Trend Study 16B-20-04

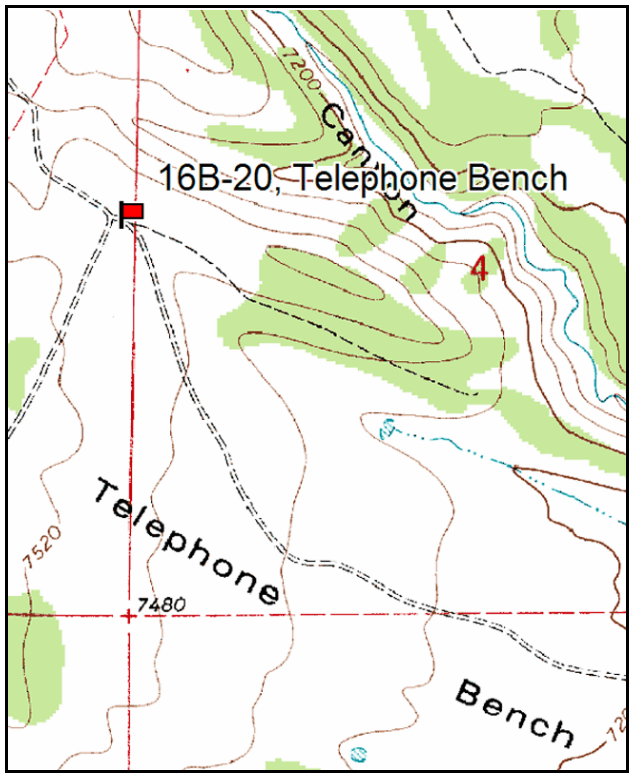
Study site name: Telephone Bench . Vegetation type: Mountain Big Sagebrush .

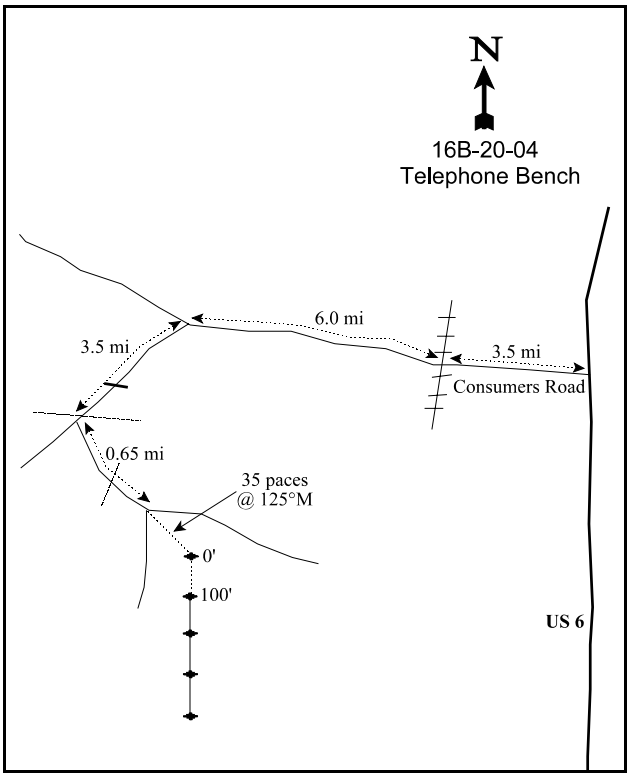
Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

From the intersection of US 6 and the Consumers Road south of Helper, go 3.5 miles to a railroad crossing. Continue up the oiled road 6.0 miles. Turn left onto a dirt road, cross Gordon Creek and proceed approximately 2.3 miles to a cattleguard. Go 1.2 miles to a wire fence. Just beyond the fence, turn left at the fork and go 0.45 miles to another fence. Continue on 0.2 miles to a fork at the top of the hill. The study site is between the forks. The 0-foot baseline stake is 35 paces southeast of fork. The study is marked by cut green fenceposts about 18" tall.





