

Trend Study 9-9-05

Study site name: Little Hole .

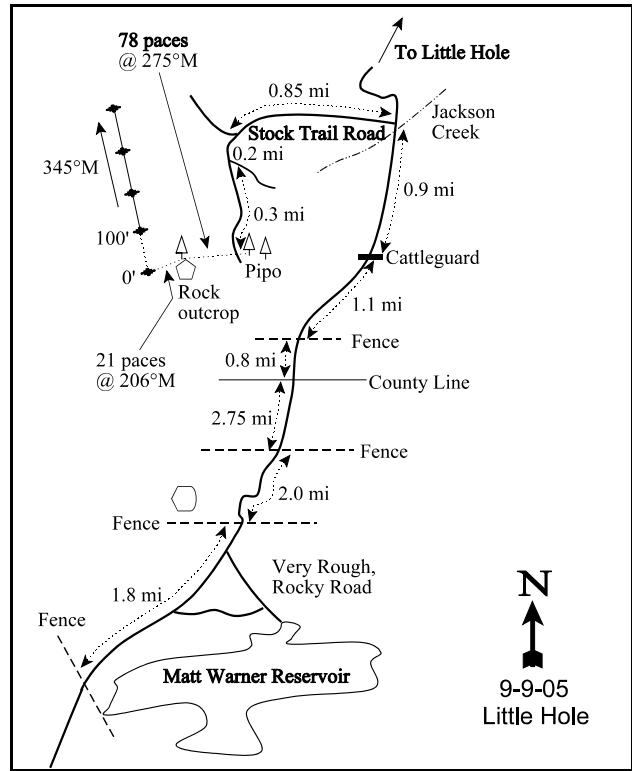
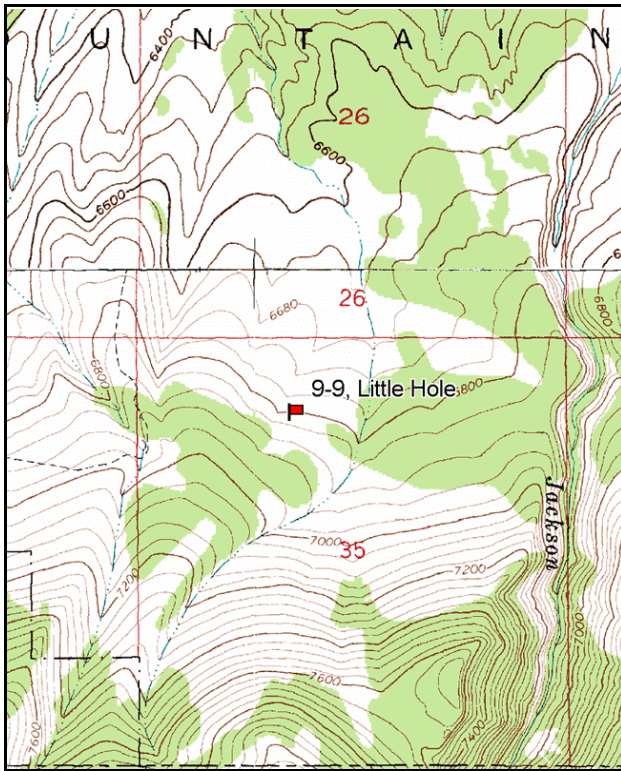
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 345 degrees magnetic.

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

LOCATION DESCRIPTION

From the intersection of Highway U.S. 191 and the Diamond Mountain Road, take the Diamond Mountain Road to the north to a fork with a sign indicating Browns Park Road 10 miles and Vernal 36 miles. Turn left (north) towards Jackson Draw and proceed down Jackson Draw towards Little Hole. When you get to Matt Warner Reservoir, continue past a fence for 1.8 miles to another fence. Continue on the very rocky road for 2.0 miles to the next fence, passing a pond on the left. Go through this fence and drive 2.75 miles to the county line. Continue 0.8 miles past the county line to a fence. From here, drive 1.1 miles to a cattle guard and continue 0.9 miles to Jackson Creek. Just after crossing Jackson Creek make a left turn and proceed 0.85 miles to an intersection. Bear left, drive 0.2 miles to a fork. Proceed to the right for 0.3 miles to two large ponderosa pines near the road. From the 2 large ponderosa pines, walk SW (275°M) for 78 paces to a large rock outcropping just below another large ponderosa. From this tree, the 0-foot baseline stake is 21 paces at 206°M. The frequency baseline is marked by 18 inch green fenceposts.



