

Trend Study 27-2-08

Study site name: Ahlstrom Hollow .

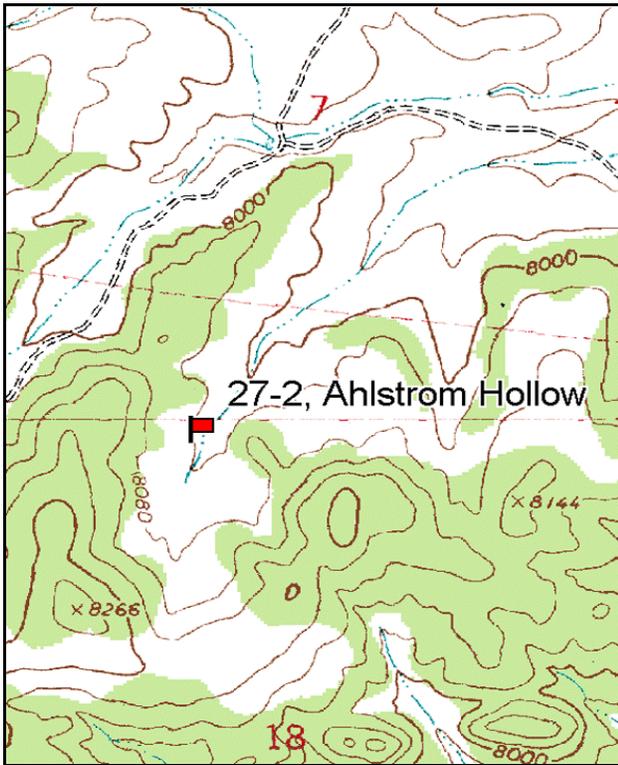
Vegetation type: Black Sagebrush .

Compass bearing: frequency baseline 190 degrees magnetic.

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

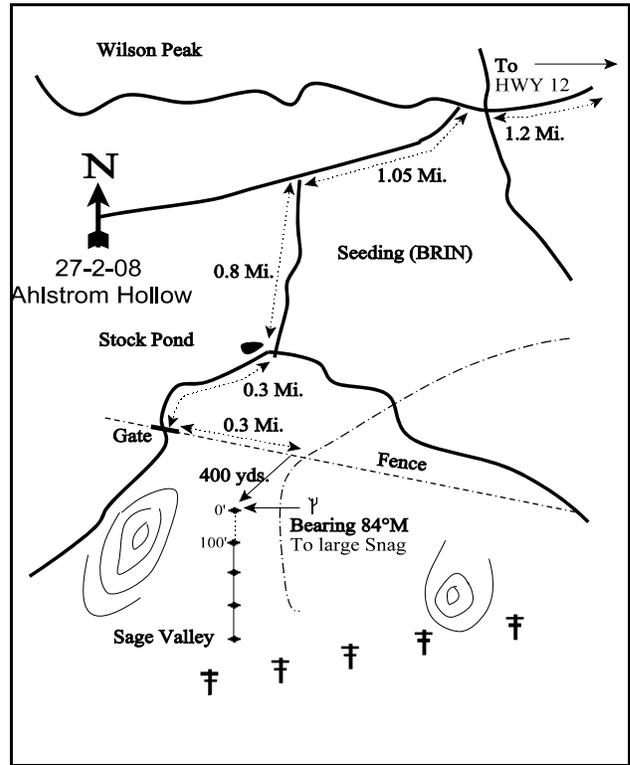
LOCATION DESCRIPTION

From the Bryce Canyon area, take SR 12 west towards Red Canyon. From the Forest Service boundary sign and mile marker 9, go 0.6 miles further west. Turn left onto Wilson Peak Rd #111, cross a cattleguard and go 1.2 miles to the Ahlstrom Hollow road intersection. Pass this 90° intersection and continue 0.05 miles on the Wilson Peak Road to a dirt road going off to the left at a 45° angle. Go down this road 1.05 miles to a fork. Bear left and continue 0.8 miles to a fork by a stock pond. Turn right and go 0.3 miles to a fence. Park here. Walk east along the fenceline up and over a ridge and down to the middle of the next valley. At the bottom of this valley, turn and walk up (south) along the bottom for about 400 yards to the 0-foot baseline, a 2-foot fencepost tagged #7150.



