

Trend Study 22-3-08

Study site name: Oak Basin.

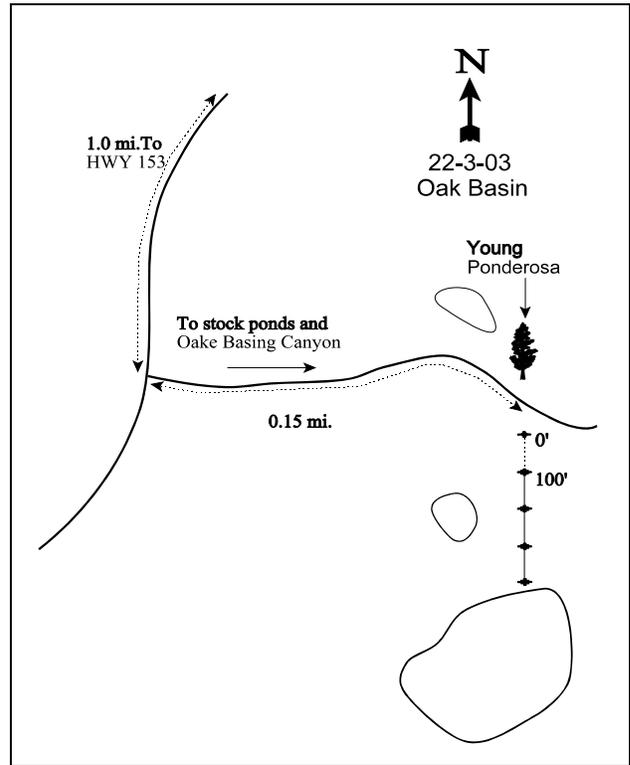
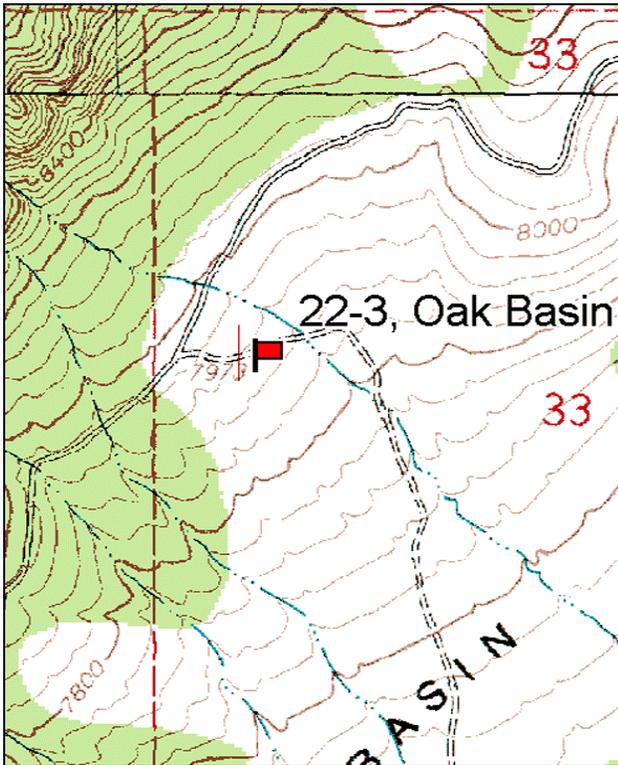
Vegetation type: Oak-Sagebrush.

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 5 on 7ft.

LOCATION DESCRIPTION

From the center of Junction in Piute County, go west on Highway 153 for 7.6 miles. Take the left fork (Oak Basin Cottonwood or Rd 134) and go just under 1 mile to another fork. Turn left and go 0.15 miles to a lone ponderosa pine 15 feet to the left of the road. The baseline starts 100 feet south of the pine. The 0-foot stake is a steel rebar tagged #7044.