Map Name: Jackson Draw

Diagrammatic Sketch

Township 2N, Range 23E, Section 35

GPS: NAD 27, UTM 12T 4525506 N, 644104 E

DISCUSSION

Little Hole - Trend Study No. 9-9

The Little Hole study is on a north-facing, 20% slope overlooking the Green River at Little Hole. The study samples a mixed mountain brush type with scattered pinyon-juniper, Ponderosa pine, and Douglas fir. Elevation is 6,800 feet and is considered an important winter range for deer and elk. This site is managed by the Utah Division of Wildlife as part of the Little Hole WMA. The state section is small and is surrounded by BLM lands, which are grazed by cattle during the summer from June 1 to October 15 as part of the Little Hole allotment. Pellet group data from 2000 estimated 28 deer, 6 elk, and 9 cow days use/acre (69 ddu/ha, 15 edu/ha, and 22 cdu/ha). Cattle pats sampled appeared to be from the fall of 1999. Pellet group data from 2005 estimated 38 deer, 9 elk, and 15 cow (93 ddu/ha, 23 edu/ha, and 36 cdu/ha).

Soils are derived from igneous parent material and have a sandy clay loam texture. Soil depth characteristically varies as the transect runs downslope. Estimated effective rooting depth is over 12 inches. Penetrometer readings used to estimate a stoniness profile index show high rock frequency between the surface down to 12 inches. The soil is slightly acidic with a pH of 6.2. Erosion potential is moderate on this 20% slope, but due to a somewhat abundant understory, erosion appears to be minimal. Evidence of past soil movement can be seen by a build-up of soil on the uphill side of shrub and tree stems. Despite minor soil movement, the erosion condition class determined soil movement as stable in 2005.

Mountain big sagebrush and antelope bitterbrush are the key browse species. Sagebrush averaged 11% cover in 2005, which is down from the 15-17% in 1995 and 2000. Density of sagebrush decreased from 4,220 plants/acre in 1995, to 3,320 in 2000, and finally to 2,600 in 2005. Percent decadency was estimated at 19% in 1995, but has doubled to over 45% in both 2000 and 2005. The percentage of plants classified as dying increased from 5% in 2000 to 29% in 2005. Young recruitment has been low, but in 2005 was not producing enough plants to replace those that were classified as dying. The seedling population had increased in 2005 and may provide some additional recruitment. Utilization on sagebrush has been light to moderate. Drought conditions had persisted for several years, but began to be above average in the winter of 2004, which may improve range conditions.

Antelope bitterbrush averaged 13.5% cover in 2005, which is higher than the 8-9% produced in 1995 and 2000. Density of bitterbrush estimated 1,780 plants/acre in 1995, decreased to 1,540 in 2000, but increased slightly to 1,860 in 2005. Percent decadence was very low in 1995 at 1% and increased in 2000 and 2005 to roughly 13%, which is still relatively low. Recruitment was moderately low at 100 plants/acre and increased from moderate-heavy use to heavy use. Vigor is good and average leader growth in 2005 was 4 inches.

A small number of true mountain mahogany and serviceberry are present. Mahogany were heavily hedged in 2005 and vigor was good. Density estimated 280 plants/acre in 2000 and 2005. Percent decadency was low in 2000 at 7% and increased to 21% in 2005. Serviceberry had an estimated density of 120 plants/acre in 1995 and 2000 and slightly increased to 280 in 2005. Use has been moderate to heavy, decadence low, and has shown good young recruitment for the few plants.

Other browse found on the site include: mountain low rabbitbrush, slenderbush eriogonum, broom snakeweed, Oregon grape, and snowberry. Point-center quarter data in 2000 estimated 42 pinyon trees/acre, 7 juniper trees/acre, 8 ponderosa pine trees/acre, and 5 Douglas fir trees/acre. The average diameter of pinyon was 1.8 inches, juniper was 6.7 inches, ponderosa pine was 3.6 inches, and Douglas fir was 3.4 inches. Point-center quarter data in 2005 estimated 20 juniper and 72 pinyon trees/acre. The average juniper diameter was 5.4 inches and pinyon diameter was 3.5 inches.