Map Name: Wilson Peak

Township 36S, Range 4W, Section 18



Diagrammatic Sketch

GPS: NAD 83, UTM 12S 388140 E, 4171099 N

DISCUSSION

Ahlstrom Hollow - Trend Study No. 27-2

Study Information

Although named Ahlstrom Hollow, this study is actually situated in a drainage north of the wide, open, revegetated valley that is Ahlstrom Hollow [elevation: 8,000 feet (2,438 m), slope: 8%-10%, aspect: east-southeast]. The small valley sampled by this trend study is above Johnson Bench, an area seeded mainly with smooth brome (*Bromus inermis*) and other grasses. This particular black sagebrush (*Artemisia nova*) and rabbitbrush (*Chrysothamnus* spp.) valley shows little evidence of the seeding treatments done in the early 1950's. Surrounded by pinyon-juniper (*Pinus edulis* and *Juniperus osteosperma*) woodland and mountain mahogany (*Cercocarpus montanus*) ridges, the valley supports a mixture of black sagebrush, rabbitbrush, and grasses with a scattered population of bitterbrush (*Purshia tridentata*). The valley drains to the northeast via an intermittent wash. A fire burned this area prior to the 2003 reading, no data was available on the fire. The area is used by deer, elk, and cattle. Pellet group transect data estimated elk use to be moderate in 2003 (31 edu/acre:76 edu/ha) and slightly moderate in 2008 (19 edu/acre:48 edu/ha). Deer use was estimated to be light in 2003 and 2008 (7 ddu/acre:18 ddu/ha and 5 ddu/acre:13 ddu/ha, respectively). Cattle use was estimated to be moderate in both 2003 and 2008 (32 cdu/acre:79 cdu/ha and 38 cdu/acre:93 cdu/ha, respectively).

Soil

The soil on the site is relatively deep with an average effective rooting depth of almost 18 inches. The soil is a sandy loam with a mildly alkaline reaction (pH 7.4). There is a high percentage of gravel in the profile, but the soil surface has very little rock or pavement cover. The soil appears to be more shallow around the edges of the valley. There is evidence of past erosion and serious gully formation, especially on the surrounding hillsides. Relative combined vegetation and litter cover was 67% in 1992, 73% in 1997, 63% in 2003, and 77% in 2008. Relative bare ground cover was 27% in 1992, 20% in 1997, 33% in 2003, and 17% in 2008. The erosion condition rating was classified as stable in 2003 and 2008.

Browse

Black sagebrush is the dominant shrub over most of the valley, although rabbitbrush is prevalent in the bottoms. Black sagebrush density was estimated at 9,680 plants/acre in 1997, 8,120 plants/acre in 2003, and 7,960 plants/acre in 2008. A fire burned through a portion of the site between the 1997 and 2003 surveys, and accounts for some of the loss in density in that year. The black sagebrush population has maintained a healthy condition over all years with a decent proportion of young, moderately low decadence, and normal vigor. Utilization of black sagebrush has been mostly light to moderate in all readings. A few bitterbrush were encountered on the frequency belts even though it appears to be more common in the lower part of the valley. Bitterbrush is a preferred forage species, and displays moderate to heavy hedging in all years. Bitterbrush plants are large, spreading, and vigorous with annual leaders averaging about three inches of growth in 2003 and 2008.

Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and dwarf rabbitbrush (*C. depressus*) are also common on the site. In 2003, all rabbitbrush on the site was classified as low rabbitbrush while the species were split in previous readings. Combined rabbitbrush density has totaled from about 3,000-4000 plants/acre over all surveys.

