

FLAT BOTTOM CANYON - TREND STUDY NO. 2-23-11

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Shallow Loam \(Low Sagebrush\), R047XA442UT](#)

Land Ownership: Private

Elevation: 5,600 ft (1,707 m)

Aspect: South

Slope: 45%

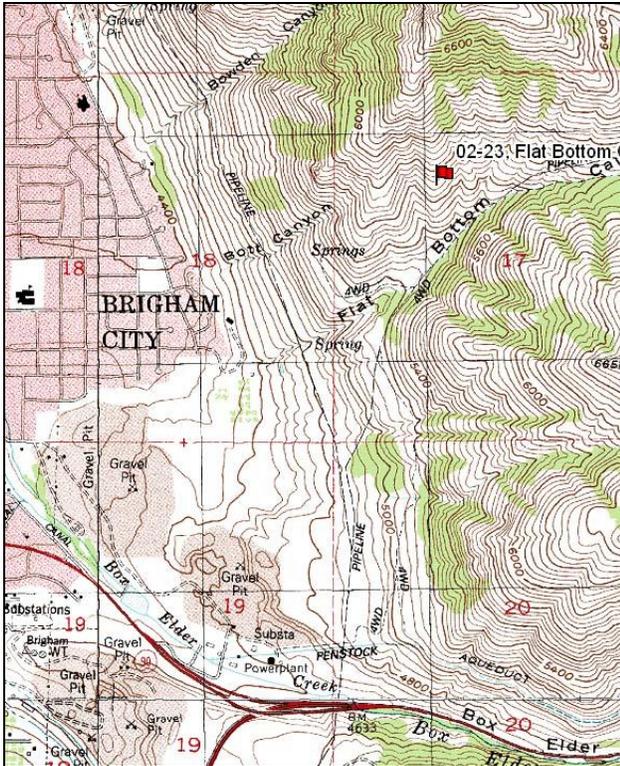
Transect bearing: 167° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 5 on 1ft.

Directions:

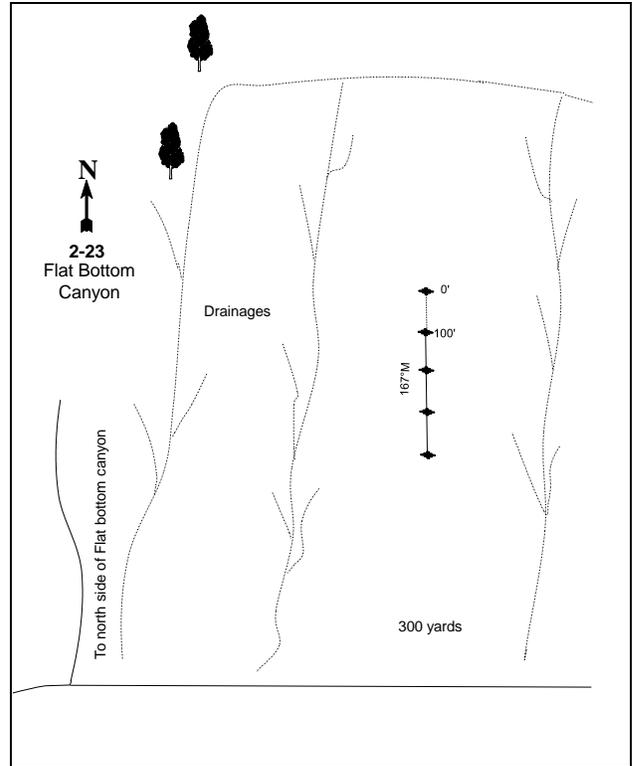
Ask for permission and directions to the mouth of the canyon at the Bingham sand and gravel pit. Four-wheel drive is needed. From mouth of canyon proceed to the ridge on north side of canyon where the site is located. Walk up the ridge about 300 yards to the 400-foot stake. The 0-foot baseline stake is further up the ridge. The 0-foot stake is marked with browse tag #7919. This site can be reached by following aqueduct road in Box Elder Canyon and around the bench to Flat Bottom Canyon.

Map Name: Mount Pisgah



Township: 9N Range: 1W Section: 17

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 417991 E 4596973 N

FLAT BOTTOM CANYON - TREND STUDY NO. 2-23

Site Information

Site Description: This study is located in Flat Bottom Canyon, which is just east of the Brigham City gravel pit. The site is utilized by deer in winter, but the study area produces relatively little browse forage. Due to the steep south facing canyon slopes, the soils are shallow and likely limits plant growth and plant densities. Deer pellet groups were sampled in moderate abundance in 2001. However, pellet groups for deer were sampled in low abundance in 2006 and 2011 (Table - Pellet Group Data). Pellet groups are concentrated near the bottom of the slope where the density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) is highest.

