-	-	.00	.40	-
F	Hymenoxys acaulis	a23	b35	a20	a16	.08	.32	.08	.08
F	Leucelene ericoides	-	4	-	-	-	.06	-	-
F	Machaeranthera grindelioides	-	3	-	2	-	.03	-	.00
F	Medicago sativa	-	-	2	-	-	-	.03	-
F	Penstemon pachyphyllus	8	2	10	7	.03	.00	.03	.05
F	Penstemon sp.	a-	b20	a-	a-	-	.07	-	-
F	Schoenocrambe linifolia	-	2	-	-	-	.00	.00	-
F	Thelesperma subnudum	a7	ab16	b27	a2	.01	.08	.18	.03

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
F	<i>Thlaspi montanum</i>	-	3	-	-	-	.00	-	-
F	<i>Townsendia incana</i>	a-	b68	c122	a-	-	.26	2.24	-
F	Unknown forb-perennial	4	-	4	-	.01	-	.18	-
Total for Annual Forbs		0	1	87	2	0	0.00	0.55	0.00
Total for Perennial Forbs		137	196	269	84	1.48	1.30	3.76	0.68
Total for Forbs		137	197	356	86	1.48	1.30	4.32	0.69

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 36

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	<i>Artemisia nova</i>	18	21	22	37	1.16	1.79	3.58	3.51
B	<i>Cercocarpus montanus</i>	1	1	1	3	1.08	.78	.63	.33
B	<i>Chrysothamnus viscidiflorus</i>	0	0	1	8	-	-	.00	.04
B	<i>Cowania mexicana stansburiana</i>	0	0	1	0	-	-	.15	-
B	<i>Ephedra viridis</i>	2	9	9	13	2.01	1.77	2.29	3.10
B	<i>Eriogonum microthecum</i>	29	26	40	26	.09	.07	.60	.24
B	<i>Gutierrezia sarothrae</i>	0	5	31	15	-	.04	.71	.22
B	<i>Juniperus osteosperma</i>	0	5	4	2	2.76	2.77	3.57	.83
B	<i>Opuntia sp.</i>	0	0	1	0	-	-	.00	-
B	<i>Pinus edulis</i>	0	2	2	1	.15	.38	.38	.15
B	<i>Purshia tridentata</i>	3	1	0	1	.00	.15	-	.15
B	<i>Yucca harrimaniae</i>	2	2	2	2	.63	.00	.03	.00
Total for Browse		55	72	114	108	7.92	7.77	11.97	8.60

#### CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 36

Species	Percent Cover		
	'99	'04	'09
<i>Artemisia nova</i>	-	2.46	3.45
<i>Cercocarpus montanus</i>	-	1.13	1.54
<i>Cowania mexicana stansburiana</i>	-	.15	-
<i>Ephedra viridis</i>	-	1.89	3.88
<i>Eriogonum microthecum</i>	-	.18	.08
<i>Gutierrezia sarothrae</i>	-	1.83	.10
<i>Juniperus osteosperma</i>	.80	3.18	.31
<i>Pinus edulis</i>	-	.55	-
<i>Purshia tridentata</i>	-	-	.13

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16C, Study no: 36

Species	Average leader growth (in)	
	'04	'09
Artemisia nova	1.5	0.6
Cercocarpus montanus	4.4	1.8

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 36

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	110	110	95	2.6	2.4	1.3
Pinus edulis	56	54	38	2.0	2.6	1.1

BASIC COVER--

Management unit 16C, Study no: 36

Cover Type	Average Cover %			
	'94	'99	'04	'09
Vegetation	16.53	17.78	18.81	13.06
Rock	16.90	13.17	13.60	12.05
Pavement	7.61	16.29	30.38	12.47
Litter	23.86	20.95	17.67	29.06
Cryptogams	.06	1.53	.01	.11
Bare Ground	29.31	30.11	29.64	34.95

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 36, Study Name: Danish Bench

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.8	7.5	56	21.4	22.6	1.8	7.8	140.8	0.9

PELLET GROUP DATA--

Management unit 16C, Study no: 36

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	36	29	24	64	-	-	-
Elk	22	57	41	24	76 (188)	43 (106)	93 (230)
Deer	19	10	16	16	17 (42)	5 (12)	31 (76)
Cattle	-	3	-	1	12 (30)	2 (5)	2 (4)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 36

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia nova</i>									
94	<b>1540</b>	14	86	0	20	3	0	0	11/19
99	<b>1700</b>	22	65	13	-	42	12	1	6/16
04	<b>1860</b>	5	85	10	560	68	10	8	7/18
09	<b>3000</b>	32	56	12	140	24	27	7	6/18
<i>Cercocarpus montanus</i>									
94	<b>20</b>	0	100	0	-	0	100	0	46/55
99	<b>20</b>	0	100	0	20	100	0	0	50/55
04	<b>20</b>	0	0	100	-	0	100	100	46/50
09	<b>60</b>	0	0	100	-	0	100	100	63/70
<i>Chrysothamnus viscidiflorus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>20</b>	0	100	-	-	0	0	0	6/9
09	<b>340</b>	76	24	-	-	0	0	0	5/7
<i>Cowania mexicana stansburiana</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	11/23
04	<b>20</b>	0	100	-	-	100	0	0	19/25
09	<b>0</b>	0	0	-	-	0	0	0	23/41
<i>Echinocereus sp.</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	6/17
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Ephedra viridis</i>									
94	<b>60</b>	0	100	0	-	0	0	0	31/46
99	<b>340</b>	12	76	12	-	29	29	35	32/42
04	<b>580</b>	34	52	14	-	38	21	14	33/43
09	<b>520</b>	0	38	62	-	0	54	15	32/44
<i>Eriogonum microthecum</i>									
94	<b>1880</b>	5	93	2	60	0	0	0	2/4
99	<b>1160</b>	12	84	3	40	7	7	2	1/3
04	<b>2320</b>	6	92	2	280	29	9	0	2/3
09	<b>940</b>	13	70	17	440	2	32	9	2/5
<i>Gutierrezia sarothrae</i>									
94	<b>0</b>	0	0	0	-	0	0	0	7/9
99	<b>460</b>	74	26	0	140	0	0	0	4/4
04	<b>5080</b>	9	91	0	-	1	0	0	6/9
09	<b>1100</b>	0	67	33	-	0	0	44	4/6

		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>Juniperus osteosperma</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	120	67	33	0	-	0	0	0	-/-	
04	80	50	50	0	-	0	0	0	-/-	
09	40	0	0	100	-	0	0	50	-/-	
<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	6/10	
09	0	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	0	0	0	-	-	0	0	0	4/12	
99	0	0	0	-	-	0	0	0	4/16	
04	20	0	100	-	-	0	0	0	4/17	
09	0	0	0	-	-	0	0	0	-/-	
<i>Pediocactus simpsonii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	4/12	
<i>Pinus edulis</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	40	100	0	0	20	0	0	50	-/-	
04	40	50	50	0	-	0	0	0	-/-	
09	20	0	0	100	-	0	0	100	-/-	
<i>Purshia tridentata</i>										
94	60	0	100	0	-	0	0	0	19/22	
99	20	0	100	0	-	0	100	0	19/22	
04	0	0	0	0	-	0	0	0	4/16	
09	20	0	0	100	-	0	100	0	19/27	
<i>Yucca harrimaniae</i>										
94	80	0	100	-	-	0	0	0	14/25	
99	40	0	100	-	-	0	0	0	9/12	
04	100	100	0	-	-	0	0	0	-/-	
09	60	100	0	-	-	0	0	0	8/12	