The herbaceous understory is diverse, especially the grass component. Perennial grass cover has increased from 11% in 1995, 21% in 2000, and 23 % in 2005. Eleven perennial grasses were sampled in 1995 and 2005, and Kentucky bluegrass was the most abundant every year sampled. The sum of the nested frequencies for perennial grasses significantly decreased from 1995 to 2000, but had nearly recovered by 2005. Other species include: needle-and-thread, oniongrass, bluebunch wheatgrass, mutton bluegrass, Sandberg bluegrass, Letterman needlegrass, and bottlebrush squirreltail.

Forbs have been diverse in number, but not particularly abundant during any reading. Twenty-two perennial forb species were encountered in 1995, 15 in 2000, and 23 in 2005. Increased precipitation returned the sum of nested frequency of perennial forbs in 2005 to the levels similar to those prior to the drought conditions in 2000-2004. Silver lupine is the only species that contributed more than 1% total cover in 2005, and it only contributed 2% cover in 2005. Hairy goldaster is the only other perennial forb to provide greater than 1% cover, which it did in 1995. Annual forbs were abundant in 1995 and fairly abundant in 2005, but nearly non-existent in 2000 due to the dry conditions.

1982 APPARENT TREND ASSESSMENT

Overall range trend appears stable to perhaps slightly improving. An apparent increase in antelope bitterbrush is encouraging. A concurrent decline in mountain big sagebrush is less so. If the community is in a state of flux, it will be important to prevent any increase in broom snakeweed or pricklypear. Soil trend appears stable.

1988 TREND ASSESSMENT

Ground cover data show an increase in vegetative cover which is consistent with frequency and density data, although the percentage of rock cover doubled to almost 13%. Percent bare ground declined from 16% to 9%. In this situation we have done nothing more than traded bare soil for rock cover. Soil trend is still considered stable. Trend for mountain big sagebrush is slightly down due to an increase in percent decadency. This condition is caused by the unusually dry conditions present this year and will improve with normal precipitation patterns. Trend for antelope bitterbrush is up due to a large increase in seedling and young plants indicating an increasing population. Overall, the browse trend is considered stable. The herbaceous understory trend is up with increased quadrat frequency for both grasses and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - up (+2)

1995 TREND ASSESSMENT

Soil trend is considered stable due to little changes in percent bare ground from 9% to 4%. Percent rock cover has declined and litter cover has remained fairly stable. The herbaceous understory makes up only 38% of the vegetative cover, but sum of nested frequency of vegetation and litter cover are high, indicating well dispersed protective cover. Trend for sagebrush is up due to a major decrease in decadency. It appears that most of the decadent shrubs are now normal mature plants with good vigor. This site was read in mid-September of 1988 and decadency numbers were likely inflated due to sagebrush dropping leaves in response to the dry conditions of that year. Trend for bitterbrush is slightly up due to an increase in the number of mature plants. Reproductive potential and percent young declined since 1988, but there are still sufficient seedlings and young to maintain the population. Average height and crown has also increased significantly. Overall browse trend is slightly up. The herbaceous understory trend is stable. Three of the five most numerous perennial grass species increased significantly, but the overall sum of nested frequency for perennial grasses declined

slightly. Sum of nested frequency for perennial forbs increased substantially. The Desirable Components Index rated this site as good with a score of 75 due to good browse cover, low decadence, good percent cover for perennial grass and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - slightly up (+1)

herbaceous understory - stable (0)

winter range condition (DC Index) - Good (75) High Potential scale

2000 TREND ASSESSMENT

Trend for soil is stable. Relative cover for bare ground doubled from 3% to 6%, but this is still comparatively low. Vegetation and litter cover remain high and are well disbursed over the site. Erosion remains minimal on this moderately steep site. Trend for browse is slightly down. Trend for mountain big sagebrush is slightly down due to the large increase in percent decadency from 19% to 47%. The percent of plants classified as dying remains low at 5%. This increase is due to drought and should improve with better precipitation in the future. Density also decreased from 4,220 plants/acre in 1995 to 3,320 in 2000. Bitterbrush remains in mostly good vigor, decadency is low at 12% and use is not extreme. Trend for the herbaceous understory is down overall. Although Kentucky bluegrass is the most abundant grass and increased in both cover and nested frequency in 2000, six other perennial grasses significantly decreased in nested frequency. Perennial forbs, while less abundant than grasses, declined in sum of nested frequency by nearly half. The Desirable Components Index rated this site as good with a score of 75 due to good browse cover, moderate decadence, good percent cover for perennial grass and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - down (-2)