Herbaceous Understory

As this area is transitional/summer range for big game, and also grazed by livestock, grasses are an important component of this site. Eight perennial grass species have been sampled on the site in at least one year, with mutton bluegrass (*Poa fendleriana*), needle-and-thread grass (*Stipa comata*), prairie junegrass (*Koeleria cristata*), and slender wheatgrass (*Agropyron trachycaulum*) being the most abundant. Only a few remnant individual smooth brome plants were found in 1987, but none were encountered in any other survey. Much of

the biomass provided by grasses had been utilized in 2003 and some cattle trampling was evident. Sum of nested frequency of grasses declined between 1987 and 1992, remained constant in 1997, decreased again in 2003, and increased for the first time in 2008. Forbs are diverse but not particularly abundant. Many of the more palatable forb species had been utilized by big game during the 1987 reading. Utilization of forbs was not evident in 2003. Average cover of forbs was 6% in 1992, declining to 3% in 1997 and 2003, and increasing to 5% in 2008. Most forbs are found only rarely with the more common species including yellow owlclover (*Orthocarpus luteus*), Eaton and low fleabane (*Erigeron eatonii* and *E. pumilus*, respectively) and longleaf phlox (*Phlox longifolia*).

1992 TREND ASSESSMENT

Trend for browse is stable. Trend is somewhat difficult to determine based on a larger sample area used to determine density. The health and vigor of black sagebrush is good, though decadence increased. Trend for the grasses and forbs is down. The sum of nested frequency of perennial grasses decreased by 24 %. The sum of nested frequency of perennial forbs decreased by 19% and the sum of nested frequency of annual forbs increased dramatically.

browse - stable (0)

grass - down (-2)

forb - down (-2)

1997 TREND ASSESSMENT

Trend for black sagebrush is stable even though density has declined 40% since 1992. Density of black sagebrush was extremely high in 1992 at 16,200 plants/acre. The current estimated population density is similar to 1987 levels at 9,680 plants/acre. This is a more manageable density for a black sagebrush site and reduces intraspecific competition. Recruitment is adequate with 11% of the population consisting of young plants. Decadence has also declined from 23% in 1992 to 14%. Vigor is normal on most plants. Trend for the grasses and forbs is stable. Nested frequency of grasses has remained similar even though grass cover has declined sharply. Nested frequency of prairie junegrass declined significantly while frequency of needle-and-thread increased significantly. Frequency of forbs increased slightly but cover was also lower compared to 1992.

browse - stable (0)

grass - stable (0)

forb - stable (0)

2003 TREND ASSESSMENT

Trend for browse is slightly down. Black sagebrush has a lower population density in 2003 due to plant mortality caused by a fire that burned a portion of the site. Recruitment declined in 2003 and decadence increased slightly. Overall, the population remains healthy. Trend for the grasses is slightly down. Sum of nested frequency of perennial grasses declined by 15%, though production was up from 7% of total cover in 1997 to 10%. The trend for forbs is down. The sum of nested frequency of perennial forbs declined by 41%, and production decreased to less than 1% of total cover. These changes are probably drought related and should improve with better precipitation.

browse - slightly down (-1)

grass - slightly down (-1)

forb - down (-2)

2008 TREND ASSESSMENT

Trend for browse is stable. The primary browse species, black sagebrush, population density has remained similar to 2003. Vigor is good in most of the population, and decadence has remained low. Recruitment has improved since 2003 with young plants comprising 13% of the sagebrush population. Trend for grasses is up. Sum of nested frequency of perennial grasses increased by 20% since 2003 and production of perennial grasses increased from 10% of total cover to 14%. There was a significant increase in the frequency of slender wheatgrass and blue grama (*Bouteloua gracilis*), and increases in the frequency of needle-and-thread grass and Letterman needlegrass. Trend for forbs is up. Sum of nested frequency of perennial forbs increased returning to near 1997 frequencies, though the sum of nested frequency of annual forbs also increased. Production of

perennial forbs increased, but is still low at 2% of total cover.

browse - stable (0)

grass - up (+2)

forb - up (+2)