Map Name: Circleville

Diagrammatic Sketch

Township 29S, Range 4W, Section 33

GPS: NAD 83, UTM 12S 384195 E, 4233814 N

DISCUSSION

Oak Basin - Trend Study No. 22-3

Study Information

This transect is located in Oak Basin approximately five miles west of Junction [elevation: 7,900 feet (2,408m), slope: 20%, aspect: southeast]. The study is part of a 600-acre tract that was dixe harrowed and seeded in 1965. The site also burned between the 1985 and 1991 surveys. Deer use the area as spring-fall range and during mild winters. The area is grazed as part of the Circleville Cattle Allotment on a three year rest rotation system. The DWR Oak Basin pellet group transect is located 200-300 feet higher in elevation and about a half mile to the north. Deer days use/acre rose from 13 (32 ddu/ha) in 1976-77 to 42 (104 ddu/ha) in 1984-85 with 5-year averages of 16 deer days (40 ddu/ha) between 1976 and 1981 and 75 deer days (185 ddu/ha) between 1981 and 1985 (Jense et al. 1985). The trend for deer days use/acre appeared stable from 1985-86 through 1991-92 with an average of 28 (69 ddu/ha) (Jense et al. 1991). Pellet group data was not collected in 1992-93, but beginning in 1993-94, there was an obvious decline in use patterns with average days use/acre dropping to an average of 4 (10 ddu/ha) between 1993-94 through 1996-97 (Evans et al. 1997). A pellet group transect was read on the site in 1998 which estimated 39 deer days use/acre (96 ddu/ha). Deer use was estimated at 46 deer days use/acre (114 ddu/ha) in 2003 and 45 deer days use/acre (74 ddu/ha) in 2008. Cattle use was estimated at 75 cow days use/acre (185 cdu/ha) in 1998, 25 cow days use/acre (63 cdu/ha) in 2003, and 22 cow days use/acre (39 cdu/ha) in 2008. Cattle were grazing the site when it was read in July of 2003. A few elk pellet groups were sampled in 2003, with the estimate going to 4 elk days use/acre (7 edu/ha) in 2008.

Soil

Soils are sandy clay loam in texture with a slightly acidic pH (6.3). Soil depth is fairly shallow as the effective rooting depth is estimated at less than 9 inches. Parent material is metamorphic rock. Initially, bare soil was low at 6%, but has increased to 26% in 2003. Conversely, litter cover on average has declined, ranging from 67% in 1985 to 32% in 2003. In 1998, no signs of erosion were noted and the soil appeared to be building. Many of the changes in basic cover categories were brought about by the fire that burned through the site prior to the 1991 reading. An erosion condition class assessment rated soils as stable in 2003 and 2008.

Browse

Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) is the key browse species on the site. Due to a fire that burned through the site between 1985 and 1991, there were no mountain big sagebrush plants encountered in the density plots in 1991. The population has since returned with an estimated density of 1,240 plants/acre in 1998 and 2003, increasing to 1,980 plants/acre in 2008. Since 1998, on average young plants have been abundant as they made up 20% of the population. Decadence since 1998 has been moderately low at only 17%, this with the moderately high population of young plants would indicate a propensity to an increase in the sagebrush population. This is evidenced by the population increasing by 60% to 1,980 plants/acre in 2008 and sagebrush line-intercept cover almost doubling since 2003.

Antelope bitterbrush (*Purshia tridentata*) and Gambel oak (*Quercus gambelii*) are also important on this site. Bitterbrush is scattered throughout the site with an estimated density of 120 plants/acre in 1998, 2003, and 2008. Bitterbrush plants are short statured due to many years of heavy browsing on a limited resource, but the population is generally healthy and vigorous. The majority of the oak sampled in 1998 were classified as young (62%), but the majority of the population has been classified as mature since 2003. Oak has been healthy and vigorous in all readings. Oak has been rated as only lightly hedged in all years except 1998 when use was classified as more moderate. The remainder of the browse species are relatively unimportant in terms of total production, but add diversity and offer variety to the deer diet.