Map Name: Jump Creek

Diagrammatic Sketch

Township 14S ,Range 8E , Section 5

GPS: NAD 27, UTM 12S 4387379 N, 496439 E

DISCUSSION

Telephone Bench - Trend Study No. 16B-20

Telephone Bench area is owned by the Utah Division of Wildlife and is located southwest of Price. This study samples a big sagebrush/grass type on the northern end of Telephone Bench at an elevation of 7,470 feet. The site aspect is northeast with a slope of 5%. This site is the highest of the winter range study sites in the area which allows for the presence of mountain big sagebrush along with black sagebrush. At one time, the area was heavily grazed by cattle, but currently no livestock grazing is permitted. Pellet group data indicates fluctuating deer use, depending on severity of the winter. During the 1990-91 winter, 51 days use/acre (125 ddu/ha) were estimated. This dropped to only 5 days use/acre (12 ddu/ha) in 1992-93, which was a hard winter. The winter of 1994-95, had an estimated 17 days use/acre (42 ddu/ha). The 1999 pellet transect data indicated light to moderate use by deer, but high use by elk. Deer use was estimated at 19 days use/acre (48 ddu/ha), and elk use at 72 days use/acre (179 edu/ha). Deer and elk use increased in 2004. For deer it went up to 32 days use/acre (79 ddu/ha). Elk use was estimated at 94 days use/acre (233 edu/ha) and only one cattle pat was sampled in both 1999 and 2004.

The soil is somewhat shallow as black sagebrush predominates (estimated effective rooting depth is about 11 inches), but there are some deeper areas where mountain big sagebrush occurs. The soil is a dense clay loam with a slightly alkaline pH (7.4). Phosphorus is low at 5.7 ppm. There is moderate localized erosion on the site with some pedestalling noted around the base of the shrubs. Litter cover substantially decreased in 1999. The ratio of bare ground to protective cover (vegetation, litter, and cryptogams) decreased from 1:2.8 in 1999 to 1:2.4 in 2004, indicating less protective cover for the soil. Bare ground relative cover increased from 31% in 1999 to 41% in 2004.

The most abundant shrub on the site is black sagebrush which had an average density of 6,817 from 1988 to 1999. Black sagebrush density in 2004 was 35% lower at 4,480 plants/acre in 2004. This loss of sagebrush was not unusual because of the exceptionally dry conditions from 2001 to 2003, which caused large losses for many sagebrush communities in Utah. Sagebrush cover was almost 8% in 1999. It deceased to just over 4% in 2004. Recruitment was good in 2004 as 9% of the population was young and 8,160 seedlings/acre were estimated. Decadency increased from 15% in 1999 to 25% in 2004. Twelve percent showed signs of poor vigor, which was up from only 3% in 1999. The drought conditions have accounted for much of the high decadency and poor vigor of black sage during the 1994 and 2004. Better precipitation patterns in 1999 resulted in a healthier population. Mountain big sagebrush has a low population density on this site. There were only 466 plants/acre in 1988, 180 in 1994, and 360 in 1999. The population dropped to 100 plants/acre in 2004. Heavy use (more highly preferred than black sagebrush) increased from 28% in 1999 to 60% in 2004. There were no young or seedling plants sampled in 2004 and decadency was up to 60% from 17% in 1999. This is likely a marginal site for mountain big sagebrush due to soil conditions, and when coupled with drought, has caused a decline in population density. Improved precipitation should help to increase reproduction for mountain big sagebrush in the future. There are a few scattered serviceberry on the site. All plants showed heavy use in 2004. Dwarf rabbitbrush declined from 6,260 plants/acre in 1999 to 2,240 in 2004. Broom snakeweed increased from 6,260 plants/acre in 1999 to 14,220 in 2004.

Grasses are dominant as they provide about half of the total vegetative cover in 1994, 1999, and 2004. Total grass cover declined from 22% in 1999 to 17% in 2004. Identification of grasses in past readings resulted in several species being “lumped” together including: bluebunch and western wheatgrass, and mutton and Sandberg bluegrass. These species were separated in the 1999 reading. Bluebunch wheatgrass was the most dominant species in 1999 with almost 13% cover. This dropped significantly in 2004 to 3%. Quadrat frequency went from 79 to 55%. Western wheatgrass also significantly declined in 2004 from 27% quadrat frequency to 4% in 2004. Mutton bluegrass and bottlebrush squirreltail also significantly declined from 1999 to 2004. Sandberg bluegrass was the only species to increase. It rose from 67 to 98% quadrat frequency and

from 2 to 9% cover. In 2004, it made up 33% of the total grass cover. Twenty perennial forbs were sampled in 1999 and 2004. Bladderpod increased significantly and made up 39% of the forb cover in 2004. Annual forbs increased from nearly nothing in 1994 and 1999 to 2% in 2004.