Browse: Browse is a minor component of the sites vegetation and consists of a meager population of mountain big sagebrush. The population for sagebrush has historically been moderate in density, but has steadily decreased over the duration of the study. Utilization was moderate to heavy in 1984 and has displayed light to moderate use since. Mature plants are short and stunted; however, the sagebrush population is vigorous and decadence is low. The upper south slopes of the canyon are all depleted of sagebrush. More sagebrush is found near the bottom of the canyon where the soil is deeper. Historically, the dominant browse species has been broom snakeweed (*Gutierrezia sarothrae*), but is not preferred by big game. Snakeweed has had a highly dense population, but has since become a sparse population and no plants were sampled in 2011 (Table - Browse Characteristics).

Herbaceous Understory: Annual grasses and weedy forbs are very abundant and considered dominant, especially on lower slopes. Cheatgrass (*Bromus tectorum*), rattlesnake brome (*B. brizaeformis*), and rattail fescue (*Festuca myuros*) dominated the herbaceous understory during all sample years; however, annual grass cover decreased in 2006.. The perennial grasses bluebunch wheatgrass (*Agropyron spicatum*), purple three-awn (*Aristida purpurea*), and Sandberg bluegrass (*Poa secunda*) are moderately abundant. The weedy perennial bulbous bluegrass (*Poa bulbosa*) was a minor component until 2006, but became the dominant perennial grass in 2011. The forb community is moderately diverse, however, the dominant forbs on the site include pale alyssum (*Alyssum alyssoides*), the weedy species western ragweed (*Ambrosia psilostachya*), and storksbill (*Erodium cicutarium*). As a noxious weed in the state of Utah, Dyer's woad (*Isatis tinctoria*) has been on the study since 1984 and has maintained a stable population (Table - Herbaceous Trends).

Soil: The soil is part of the Foxol series, and is found on mountain sides. The parent material consists of colluvium derived from quartzite and/or residuum weathered from quartzite. The soil is well drained with a moderately permeable restrictive layer (Soil Survey Staff 2011). The soil is very rocky with a loam texture, and with a soil reaction that is moderately acidic (pH 5.9) (Table - Soil Analysis Data). Bare ground cover is low to moderate, while protective ground cover is provided by high amounts of vegetation, rock, and pavement that decrease the erosion potential. The soil erosion condition was classified as slight in 2006, but stable for all other sample years.

Trend Assessments

Browse:

- **1984 to 1990 - down (-2):** The density for mountain big sagebrush decreased 75% from 2,231 plants/acre to 565 plants/acre. Decadence within the sagebrush population increased from 21% of the population to 24%. Poor vigor decreased from 4% to 0%. Recruitment of young sagebrush decreased from 48% to 18% of the population.
- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend is determined using other parameters. Sagebrush decadence and poor vigor decreased and was not observed within the population.

- **1996 to 2001 - down (-2):** The density for mountain big sagebrush decreased 20% from 200 plants/acre to 160 plants/acre. Decadence increased to 13% of the sagebrush population, while poor vigor was not observed within the population. Young sagebrush recruitment decreased significantly from 70% of the population to 0%.
- **2001 to 2006 - down (-2):** The density for mountain big sagebrush decreased 88% to 20 plants/acre. Decadence and poor vigor was not measured within the small population. Recruitment of young sagebrush was not observed.
- **2006 to 2011 - stable (0):** The density for mountain big sagebrush increased two-fold to 40 plants/acre. The population is exceptionally small and the increase in density does not justify a change in trend. Decadence and poor vigor was not observed within the population. Recruitment of young sagebrush was not observed.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 28%. Sandberg bluegrass increased significantly in nested frequency, and contributed to the increase in the sum of nested frequency. Bluebunch wheatgrass was the dominant perennial grass species.
- **1990 to 1996 - down (-2):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, decreased 46%. Sandberg bluegrass decreased significantly in nested frequency, and had a cover of 1%. Bluebunch wheatgrass maintained a stable population, and had a cover of 4%. Bulbous bluegrass was observed for the first time and was a minor component of perennial grass community. Annual grasses were included in the sample for the first time in 1996. The weedy species cheatgrass is the dominant herbaceous species with a cover of 17%.
- **1996 to 2001 - slightly up (+1):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 59%. A significant increase in purple three-awn contributed to the perennial compositional shift. Sandberg bluegrass and bluebunch wheatgrass maintained stable populations, and cover increased to 4% and 5%, respectively. The weedy annual species cheatgrass and rattlesnake brome both had a significant decrease in nested frequency, however, the annual grass species rattail fescue increased significantly in nested frequency, and increased in cover from 1% to 6%.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, remained similar. The weedy species bulbous bluegrass increased significantly in nested frequency, and increased in cover from 1% to 8%. Rattail fescue was not sampled on the site.
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, remained similar. All perennial grass species maintained stable populations; however, bulbous bluegrass increased in cover to 12%. The annual grass species rattail fescue increased significantly in nested frequency, and had a cover of 5%.