Herbaceous Understory

The herbaceous understory is dominated by perennial grasses. Ten or more grasses were encountered on the site since 1998. Intermediate wheatgrass (*Agropyron intermedium*) is by far the dominant species as it provided nearly 80% of the total grass cover in 1998 and 2003, decreasing slightly to 73% in 2008. This species has maintained a fairly constant nested frequency value in all years, both pre and post-burn samples included. It has never been below 95% quadrat frequency. Crested wheatgrass (*Agropyron cristatum*) is second to intermediate wheatgrass in abundance. This is to be expected as intermediate grass is more competitive at higher elevations associated with more precipitation. Crested wheatgrass quadrat frequency has steadily decreased from 79% in 1985 to 48% in 2008. The only native perennial grass to be fairly abundant is mutton bluegrass (*Poa fendleriana*), although it only contributes less than 1% cover. This species is found primarily under the protection of shrubs and where intermediate wheatgrass is less abundant. Utilization on grasses was moderate at the time of sampling in 1998, but somewhat lighter in 2003. In 2008, all grasses were heavily utilized by livestock. In general, the grasses under the canopy of browse plants received the lightest use, while those in the interspaces were generally utilized to within a few inches of the ground. Perennial grass sum of nested frequency has declined over all years until 2008, when it increased by 13%.

The forb component is poor for a site at this elevation. Silvery lupine (*Lupinus argenteus*) has been the most abundant forb species in all samples, although it significantly declined in nested frequency between 1998 and 2003 due to drier conditions. Most other species have fairly low quadrat frequencies throughout the area. Use of these forbs by cattle is light. However the forbs, especially the lupine, are unquestionably important in the spring and summer diet for deer. A highly competitive perennial grass component, primarily seeded exotics, will make it difficult for most forbs to increase in the future. However, the grass component is much better at protecting the soils.

1991 TREND ASSESSMENT

Browse trend is down with the loss of all browse except for Gambel oak and pricklypear cactus (*Opuntia* sp.) to the fire. The herbaceous understory trend is slightly down. Of the 29 species encountered, 14 show downward trends. Even with crested wheatgrass and intermediate wheatgrass with quadrat frequencies of 67% and 99% respectively, the overall trend with the effects of long-term drought and a relatively recent fire is slightly down. Forb trend is up as the nested frequency of perennial forbs is slightly up 44%.

browse - down (-2)

grass - slightly down (-1)

forb - slightly up (+2)

1998 TREND ASSESSMENT

The browse trend is up with the recovery of mountain big sagebrush after the fire. The population appears healthy with young plants making up 26% of the population and decadence at 15%. The grass trend is stable with intermediate and crested wheat grasses slightly increasing in sum of nested frequency, while many of the other native species had declining frequencies. Except for lupine which is the most abundant forb through all years, most of the other perennial forbs showed slight decreases in overall nested frequencies. Overall, trend for perennial forbs is slightly down.

Winter Range Condition (DCI) - poor (45) mid-level potential scale

browse - up (+2)

grass - stable (0)

forb - slightly down (-1)

2003 TREND ASSESSMENT

Trend for browse is stable. The key species, mountain big sagebrush, has a stable density and normal vigor throughout most of the population. Decadence increased slightly and recruitment by young plants declined but is still adequate. The current levels for both of these parameters are acceptable with the dry conditions in 2003. Bitterbrush also has a stable density, while Gambel oak is increasing on the site yet it still contributes to about 1% cover. Grass trend is slightly down as intermediate wheatgrass, the dominate grass on the site (99% quadrat frequency), maintained a fairly stable nested frequency value in 2003. Crested wheatgrass

significantly declined as did *Carex*. Cover for perennial grasses went down by 25%. The forb trend is down. The only abundant perennial forb, silvery lupine, significantly declined in frequency and cover in 2003. Overall, average cover of perennial forbs declined by 66%, and sum of nested frequency decreased by over 40%. The dry conditions in 2003 played a definitive role in the decline of herbaceous species.

Winter Range Condition (DCI) - fair (55) mid-level potential scale

browse - stable (0) grass - slightly down (-1) forb - down (-2)

2008 TREND ASSESSMENT

Trend for browse is up. The key species, mountain big sagebrush density increased by almost 60%. Vigor is normal throughout the population and decadence is moderately low at only 13% and recruitment of young plants increased to 25%, which is more than adequate for maintaining the population. Bitterbrush density is similar to 2003, while Gambel oak is increasing on the site yet it still contributes to about 1% cover. Grass trend is slightly up as intermediate wheatgrass, the dominate grass on the site (98% quadrat frequency), maintained a fairly stable nested frequency value. Crested wheatgrass and *Carex* had increased sum of nested frequency values. Overall, sum of nested frequency for perennial grasses increased by 13%. The forb trend is stable. Silvery lupine contributes to over 90% of the perennial forb cover. The only abundant perennial forb continues to be silvery lupine (an increaser with livestock grazing), which showed little change from 2003. Overall, average cover of perennial forbs showed little change.