1994 TREND ASSESSMENT

Ground cover characteristics have remained basically stable since the last reading. The abundant herbaceous ground cover and litter cover adequately protect the soil on the site. Due in part to drought conditions, mountain big sagebrush and serviceberry are not doing well on this marginal site. Black sagebrush, the key browse species, is also suffering the effects of drought. It has a stable population density at the present time, however decadency has increased (from 45 to 55%), coupled with the reduced vigor (those with poor vigor have gone from 10 to 34%), there has also been an increase in percentage of decadent plants classified as dying (from 9 to 50%). All of these downward indicators indicate a decline in population density in the future if current drought conditions persist. These factors, and the abundance of increaser rabbitbrush and broom snakeweed, combine to cause a slightly downward browse trend on this site. Like many of the sites on this unit, the herbaceous understory trend is mixed. Sum of nested frequency for perennial grasses increased 51% while those of perennial forbs declined 37%. Combined nested frequencies of grasses and forbs resulted in a fairly stable trend. The Desirable Components Index (see methods) rating is fair at 58 for a black sagebrush/mountain big sagebrush community. The sagebrush component is healthy, but not overly abundant. The herbaceous understory is healthy.

TREND ASSESSMENT
soil - stable (3)
browse - down slightly (2)
herbaceous understory - stable (3)
winter range condition (DC Index) - 58 (fair) Black sagebrush/mountain big sagebrush type

1999 TREND ASSESSMENT

Trend for soil is stable. While percent litter substantially decreased, vegetative cover increased, and bare ground decreased. Herbaceous vegetation provides 64% of the vegetation cover at the site with most of this coming from perennial species which are good at holding soils in place. Evidence of erosion is slight at the present time, although it could increase in the future with a continuing decline in litter cover. Trend for browse is slightly up. Many of the browse parameters measured showed a declining trend 5 years ago due to drought. With better moisture in the past few years, these parameters currently are showing improvement. Decadency for black sagebrush has declined from 55% to 15%, with many of the decadent plants regaining their vigor and being classified as mature with normal vigor in 1999. Biotic potential and recruitment are high, increasing to 21% and 16% respectively. Use has increased from 35% to 40% of the population showing moderate use. Mountain big sagebrush is not particularly abundant, although density increased in 1999. Decadency also decreased from 33% in 1994 to 17% in 1999. One negative aspect is the abundance of broom snakeweed. Trend for the herbaceous understory is fairly stable. Although sum of nested frequency for perennial species declined as a whole, perennial grass nested frequency increased. Since perennial grasses make up over 80% of the perennial herbaceous cover on the site, trend is considered stable for herbaceous species. The DCI score increased to good due to increased preferred browse cover, improved decadence, higher proportion of young shrubs, and increased forb abundance.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly (4)
herbaceous understory - stable (3)
winter range condition (DC Index) - 76 (good) Black sagebrush/mountain big sagebrush type

2004 TREND ASSESSMENT

Soil trend is slightly down. Vegetation and cryptogam cover decreased, while relative percent bare ground increased from 31% in 1999 to 41% in 2004. Trend for browse is down. Black sagebrush density declined 35% and decadency increased from 15 to 25%. Moderate-heavy use declined from 55% to only 19%. Mountain big sagebrush (which provides a very minor browse component for this site) density is lower and percent decadency is higher than 1999. Drought conditions have contributed to these declines. Broom snakeweed density is twice as high as it was in 1999. Herbaceous understory trend is slightly down. Perennial grasses decreased from 22% cover in 1999 to 17% in 2004. Sum of nested frequency for perennial grasses also declined. Bluebunch wheatgrass declined significantly. Sandberg bluegrass has increased, but is not as good of a forage species. Perennial forb cover and nested frequency is higher, but annual forbs have also increased with the decrease in sagebrush. The DCI score decreased to fair due to decreased preferred browse cover and slight declines in decadence and the amount of young shrubs.