HERBACEOUS TRENDS --

Management unit 27 , Study no: 2

T y p e	Species	Nested Frequency					Average Cover %			
		'87	'92	'97	'03	'08	'92	'97	'03	'08
G	Agropyron dasystachyum	-	-	-	2	-	-	-	.00	-
G	Agropyron trachycaulum	_a 8	_a 12	_{ab} 21	_b 46	_c 105	.42	.11	.62	3.49
G	Bouteloua gracilis	_c 96	_b 69	_b 64	_{bc} 27	_a 67	_b 2.23	.72	.29	1.11
G	Bromus inermis	2	-	-	-	-	-	-	-	-
G	Bromus tectorum (a)	-	-	3	-	-	-	.00	-	-
G	Koeleria cristata	_b 148	_b 134	_a 89	_a 71	_a 65	3.09	.98	.92	1.27
G	Oryzopsis hymenoides	-	-	-	-	-	.00	-	-	-
G	Poa fendleriana	_a 129	_c 232	_c 201	_{bc} 187	_{ab} 161	7.53	2.88	4.38	3.37
G	Poa pratensis	-	-	-	-	4	-	-	-	.06
G	Poa secunda	_c 229	_a 5	_b 36	_{ab} 23	_a 9	.01	.81	.24	.19
G	Stipa columbiana	-	-	-	-	-	-	-	-	.00
G	Stipa comata	_b 130	_a 80	_{ab} 111	_{ab} 107	_b 138	1.95	1.31	2.99	4.44
G	Stipa lettermani	_a -	_{ab} 29	_b 34	_a 9	_{ab} 17	.68	.58	.21	.50
G	Vulpia octoflora (a)	-	-	-	3	-	-	-	.00	-
Total for Annual Grasses		0	0	3	3	0	0	0.00	0.00	0
Total for Perennial Grasses		742	561	556	472	566	15.94	7.42	9.67	14.46
Total for Grasses		742	561	559	475	566	15.94	7.42	9.68	14.46
F	Agoseris glauca	_a -	_a -	_a 1	_b 36	_a 8	-	.00	.23	.02
F	Alyssum alyssoides (a)	-	-	-	-	6	-	-	.01	.07
F	Ambrosia sp.	-	3	-	-	-	.06	-	-	-
F	Antennaria rosea	7	6	8	-	3	.04	.33	-	.01
F	Androsace septentrionalis (a)	-	_{ab} 5	_a 3	_a -	_b 13	.04	.00	-	.08
F	Arabis sp.	_a -	_b 6	_b 12	_a -	_{ab} 2	.02	.03	-	.03
F	Aster chilensis	-	-	7	-	-	-	.01	-	-
F	Castilleja linariaefolia	_a -	_a -	_a -	_b 8	_b 10	-	-	.02	.02
F	Calochortus nuttallii	-	-	-	2	2	-	-	.00	.00
F	Castilleja sp.	-	-	-	-	-	-	-	.00	-
F	Chenopodium leptophyllum(a)	-	-	-	2	1	-	-	.00	.00
F	Comandra pallida	-	-	1	-	-	-	.00	-	-
F	Collinsia parviflora (a)	-	-	-	8	2	-	-	.02	.00
F	Crepis acuminata	-	-	-	3	-	-	-	.00	-