Winter Range Condition (DCI) - good (68) mid-level potential scale

browse - up (+2) grass - slightly up (+1) forb - stable (0)

HERBACEOUS TRENDS --

Management unit 22 , Study no: 3

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
G	<i>Agropyron cristatum</i>	_c 221	_b 169	_{bc} 176	_a 101	_a 126	4.73	2.94	2.55
G	<i>Agropyron intermedium</i>	_{ab} 316	_a 303	_b 326	_{ab} 319	_a 303	20.23	15.73	12.60
G	<i>Agropyron spicatum</i>	-	-	-	3	-	-	.00	-
G	<i>Agropyron trachycaulum</i>	-	4	-	-	-	-	-	-
G	<i>Bouteloua gracilis</i>	4	2	1	8	3	.03	.44	.38
G	<i>Bromus inermis</i>	_b 16	_a -	_a 12	_a 5	_b 18	.16	.07	.26
G	<i>Bromus tectorum</i> (a)	-	-	-	-	5	-	-	.01
G	<i>Carex</i> sp.	_b 34	_b 24	_b 26	_a 1	_b 46	.55	.03	.69
G	<i>Elymus junceus</i>	_b 10	_a -	_a -	_a -	_a -	-	-	-
G	<i>Koeleria cristata</i>	1	3	-	3	-	-	.03	-
G	<i>Oryzopsis hymenoides</i>	-	-	3	-	1	.00	-	.00
G	<i>Poa fendleriana</i>	_d 127	_{cd} 102	_a 28	_{ab} 43	_{bc} 60	.33	.41	.77
G	<i>Poa pratensis</i>	8	-	3	5	-	.00	.03	-
G	<i>Poa secunda</i>	-	-	-	2	-	-	.00	-
G	<i>Sitanion hystrix</i>	1	1	2	-	-	.00	-	-
G	<i>Stipa comata</i>	3	7	-	1	4	-	.00	.01

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'98	'03	'08	'98	'03	'08
G	<i>Stipa lettermani</i>	_{bc} 19	_c 31	_{bc} 24	_{ab} 8	_a 3	.46	.21	.03
Total for Annual Grasses		0	0	0	0	5	0	0	0.00
Total for Perennial Grasses		760	646	601	499	564	26.53	19.93	17.31
Total for Grasses		760	646	601	499	569	26.53	19.93	17.32
F	<i>Agoseris glauca</i>	-	13	9	-	8	.01	-	.02
F	<i>Arabis</i> sp.	-	16	-	1	-	-	.03	-
F	<i>Astragalus convallarius</i>	6	7	-	7	1	-	.02	.01
F	<i>Astragalus</i> sp.	4	-	6	3	7	.16	.06	.02
F	<i>Castilleja chromosa</i>	10	14	-	-	-	-	-	-
F	<i>Calochortus nuttallii</i>	2	9	3	-	1	.00	-	.00
F	<i>Chenopodium album</i> (a)	-	8	-	-	-	-	-	-
F	<i>Cirsium</i> sp.	-	-	-	-	3	-	-	.00
F	<i>Cryptantha</i> sp.	5	-	-	2	3	-	.00	.00
F	<i>Eriogonum racemosum</i>	5	6	2	1	4	.03	.00	.06
F	<i>Gayophytum ramosissimum</i> (a)	-	-	-	-	8	-	-	.02
F	<i>Hackelia patens</i>	-	2	2	-	-	.00	-	-
F	<i>Lactuca serriola</i>	-	-	4	-	-	.01	-	-
F	<i>Lithospermum ruderales</i>	-	-	-	4	-	-	.00	-
F	<i>Lomatium</i> sp.	-	2	-	-	2	-	-	.03
F	<i>Lotus utahensis</i>	12	4	-	-	1	-	-	.03
F	<i>Lupinus argenteus</i>	45	50	70	29	34	7.11	2.34	2.62
F	<i>Medicago sativa</i>	4	1	4	3	-	.06	.00	-
F	<i>Microsteris gracilis</i> (a)	-	-	-	21	2	-	.14	.00
F	<i>Orobanche</i> sp.	-	-	-	-	1	-	-	.00
F	<i>Phlox longifolia</i>	12	33	3	3	3	.01	.00	.01
F	<i>Polygonum douglasii</i> (a)	-	-	47	-	21	.16	-	.06
F	<i>Ranunculus testiculatus</i> (a)	-	-	-	-	2	-	-	.00
F	<i>Zigadenus paniculatus</i>	8	6	-	7	9	-	.01	.06
Total for Annual Forbs		0	8	47	21	33	0.15	0.14	0.10
Total for Perennial Forbs		113	163	103	60	77	7.41	2.50	2.88
Total for Forbs		113	171	150	81	110	7.57	2.64	2.98