winter range condition (DC Index) - Good (75) High Potential scale

2005 TREND ASSESSMENT

Trend for soil is stable. Protective ground cover (vegetation, litter, and cryptogams) to bare soil has increased from 2000 and still provides good protection from erosion. Trend for key browse mountain big sagebrush and antelope bitterbrush is slightly down. Mountain big sagebrush is down with half of the sagebrush population classified as decadent. Density decreased by 22% with 29% of the population classified as dying. Recruitment of young is low and not replacing the population classified as dying. Bitterbrush density slightly increased, percent decadence is low, and has good vigor. This improved bitterbrush is not enough to compensate for the downward sagebrush trend. Trend for herbaceous understory is up. Perennial grasses are abundant and provided good forage. Sum of nested frequency increased for both perennial grasses and forbs and returned to levels similar to 1995. Cheatgrass is present on the site, but in low numbers. The Desirable Components Index rated this site as good with a score of 80 due to good browse cover, moderate decadence, excellent percent cover for perennial grass and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - up (+2)

winter range condition (DC Index) - Good (80) High Potential scale

HERBACEOUS TRENDS --
Management unit 09 , Study no: 9

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron dasystachyum	a53	b92	b115	b94	1.24	1.89	1.49
G	Agropyron spicatum	c97	bc70	ab41	a39	.84	1.12	1.03
G	Bromus tectorum (a)	-	c50	a3	b25	.45	.00	.12
G	Carex sp.	2	9	7	1	.17	.18	.03
G	Koeleria cristata	c61	ab5	a-	b13	.02	-	.22
G	Melica bulbosa	a27	c98	ab43	b60	1.87	.69	1.89
G	Poa fendleriana	a28	b92	a35	a12	1.38	.92	.34
G	Poa pratensis	a90	a140	b206	b231	3.18	14.19	11.21
G	Poa secunda	c150	b75	a27	ab50	1.00	.22	1.50
G	Sitanion hystrix	b113	a33	a12	a18	.35	.22	.56
G	Stipa comata	d144	b57	a20	c96	1.03	.80	3.87
G	Stipa lettermani	8	8	16	24	.21	.39	.73
Total for Annual Grasses		0	50	3	25	0.45	0.00	0.12
Total for Perennial Grasses		773	679	522	638	11.33	20.68	22.90
Total for Grasses		773	729	525	663	11.79	20.68	23.03
F	Agoseris glauca	a-	bc15	ab3	c22	.06	.00	.13
F	Alyssum alyssoides (a)	-	-	-	1	-	-	.03
F	Antennaria rosea	15	8	16	9	.48	.86	.48
F	Arabis sp.	3	3	-	5	.00	-	.01
F	Astragalus convallarius	1	11	12	5	.09	.39	.06
F	Astragalus sp.	1	-	-	-	-	-	-
F	Castilleja linariaefolia	-	1	-	-	.06	-	-
F	Calochortus nuttallii	-	3	-	2	.01	-	.02
F	Chaenactis douglasii	b13	a-	a1	a-	-	.00	-
F	Collomia linearis (a)	-	c109	a-	b41	.33	-	.22
F	Comandra pallida	a-	b29	b25	b32	.26	.18	.82
F	Collinsia parviflora (a)	-	c252	a10	b165	2.74	.02	.95
F	Crepis acuminata	b8	ab7	a-	ab3	.04	-	.06
F	Cystopteris fragilis	4	-	-	-	-	-	-
F	Delphinium nuttallianum	-	6	-	7	.01	-	.02
F	Descurainia pinnata (a)	-	2	-	4	.00	-	.03
F	Draba sp. (a)	-	-	-	3	-	-	.00
F	Erigeron eatonii	b15	a1	ab7	a-	.00	.01	.00
F	Eriogonum umbellatum	2	-	2	-	-	.00	-