TREND ASSESSMENT
soil - slightly down (2)
browse - down (1)
herbaceous understory - down slightly (2)
winter range condition (DC Index) - 61 (fair) Black sagebrush/mountain big sagebrush type

HERBACEOUS TRENDS --
Management unit 16B, Study no: 20

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
G	Agropyron smithii	$_{c}$265	$_{c}$238	$_{b}$72	$_{a}$11	8.94	.72	.59
G	Agropyron spicatum	$_{a}$-	$_{a}$-	$_{c}$239	$_{b}$131	-	12.92	3.01
G	Bouteloua gracilis	15	13	22	15	.48	.46	.86
G	Bromus tectorum (a)	-	-	-	4	-	-	.01
G	Elymus salina	$_{a}$-	$_{b}$65	$_{b}$78	$_{b}$60	2.37	4.17	3.00
G	Koeleria cristata	-	3	3	-	.01	.03	-
G	Oryzopsis hymenoides	-	3	3	10	.00	.00	.31
G	Poa fendleriana	$_{c}$95	$_{d}$250	$_{b}$36	$_{a}$1	4.42	.41	.00
G	Poa secunda	$_{a}$-	$_{a}$-	$_{b}$156	$_{c}$274	-	2.30	8.67
G	Sitanion hystrix	$_{ab}$16	$_{b}$26	$_{b}$22	$_{a}$4	.13	.44	.03
G	Stipa comata	4	-	-	-	-	-	-
Total for Annual Grasses		0	0	0	4	0	0	0.00
Total for Perennial Grasses		395	598	631	506	16.36	21.48	16.50
Total for Grasses		395	598	631	510	16.36	21.48	16.51
F	Agoseris glauca	-	-	5	-	-	.04	.00
F	Antennaria rosea	$_{b}$59	$_{a}$46	$_{a}$15	$_{a}$2	.90	.26	.00
F	Arabis spp.	8	2	4	1	.00	.01	.00
F	Astragalus convallarius	$_{b}$91	$_{a}$40	$_{a}$52	$_{a}$60	.14	.77	.50
F	Astragalus tenellus	$_{ab}$10	$_{ab}$1	$_{b}$9	$_{a}$-	.00	.64	-

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
F	Balsamorhiza hookeri	$_{b}$22	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
F	Castilleja linariaefolia	$_{b}$137	$_{a}$21	$_{a}$29	$_{a}$12	.06	.19	.14
F	Calochortus nuttallii	$_{a}$-	$_{a}$4	$_{a}$3	$_{b}$27	.01	.00	.07
F	Comandra pallida	20	24	31	15	.15	.37	.09
F	Collinsia parviflora (a)	-	$_{a}$3	$_{a}$-	$_{b}$67	.00	-	.25
F	Crepis acuminata	$_{a}$2	$_{b}$36	$_{a}$1	$_{a}$-	.26	.03	.00
F	Delphinium nuttallianum	-	-	-	3	-	-	.00
F	Descurainia pinnata (a)	-	$_{a}$3	$_{a}$1	$_{b}$18	.00	.03	.03
F	Erigeron eatonii	$_{c}$64	$_{b}$37	$_{b}$15	$_{a}$-	.19	.04	-
F	Eriogonum jamesii	11	12	10	12	.34	.24	.48
F	Gilia spp. (a)	-	4	-	-	.01	-	-
F	Hymenoxys acaulis	$_{b}$10	$_{a}$-	$_{ab}$4	$_{a}$3	-	.06	.03
F	Lappula occidentalis (a)	-	$_{a}$3	$_{a}$-	$_{b}$124	.00	-	2.05
F	Lesquerella spp.	$_{a}$20	$_{ab}$47	$_{b}$63	$_{c}$151	.10	.48	3.35
F	Lomatium spp.	-	6	1	-	.01	.03	-
F	Machaeranthera grindelioides	$_{b}$26	$_{ab}$11	$_{ab}$15	$_{a}$5	.03	.39	.06
F	Paronychia sessiliflora	10	-	-	-	-	-	-
F	Penstemon carnosus	$_{a}$-	$_{a}$-	$_{a}$-	$_{b}$13	-	-	.06
F	Pedicularis centranthera	$_{a}$-	$_{a}$-	$_{a}$-	$_{b}$11	-	-	.39
F	Penstemon watsonii	$_{b}$45	$_{b}$38	$_{b}$50	$_{a}$2	.10	.79	.03
F	Phlox longifolia	$_{c}$175	$_{b}$119	$_{a}$8	$_{a}$5	.27	.01	.04
F	Polygonum douglasii (a)	-	2	-	4	.00	-	.01
F	Schoencrambe linifolia	-	-	-	2	-	-	.03
F	Senecio multilobatus	$_{ab}$2	$_{a}$-	$_{ab}$5	$_{b}$12	-	.01	.25
F	Sphaeralcea coccinea	$_{a}$1	$_{ab}$5	$_{bc}$20	$_{c}$19	.06	.09	.44
F	Trifolium gymnocarpon	$_{c}$30	$_{ab}$16	$_{a}$3	$_{bc}$22	.04	.00	.16
F	Zigadenus paniculatus	-	-	-	5	-	-	.01
Total for Annual Forbs		0	15	1	213	0.02	0.03	2.35
Total for Perennial Forbs		743	465	343	382	2.71	4.48	6.20
Total for Forbs		743	480	344	595	2.74	4.51	8.56