Type	Species	Nested Frequency					Average Cover %			
		'87	'92	'97	'03	'08	'92	'97	'03	'08
F	<i>Cryptantha bakeri</i>	c60	b12	b20	a-	ab6	.06	.05	-	.02
F	Cruciferae	6	3	-	-	-	.00	-	-	-
F	<i>Cymopterus</i> sp.	-	-	1	-	-	-	.00	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	a-	b35	a6	-	-	.68	.01
F	<i>Draba</i> sp. (a)	-	-	-	2	-	-	-	.01	-
F	<i>Erigeron eatonii</i>	abc14	bc27	a2	ab11	c28	.33	.01	.02	.19
F	<i>Erigeron pumilus</i>	ab11	a1	b22	ab11	ab17	.15	.20	.05	.06
F	<i>Eriogonum racemosum</i>	6	13	14	8	10	.18	.16	.02	.07
F	<i>Eriogonum umbellatum</i>	20	12	18	15	15	.11	.20	.26	.17
F	<i>Euphorbia robusta</i>	b11	ab3	ab4	a-	a-	.18	.06	-	-
F	<i>Gayophytum ramosissimum</i> (a)	-	-	14	1	4	-	.03	.01	.01
F	<i>Heterotheca villosa</i>	ab15	ab3	a2	ab5	b18	.15	.03	.06	.64
F	<i>Holosteum umbellatum</i> (a)	-	-	3	-	-	-	.00	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	a5	b53	c81	-	.01	1.39	.86
F	<i>Lotus utahensis</i>	b34	ab21	a13	a11	ab17	.33	.25	.05	.13
F	<i>Lupinus argenteus</i>	-	-	-	2	-	-	-	.00	-
F	<i>Microsteris gracilis</i> (a)	-	-	b61	a2	a8	-	.17	.00	.02
F	<i>Oenothera pallida</i>	-	-	3	7	11	-	.00	.07	.09
F	<i>Orthocarpus luteus</i> (a)	a21	b121	b111	a33	b98	2.70	1.43	.19	1.43
F	<i>Pedicularis centranthera</i>	-	-	-	-	8	-	-	-	.04
F	<i>Penstemon comarrhenus</i>	b36	a14	a12	a-	a14	1.01	.05	-	.12
F	<i>Penstemon</i> sp.	a-	a-	ab8	a1	b13	-	.07	.00	.05
F	<i>Phlox longifolia</i>	a29	b66	b72	a21	a29	.30	.35	.07	.16
F	<i>Polygonum douglasii</i> (a)	-	b25	b26	a-	b37	.06	.07	-	.09
F	<i>Sphaeralcea coccinea</i>	-	-	-	-	2	-	-	-	.00
F	<i>Taraxacum officinale</i>	a-	ab7	b8	ab2	ab3	.39	.05	.00	.06
F	<i>Tragopogon dubius</i>	2	-	5	-	2	-	.01	-	.00
F	<i>Trifolium kingii</i>	a-	ab6	b9	ab1	ab9	.01	.02	.00	.07
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-
Total for Annual Forbs		21	151	223	136	256	2.81	1.73	2.33	2.60
Total for Perennial Forbs		252	203	242	144	227	3.37	1.92	0.91	2.01
Total for Forbs		273	354	465	280	483	6.18	3.65	3.24	4.61

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

BROWSE TRENDS --

Management unit 27 , Study no: 2

Type	Species	Strip Frequency				Average Cover %			
		'92	'97	'03	'08	'92	'97	'03	'08
B	Artemisia nova	98	98	57	61	24.25	21.39	15.10	17.68
B	Chrysothamnus depressus	33	31	0	11	.67	.00	-	.39
B	Chrysothamnus viscidiflorus viscidiflorus	52	27	62	54	4.70	1.90	6.95	4.89
B	Juniperus osteosperma	1	2	1	1	.15	.85	.85	1.00
B	Leptodactylon pungens	49	42	31	32	2.34	.64	.67	.39
B	Opuntia sp.	2	1	1	1	.03	.00	.00	.03
B	Purshia tridentata	5	2	1	1	.38	.03	.00	.38
B	Tetradymia canescens	14	11	12	10	.09	.24	.06	.18
Total for Browse		254	214	165	171	32.63	25.07	23.64	24.95

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 2

Species	Percent Cover		
	'97	'03	'08
Artemisia nova	-	15.88	23.25
Chrysothamnus viscidiflorus viscidiflorus	-	6.90	10.76
Juniperus osteosperma	1.60	1.96	2.20
Leptodactylon pungens	-	.23	.46
Purshia tridentata	-	.50	.50
Tetradymia canescens	-	.08	.20

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 27 , Study no: 2

Species	Average leader growth (in)	
	'03	'08
Artemisia nova	1.6	0.9
Purshia tridentata	3.0	2.9

BASIC COVER --

Management unit 27 , Study no: 2

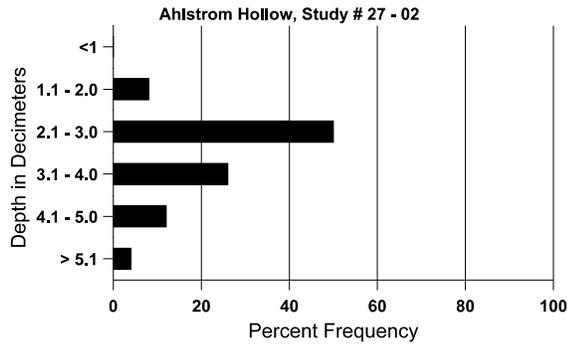
Cover Type	Average Cover %				
	'87	'92	'97	'03	'08
Vegetation	5.50	47.05	38.87	38.60	49.75
Rock	1.25	7.93	.07	.54	1.19
Pavement	12.75	0	7.14	4.17	5.49
Litter	66.25	31.65	42.92	33.63	39.04
Cryptogams	0	.41	.46	.04	.05
Bare Ground	14.25	31.40	22.36	37.97	20.20