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
F	Gayophytum ramosissimum(a)	-	3	-	3	.00	-	.01
F	Heterotheca villosa	_b 84	_a 51	_a 40	_a 30	1.01	.73	.96
F	Ipomopsis aggregata	3	6	5	-	.02	.06	.01
F	Lepidium densiflorum (a)	-	7	-	4	.02	-	.04
F	Linum lewisii	-	3	-	-	.00	-	.00
F	Lithospermum ruderales	4	1	1	2	.03	.00	.18
F	Lomatium sp.	-	7	-	7	.02	-	.04
F	Lupinus argenteus	_a -	_c 38	_b 11	_c 49	.69	.10	2.15
F	Lychnis drummondii	-	-	-	2	-	-	.00
F	Microsteris gracilis (a)	-	4	2	8	.01	.00	.01
F	Navarretia intertexta (a)	-	-	-	1	-	-	.00
F	Orobanche sp.	-	5	-	5	.03	-	.06
F	Penstemon sp.	3	-	-	-	-	-	-
F	Petradoria pumila	7	-	-	-	-	-	-
F	Phlox hoodii	-	2	3	3	.00	.15	.15
F	Polygonum douglasii (a)	-	_b 19	_a 8	_a 8	.06	.02	.01
F	Sphaeralcea coccinea	_b 24	_{ab} 17	_{ab} 13	_a 9	.09	.20	.09
F	Taraxacum officinale	_b 17	_b 16	_a -	_{ab} 8	.07	-	.08
F	Tragopogon dubius	_b 9	_a -	_a -	_a -	-	-	.00
F	Trifolium gymnocarpon	_a -	_b 29	_a 6	_b 31	.06	.04	.11
F	Zigadenus paniculatus	_a -	_a 2	_{ab} 4	_b 7	.00	.06	.10
Total for Annual Forbs		0	396	20	238	3.18	0.05	1.34
Total for Perennial Forbs		213	261	149	238	3.09	2.82	5.60
Total for Forbs		213	657	169	476	6.27	2.87	6.94

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

BROWSE TRENDS --

Management unit 09 , Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Amelanchier utahensis	6	4	6	.03	.41	.93
B	Artemisia tridentata vaseyana	91	82	71	15.07	16.77	11.15
B	Cercocarpus montanus	16	13	12	1.31	1.69	2.90
B	Chrysothamnus viscidiflorus lanceolatus	4	4	1	.18	.06	-
B	Eriogonum heracleoides	2	1	3	.18	-	-
B	Eriogonum microthecum	32	24	22	1.07	1.12	.87
B	Gutierrezia sarothrae	6	0	1	-	-	.15
B	Mahonia repens	2	0	0	-	-	-
B	Pinus edulis	0	4	6	1.74	2.24	5.44
B	Pinus ponderosa	0	0	0	.38	-	-
B	Purshia tridentata	51	56	56	7.84	9.34	13.51
B	Symphoricarpos oreophilus	16	15	21	1.53	2.60	4.44
B	Tetradymia canescens	0	1	1	-	-	.15
Total for Browse		226	204	200	29.36	34.25	39.58

CANOPY COVER, LINE INTERCEPT --

Management unit 09 , Study no: 9

Species	Percent Cover	
	'00	'05
Amelanchier utahensis	-	1.54
Artemisia tridentata vaseyana	-	9.61
Cercocarpus montanus	-	3.59
Chrysothamnus viscidiflorus lanceolatus	-	.20
Eriogonum heracleoides	-	.11
Eriogonum microthecum	-	1.03
Pinus edulis	2.00	7.48
Purshia tridentata	-	22.01
Symphoricarpos oreophilus	-	10.26
Tetradymia canescens	-	.03

PELLET GROUP DATA --

Management unit 09 , Study no: 9

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	4	13	27
Moose	1	1	-
Elk	4	3	7
Deer	15	12	8
Cattle	6	7	10

Days use per acre (ha)	
'00	'05
-	-
2 (5)	-
6 (15)	9 (23)
28 (69)	38 (93)
9 (22)	15 (36)

BROWSE CHARACTERISTICS --

Management unit 09 , Study no: 9

		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												
82	33	-	-	33	-	-	100	0	0	-	0	27/22
88	66	-	33	33	-	-	0	0	0	-	0	26/20
95	120	-	20	100	-	-	33	0	0	-	33	29/38
00	120	-	40	80	-	-	17	17	0	-	17	35/44
05	280	20	100	160	20	-	50	50	7	-	0	32/37
Artemisia tridentata vaseyana												
82	1999	-	33	1600	366	-	57	2	18	1	3	17/23
88	3566	-	400	533	2633	-	42	3	74	2	4	16/20
95	4220	20	280	3140	800	600	45	2	19	4	4	23/34
00	3320	140	160	1600	1560	500	1	0	47	5	5	25/32
05	2600	320	60	1340	1200	1400	26	12	46	29	29	28/34
Ceanothus fendleri												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	8/23
Cercocarpus montanus												
82	33	-	-	33	-	-	100	0	0	-	0	28/31
88	66	100	33	33	-	-	50	50	0	-	0	22/31
95	380	20	40	340	-	20	21	11	0	-	0	37/50
00	280	-	60	200	20	-	29	21	7	-	21	35/49
05	280	-	20	200	60	-	21	79	21	-	0	39/45