Forb:

- **1984 to 1990 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 40%. The decrease is primarily due to the weedy species western ragweed, which had a significant decrease in nested frequency.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency for perennial forbs increased three fold, however, the increase was due to the weedy species western ragweed, which increased significantly in nested frequency, and had a cover of 4%. Utah locoweed (*Astragalus utahensis*) had a significant increase in nested frequency, and had a cover of 1%.
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 42%. Western ragweed almost exclusively contributed to the decrease. Ragweed had a significant decrease in nested frequency, and decreased in cover to 2%. The annual species annual sunflower (*Helianthus annuus*), pale alyssum, and jagged chickweed (*Holosteum umbellatum*) all had a significant increase in nested frequency.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 14%. The perennial species western ragweed had no significant increase in nested frequency, but increased in

cover to 5%. The annual species pale alyssum decreased significantly in nested frequency and had a cover of 1%.

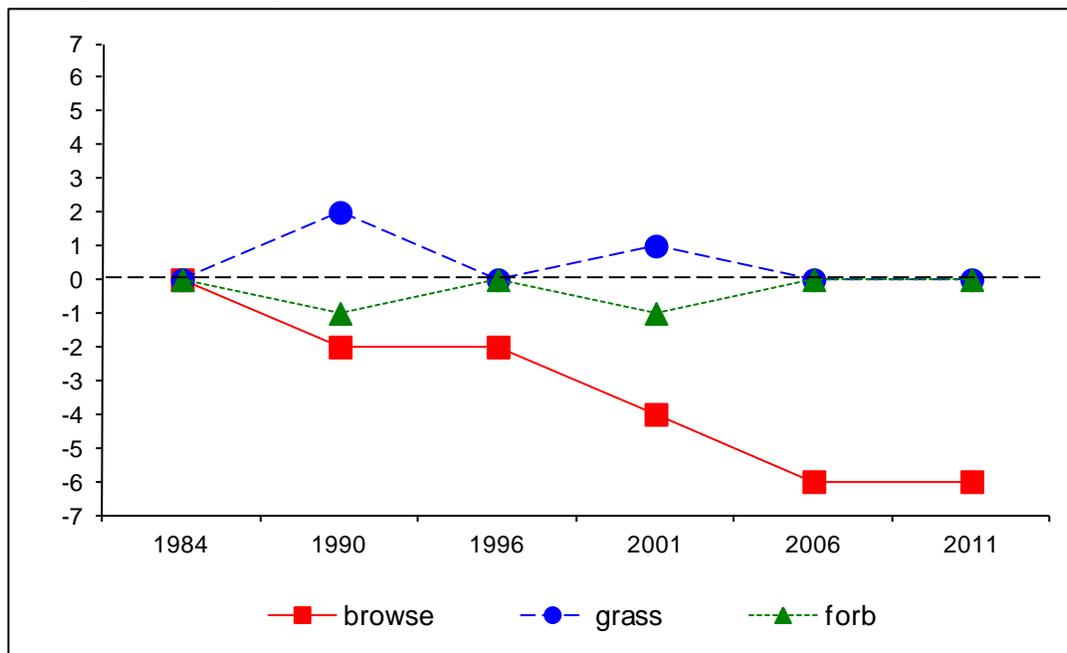
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial forbs remained similar. The perennial forb spring parsley (*Cymopterus sp.*) had a significant increase in nested frequency. The annual species pale alyssum had a significant decrease in nested frequency, and decreased in cover to less than 1%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 2, study no: 23