SOIL ANALYSIS DATA --

Management unit 27, Study no: 2, Study Name: Ahlstrom Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
17.6	65.3 (14.8)	7.4	66.4	19.1	14.6	2.5	15.9	86.4	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 2

Type	Quadrat Frequency			
	'92	'97	'03	'08
Rabbit	30	11	13	47
Elk	22	7	12	10
Deer	6	14	8	3
Cattle	3	6	8	10

Days use per acre (ha)	
'03	'08
-	-
31 (76)	19 (48)
7 (18)	5 (13)
32 (79)	38 (93)

BROWSE CHARACTERISTICS --
Management unit 27 , Study no: 2

		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 frigida												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	11/7
Artemisia nova												
87	9532	2599	2333	6133	1066	-	33	13	11	-	0	16/20
92	16200	1020	3400	9020	3780	-	22	2	23	3	4	-/-
97	9680	1140	1100	7220	1360	420	5	0	14	3	4	16/27
03	8120	-	480	6000	1640	2580	9	0	20	4	4	15/23
08	7960	1200	1040	5760	1160	180	7	2	15	5	6	15/26
Chrysothamnus depressus												
87	3132	799	266	2733	133	-	17	15	4	-	0	4/10
92	1920	-	1000	920	-	-	5	1	0	-	0	-/-
97	1900	-	40	1860	-	-	0	0	0	-	0	10/10
03	0	-	-	-	-	-	0	0	0	-	0	-/-
08	600	-	-	600	-	-	47	3	0	-	0	3/8
Chrysothamnus viscidiflorus viscidiflorus												
87	3332	733	466	2533	333	-	32	4	10	-	0	16/18
92	4080	20	1600	2360	120	-	4	.49	3	.98	.98	-/-
97	900	-	20	780	100	-	0	0	11	-	2	14/20
03	4300	-	20	4120	160	-	0	0	4	.46	.46	12/18
08	3000	40	240	1860	900	20	2	0	30	10	10	14/25
Juniperus osteosperma												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	20	-	20	-	-	-	100	0	-	-	0	-/-
97	40	-	20	20	-	-	0	0	-	-	0	-/-
03	20	-	-	20	-	-	0	0	-	-	0	-/-
08	20	-	-	20	-	-	0	0	-	-	0	-/-

		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)
Leptodactylon pungens												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
92	5040	-	420	4540	80	-	0	0	2	1	2	-/-
97	2780	60	220	2520	40	80	0	0	1	1	1	6/6
03	1720	-	40	1580	100	-	0	0	6	5	5	5/7
08	1200	-	60	1040	100	-	0	0	8	-	0	5/8
Opuntia sp.												
87	133	-	-	133	-	-	0	0	0	-	0	3/8
92	120	-	100	-	20	-	0	0	17	-	0	-/-
97	20	-	20	-	-	-	0	0	0	-	0	-/-
03	20	-	-	20	-	-	0	0	0	-	0	-/-
08	20	-	-	20	-	-	0	0	0	-	0	-/-
Purshia tridentata												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
92	100	-	80	20	-	-	0	60	0	-	0	-/-
97	40	-	-	40	-	-	50	50	0	-	0	21/43
03	20	-	-	-	20	40	0	100	100	-	0	19/59
08	40	-	-	40	-	-	0	100	0	-	0	21/51
Tetradymia canescens												
87	266	-	-	266	-	-	75	0	0	-	0	9/9
92	420	-	200	200	20	-	14	5	5	-	0	-/-
97	400	60	160	240	-	-	0	0	0	-	0	9/11
03	300	-	20	260	20	-	0	0	7	7	7	9/12
08	280	-	40	240	-	-	0	0	0	-	0	11/17