		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)	
<i>Chrysothamnus viscidiflorus lanceolatus</i>													
82	0	-	-	-	-	-	0	0	-	-	0	-/-	
88	0	-	-	-	-	-	0	0	-	-	0	-/-	
95	220	-	-	220	-	-	0	0	-	-	0	16/19	
00	180	-	40	140	-	-	0	0	-	-	0	14/10	
05	60	-	-	60	-	-	0	100	-	-	0	16/19	
<i>Eriogonum heracleoides</i>													
82	0	-	-	-	-	-	0	0	-	-	0	-/-	
88	0	-	-	-	-	-	0	0	-	-	0	-/-	
95	40	-	-	40	-	-	0	0	-	-	0	7/19	
00	40	-	-	40	-	-	0	0	-	-	0	-/-	
05	60	-	-	60	-	-	0	0	-	-	0	9/21	
<i>Eriogonum microthecum</i>													
82	200	-	-	200	-	-	0	0	0	-	17	9/8	
88	732	33	266	366	100	-	0	0	14	-	9	7/6	
95	1960	-	60	1900	-	-	0	0	0	-	0	11/16	
00	1100	40	100	980	20	-	2	0	2	-	0	9/11	
05	740	-	40	680	20	-	5	3	3	-	0	8/12	
<i>Gutierrezia sarothrae</i>													
82	266	-	-	266	-	-	0	0	-	-	0	9/6	
88	166	-	-	166	-	-	0	0	-	-	0	7/6	
95	160	-	-	160	-	-	0	0	-	-	0	10/10	
00	0	-	-	-	-	-	0	0	-	-	0	-/-	
05	20	-	-	20	-	-	0	0	-	-	0	11/17	
<i>Mahonia repens</i>													
82	0	-	-	-	-	-	0	0	-	-	0	-/-	
88	0	-	-	-	-	-	0	0	-	-	0	-/-	
95	40	-	40	-	-	-	0	0	-	-	0	4/5	
00	0	-	-	-	-	-	0	0	-	-	0	-/-	
05	0	-	-	-	-	-	0	0	-	-	0	-/-	
<i>Opuntia sp.</i>													
82	233	-	-	233	-	-	0	0	0	-	0	6/9	
88	333	-	200	100	33	-	0	0	10	-	30	4/6	
95	0	-	-	-	-	-	0	0	0	-	0	4/7	
00	0	-	-	-	-	-	0	0	0	-	0	7/22	
05	0	-	-	-	-	-	0	0	0	-	0	6/11	

		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)
Pinus edulis												
82	33	-	33	-	-	-	0	0	0	-	0	-/-
88	33	66	33	-	-	-	0	0	0	-	0	-/-
95	0	-	-	-	-	-	0	0	0	-	0	-/-
00	80	20	40	40	-	-	0	0	0	-	0	-/-
05	120	40	40	60	20	-	0	0	17	-	0	-/-
Pinus ponderosa												
82	66	-	33	33	-	-	0	0	-	-	0	41/69
88	133	-	133	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-
Purshia tridentata												
82	399	-	66	333	-	-	33	0	0	-	0	22/32
88	1866	400	1300	500	66	-	25	7	4	-	4	17/24
95	1780	20	300	1460	20	40	49	1	1	-	0	22/50
00	1540	-	80	1280	180	40	6	26	12	-	4	25/49
05	1860	-	100	1520	240	60	42	54	13	3	3	24/45
Symphoricarpos oreophilus												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	460	20	160	300	-	-	0	0	0	-	0	20/43
00	520	-	60	460	-	-	0	0	0	-	0	12/28
05	1080	-	80	980	20	-	0	0	2	-	0	21/37
Tetradymia canescens												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	0	-	-	-	-	-	0	0	0	-	0	13/22
00	40	-	-	20	20	-	0	0	50	-	0	17/24
05	20	-	-	20	-	-	0	0	0	-	0	17/30