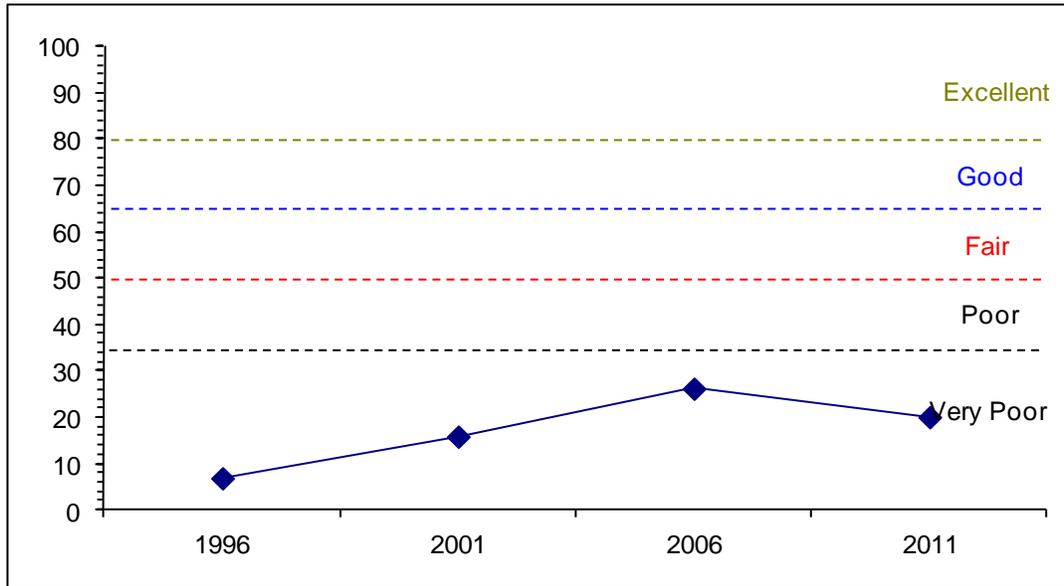
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	0.2	0.0	0.0	12.5	-13.9	10.0	-2.0	6.9	Very Poor
01	0.0	0.0	0.0	22.7	-10.0	5.1	-2.0	15.8	Very Poor
06	0.0	0.0	0.0	24.7	-6.5	10.0	-2.0	26.2	Very Poor
11	0.2	0.0	0.0	27.8	-14.0	8.1	-2.0	20.0	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 2 Study no: 23



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 2, Study no: 23



HERBACEOUS TRENDS--
 Management unit 02, Study no: 23

Type	Species	Nestled Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron spicatum	c184	bc182	ab126	a117	a125	ab127	4.07	4.67	7.17	6.15
G	Aristida purpurea	a9	ab38	b48	c86	c85	c85	1.17	2.61	3.64	3.50
G	Bromus brizaeformis (a)	-	-	c152	b70	a17	a15	1.00	.20	.04	.05
G	Bromus japonicus (a)	-	-	-	4	-	-	-	.01	-	-
G	Bromus tectorum (a)	-	-	b387	a330	a342	a347	16.60	7.41	8.67	13.75
G	Festuca myuros (a)	-	-	b87	d278	a-	c128	.91	5.73	-	4.93
G	Poa bulbosa	-	-	a10	a46	b213	b187	.02	.75	7.60	11.51
G	Poa secunda	a162	c234	a70	a184	a147	a177	1.00	4.06	1.51	4.25
Total for Annual Grasses		0	0	626	682	359	490	18.51	13.36	8.71	18.73
Total for Perennial Grasses		355	454	254	433	570	576	6.28	12.11	19.94	25.42
Total for Grasses		355	454	880	1115	929	1066	24.79	25.48	28.66	44.15
F	Achillea millefolium	-	-	2	11	2	-	.03	.19	.03	-
F	Agoseris glauca	-	6	10	-	1	2	.05	-	.00	.00
F	Allium sp.	a-	a-	a-	a-	b8	a-	-	.00	.01	-
F	Alyssum alyssoides (a)	-	-	a127	c296	b200	a119	.38	1.07	.52	.31
F	Ambrosia psilostachya	b83	a13	d152	b75	bd123	bc96	4.23	1.82	4.83	3.30
F	Artemisia ludoviciana	b39	a10	a9	a5	a10	a6	.22	.06	.07	.18
F	Astragalus convallarius	-	-	-	2	-	-	-	.00	-	-
F	Astragalus utahensis	a2	a1	b21	ab12	a1	ab9	.49	.07	.03	.24
F	Balsamorhiza hookeri	-	4	-	-	-	-	-	-	-	-
F	Collinsia parviflora (a)	-	-	-	-	-	2	-	-	-	.00
F	Cymopterus sp.	a-	c33	bc24	bc21	b14	c36	.08	.14	.06	.26
F	Draba sp. (a)	-	-	a-	a37	b165	a3	-	.20	.35	.01
F	Epilobium brachycarpum (a)	-	-	6	-	2	3	.02	-	.00	.00