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

BROWSE TRENDS --

Management unit 22 , Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	<i>Artemisia tridentata vaseyana</i>	41	40	49	3.79	4.25	6.72
B	<i>Cercocarpus ledifolius</i>	0	1	1	.15	.00	.00
B	<i>Chrysothamnus depressus</i>	0	0	0	-	.03	-
B	<i>Chrysothamnus nauseosus</i>	0	0	1	-	-	.00
B	<i>Chrysothamnus nauseosus hololeucus</i>	0	1	0	-	.00	-
B	<i>Chrysothamnus viscidiflorus</i>	1	1	0	.00	.00	-
B	<i>Juniperus osteosperma</i>	2	1	1	.85	.98	1.00
B	<i>Opuntia sp.</i>	6	3	2	.36	.21	.03
B	<i>Purshia tridentata</i>	6	5	6	.18	.91	1.02
B	<i>Quercus gambelii</i>	7	6	6	.21	.30	.30
Total for Browse		63	58	64	5.54	6.68	9.09

CANOPY COVER, LINE INTERCEPT --

Management unit 22 , Study no: 3

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	7.33	13.60
<i>Chrysothamnus depressus</i>	.08	-
<i>Juniperus osteosperma</i>	1.39	1.71
<i>Opuntia sp.</i>	.20	.16
<i>Purshia tridentata</i>	.38	.03
<i>Quercus gambelii</i>	1.21	.91

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 22 , Study no: 3

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	1.9	1.9
<i>Purshia tridentata</i>	2.4	-

BASIC COVER --

Management unit 22 , Study no: 3

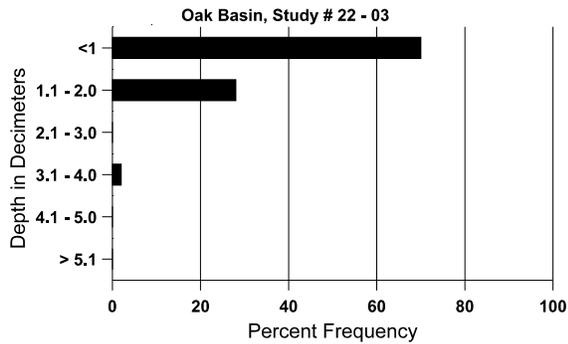
Cover Type	Average Cover %				
	'85	'91	'98	'03	'08
Vegetation	7.50	7.25	46.47	30.70	33.64
Rock	17.75	20.25	19.61	23.41	22.57
Pavement	2.00	1.00	1.47	1.69	4.10
Litter	66.50	53.75	48.23	31.67	34.90
Cryptogams	0	.25	.05	.00	0
Bare Ground	6.25	17.50	9.83	26.11	16.00

SOIL ANALYSIS DATA --

Management unit 22, Study no: 3, Study Name: Oak Basin

Effective rooting depth (in)	Temp °F (depth)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
8.5	61.2 (11.6)	6.3	70.0	9.4	20.6	3.9	16.2	332.8	0.9