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

BROWSE TRENDS --
Management unit 16B, Study no: 20

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	9	10	11	.56	.38	.56
B	Artemisia nova	94	96	84	5.24	7.77	4.29
B	Artemisia tridentata vaseyana	8	12	5	.83	.03	.00
B	Chrysothamnus depressus	84	80	56	2.48	4.32	1.16
B	Chrysothamnus viscidiflorus viscidiflorus	48	38	10	.90	.66	.00
B	Eriogonum corymbosum	3	5	0	.03	.09	-
B	Gutierrezia sarothrae	53	68	82	1.54	1.50	3.17
B	Opuntia spp.	2	0	0	.00	-	-
B	Pediocactus simpsonii	1	1	1	.01	-	.00
B	Tetradymia canescens	2	5	5	-	.00	-
Total for Browse		304	315	254	11.61	14.75	9.20

CANOPY COVER, LINE INTERCEPT --
Management unit 16B, Study no: 20

Species	Percent Cover '04
Amelanchier utahensis	.08
Artemisia nova	5.30
Artemisia tridentata vaseyana	.25
Chrysothamnus depressus	1.06
Chrysothamnus viscidiflorus viscidiflorus	.15
Gutierrezia sarothrae	2.23

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 16B, Study no: 20

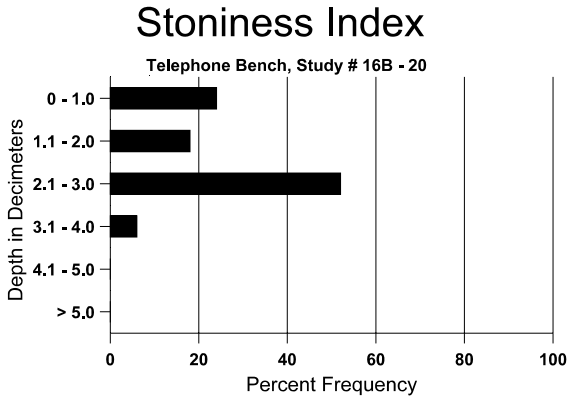
Species	Average leader growth (in) '04
Amelanchier utahensis	1.6
Artemisia tridentata vaseyana	3.2

BASIC COVER --
Management unit 16B, Study no: 20

Cover Type	Average Cover %			
	'88	'94	'99	'04
Vegetation	14.00	32.61	37.92	32.43
Rock	4.25	2.26	1.97	2.67
Pavement	1.00	.54	.61	.52
Litter	42.00	42.15	24.82	28.38
Cryptogams	3.75	4.62	6.30	2.60
Bare Ground	35.00	34.70	31.67	45.57