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Erigeron sp.	-	-	2	-	-	-	.15	-	-	-
F	Eriogonum umbellatum	-	-	4	2	5	-	.09	.03	.21	-
F	Erodium cicutarium (a)	-	-	_b 140	_c 217	_b 151	_a 22	1.21	4.96	2.81	.05
F	Hackelia patens	-	-	-	3	-	-	-	.00	-	-
F	Helianthus annuus (a)	-	2	-	-	-	7	-	-	-	.06
F	Holosteum umbellatum (a)	-	-	_a 21	_b 212	_b 261	_a 5	.04	.86	.89	.01
F	Isatis tinctoria	_{ab} 13	_{ab} 16	_b 25	_{ab} 14	_a 1	_a 10	.13	.20	.00	.02
F	Lactuca serriola (a)	_a -	_a -	_a 3	_a -	_a -	_b 17	.00	-	-	.44
F	Tragopogon dubius (a)	30	18	33	25	-	29	.36	.26	-	.25
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-	-
F	Veronica biloba (a)	-	-	-	-	3	-	-	-	.00	-
Total for Annual Forbs		30	20	330	787	782	207	2.03	7.37	4.59	1.15
Total for Perennial Forbs		138	83	249	145	165	159	5.50	2.54	5.26	4.03
Total for Forbs		168	103	579	932	947	366	7.53	9.91	9.85	5.19

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

BROWSE TRENDS--

Management unit 02, Study no: 23

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata vaseyana	7	5	1	2	.18	.03	.03	.15
B	Chrysothamnus nauseosus hololeucus	3	5	0	0	.53	1.39	-	-
B	Gutierrezia sarothrae	54	69	0	0	1.46	4.40	-	-
B	Opuntia sp.	1	6	2	4	-	.01	-	.06
Total for Browse		65	85	3	6	2.17	5.83	0.03	0.21

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 23

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	.36	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 23

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	2.6	-	-

BASIC COVER--

Management unit 02, Study no: 23

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	2.25	9.50	42.44	47.72	43.59	47.65
Rock	16.50	18.00	18.50	17.84	22.36	21.82
Pavement	18.25	33.25	10.93	19.59	21.03	22.96
Litter	40.00	22.50	41.72	19.67	11.59	14.01
Cryptogams	6.00	4.25	1.90	2.01	4.81	.69
Bare Ground	17.00	12.50	1.45	6.20	8.23	2.55

SOIL ANALYSIS DATA --

Management unit 02, Study no: 23, Study Name: Flat Bottom Canyon

Effective rooting depth (in)	pH	Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
7.1	5.9	48.2	29.4	22.4	1.8	10.7	140.8	0.3

PELLET GROUP DATA--

Management unit 02, Study no: 23

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Deer	7	5	8	5	25 (63)	15 (36)	8 (20)

BROWSE CHARACTERISTICS--

Management unit 02, Study no: 23

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Amelanchier alnifolia									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	0	0	0	-	-	0	0	0	-/-
01	0	0	0	-	-	0	0	0	43/56
06	0	0	0	-	-	0	0	0	-/-
11	0	0	0	-	-	0	0	0	37/63
Artemisia tridentata vaseyana									
84	2231	48	31	21	33	24	33	4	6/6
90	565	18	59	24	-	29	12	0	8/10
96	200	70	30	0	-	0	0	0	13/22
01	160	0	88	13	-	63	0	0	13/27
06	20	0	100	0	-	100	0	0	14/22
11	40	0	100	0	-	50	0	0	16/26

		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>Chrysothamnus nauseosus hololeucus</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	60	67	33	0	-	0	0	0	32/54	
01	120	17	67	17	-	0	0	0	31/51	
06	0	0	0	0	-	0	0	0	24/31	
11	0	0	0	0	-	0	0	0	33/46	
<i>Gutierrezia sarothrae</i>										
84	1065	6	81	12	166	0	0	0	9/12	
90	2432	26	73	1	233	1	0	1	7/8	
96	3240	30	62	8	80	0	0	0	9/13	
01	4760	1	93	6	-	0	0	5	8/16	
06	0	0	0	0	-	0	0	0	10/15	
11	0	0	0	0	-	0	0	0	12/22	
<i>Opuntia sp.</i>										
84	66	0	100	0	-	0	0	0	7/11	
90	99	67	0	33	66	0	0	0	-/-	
96	20	0	100	0	-	0	0	0	3/10	
01	160	25	63	13	-	0	0	0	2/8	
06	40	0	100	0	-	0	0	0	4/10	
11	80	0	100	0	-	0	0	0	4/8	