Stoniness Index



PELLET GROUP DATA --

Management unit 22 , Study no: 3

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	5	7	75
Elk	1	-	2
Deer	25	16	14
Cattle	17	6	10

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	3 (7)	3 (7)
39 (96)	46 (114)	30 (74)
75 (185)	25 (63)	16 (39)

BROWSE CHARACTERISTICS --
 Management unit 22 , Study no: 3

		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 nova													
85	66	-	-	-	66	-	100	0	100	-	0	-/-	
91	0	-	-	-	-	-	0	0	0	-	0	-/-	
98	0	-	-	-	-	-	0	0	0	-	0	-/-	
03	0	-	-	-	-	-	0	0	0	-	0	-/-	
08	0	-	-	-	-	-	0	0	0	-	0	-/-	
Artemisia tridentata vaseyana													
85	5265	66	533	2866	1866	-	38	15	35	-	0	20/19	
91	0	-	-	-	-	-	0	0	0	-	0	-/-	
98	1240	20	320	740	180	300	31	0	15	3	3	21/26	
03	1240	-	120	840	280	220	24	11	23	2	2	26/30	
08	1980	120	500	1220	260	220	35	2	13	2	2	24/38	
Cercocarpus ledifolius													
85	199	-	199	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
98	0	-	-	-	-	-	0	0	-	-	0	-/-	
03	20	-	-	20	-	20	0	100	-	-	0	23/22	
08	20	-	-	20	-	-	100	0	-	-	0	21/27	
Chrysothamnus depressus													
85	66	-	-	66	-	-	0	0	-	-	0	6/6	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
98	0	-	-	-	-	-	0	0	-	-	0	-/-	
03	0	-	-	-	-	-	0	0	-	-	0	7/13	
08	0	-	-	-	-	-	0	0	-	-	0	-/-	
Chrysothamnus nauseosus													
85	0	-	-	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
98	0	-	-	-	-	-	0	0	-	-	0	-/-	
03	0	-	-	-	-	-	0	0	-	-	0	-/-	
08	20	-	-	20	-	-	0	100	-	-	0	5/7	

		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 hololeucus													
85	0	-	-	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
98	0	-	-	-	-	-	0	0	-	-	0	-/-	
03	20	-	-	20	-	-	0	100	-	-	0	-/-	
08	0	-	-	-	-	-	0	0	-	-	0	-/-	
Chrysothamnus viscidiflorus													
85	0	-	-	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
98	20	-	-	20	-	-	0	0	-	-	0	6/10	
03	20	-	-	20	-	-	0	0	-	-	0	9/10	
08	0	-	-	-	-	-	0	0	-	-	0	-/-	
Juniperus osteosperma													
85	0	-	-	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
98	40	-	-	40	-	-	0	0	-	-	0	-/-	
03	20	-	-	20	-	-	0	0	-	-	0	-/-	
08	20	-	-	20	-	-	0	0	-	-	0	-/-	
Opuntia sp.													
85	66	-	66	-	-	-	0	0	0	-	0	-/-	
91	66	-	-	66	-	-	0	0	0	-	100	9/16	
98	140	20	-	120	20	-	0	0	14	-	0	7/12	
03	120	-	-	120	-	-	0	0	0	-	0	5/11	
08	40	20	-	20	20	-	0	0	50	-	50	5/10	
Purshia tridentata													
85	465	-	66	333	66	-	71	29	14	-	0	18/20	
91	0	-	-	-	-	-	0	0	0	-	0	-/-	
98	120	-	-	120	-	-	0	100	0	-	0	11/26	
03	120	-	-	100	20	-	0	100	17	17	17	11/30	
08	120	-	-	120	-	-	17	83	0	-	0	10/28	
Quercus gambelii													
85	15798	2266	13333	1999	466	-	5	0	3	-	2	33/14	
91	9066	5733	9066	-	-	-	0	0	0	-	0	-/-	
98	520	20	320	200	-	20	42	0	0	-	0	24/24	
03	960	-	40	920	-	60	0	0	0	-	0	27/23	
08	840	-	120	700	20	40	69	0	2	-	0	31/25	