SOIL ANALYSIS DATA --
Management unit 16B, Study no: 20, Study Name: Telephone Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
11.2	56.4 (12.8)	7.4	38.4	29.8	31.8	1.7	5.7	83.2	0.5



PELLET GROUP DATA --
Management unit 16B, Study no: 20

Type	Quadrat Frequency		
	'94	'99	'04
Sheep	-	1	-
Rabbit	20	6	4
Elk	51	37	61
Cattle	-	-	-
Deer	18	16	7

Days use per acre (ha)	
'99	'04
-	-
-	-
72 (179)	94 (233)
1 (2)	1 (2)
19 (48)	32 (79)

BROWSE CHARACTERISTICS --
Management unit 16B, Study no: 20

		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)
Amelanchier utahensis												
88	**466**	66	466	-	-	-	29	57	-	-	0	-/-
94	**180**	-	-	180	-	-	44	22	-	-	0	63/88
99	**200**	20	60	140	-	-	30	70	-	-	0	24/28
04	**220**	-	-	220	-	-	0	100	-	-	0	21/26
Artemisia nova												
88	**6932**	2400	1866	1933	3133	-	11	0	45	1	10	10/12
94	**6680**	120	900	2080	3700	1920	35	1	55	33	34	9/14
99	**6840**	1460	1080	4760	1000	1580	40	15	15	2	3	8/16
04	**4480**	8160	400	2980	1100	3440	19	.44	25	12	12	9/17
Artemisia tridentata vaseyana												
88	**466**	66	200	133	133	-	14	57	29	-	0	11/12
94	**180**	-	-	120	60	20	78	0	33	11	11	18/21
99	**360**	120	40	260	60	260	50	28	17	11	11	14/19
04	**100**	-	-	40	60	80	20	60	60	20	20	16/26
Chrysothamnus depressus												
88	**5133**	200	2200	2800	133	-	1	1	3	.38	4	5/7
94	**6140**	-	40	6020	80	120	0	0	1	.32	.32	4/8
99	**6260**	680	320	5880	60	20	19	0	1	-	0	4/10
04	**2240**	20	40	1740	460	520	21	9	21	15	15	5/8
Chrysothamnus nauseosus												
88	**66**	-	-	-	66	-	0	100	100	-	0	-/-
94	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**0**	-	-	-	-	-	0	0	0	-	0	-/-
Chrysothamnus viscidiflorus viscidiflorus												
88	**5599**	133	1933	3533	133	-	2	0	2	-	0	4/6
94	**2520**	-	80	2420	20	40	0	0	1	-	0	4/10
99	**1600**	-	20	1580	-	-	1	0	0	-	0	5/10
04	**380**	-	-	380	-	-	5	0	0	-	0	5/11
Eriogonum corymbosum												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**60**	-	-	60	-	-	33	0	-	-	0	13/27
99	**180**	-	-	180	-	-	11	0	-	-	0	10/18
04	**0**	-	-	-	-	-	0	0	-	-	0	15/23

		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)
Gutierrezia sarothrae												
88	**800**	-	400	400	-	-	0	0	0	-	0	5/4
94	**2300**	20	500	1720	80	140	0	0	3	.86	.86	5/6
99	**5940**	100	440	5500	-	40	0	0	0	-	0	6/7
04	**14220**	340	1760	12460	-	20	0	0	0	-	.14	4/7
Opuntia spp.												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**40**	-	20	20	-	-	0	0	-	-	0	2/7
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Pediocactus simpsonii												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**20**	-	-	20	-	-	0	0	-	-	0	-/-
99	**20**	-	-	20	-	-	0	100	-	-	0	6/3
04	**20**	-	-	20	-	-	0	0	-	-	0	1/2
Sambucus cerulea												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	2/11
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Tetradymia canescens												
88	**66**	-	-	66	-	-	100	0	0	-	0	12/16
94	**40**	20	-	40	-	-	0	0	0	-	0	11/14
99	**100**	-	20	80	-	-	20	0	0	-	0	8/16
04	**100**	-	-	80	20	-	0	0	20	-	0	10/17