

CHAPMAN CANAL - TREND STUDY NO. 4-14-11

Vegetation Type: Wyoming Big Sagebrush

Range Type: Substantial Deer Year-long, Crucial Elk Winter

NRCS Ecological Site Description: [Semidesert Stony Loam \(Black Sagebrush\), R047XB252UT](#)

Land Ownership: DL&L

Elevation: 6,500 ft (1,981 m)

Aspect: West

Slope: 8%

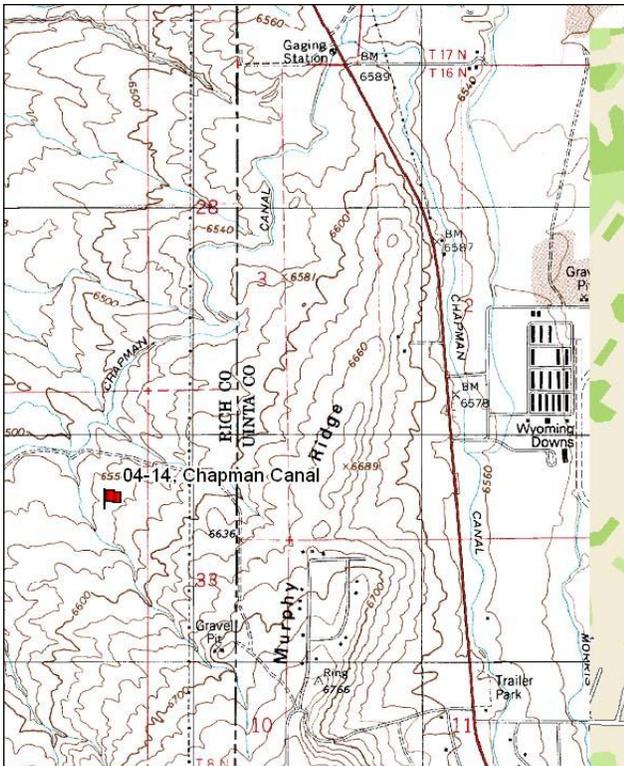
Transect bearing: 165° magnetic

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

Directions:

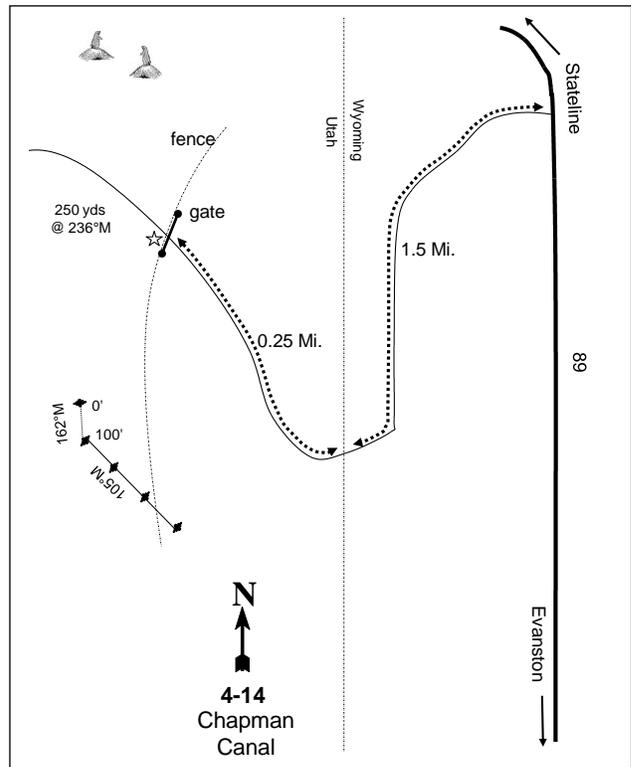
From the state line southbound on Highway 16/89, proceed 0.6 miles towards Evanston and turn right (west). Proceed 1.5 miles, crossing Chapman Canal, to a gate (DL&L). Go through the gate and travel 0.25 miles to a fence/gate. From the gate walk approximately 130 paces at 218 degrees magnetic to the 0-foot stake of the baseline, marked with browse tag #7939. The baseline doglegs after 100 feet and runs 105 degrees magnetic.

Map Name: Neponset Reservoir NE



Township: 8N Range: 8E Section: 32

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 495549 E 4581878 N

## CHAPMAN CANAL - TREND STUDY NO. 4-14

### Site Information

Site Description: The study is located three miles east of Neponset Reservoir, near the Utah-Wyoming state line. This section of land was owned by the School and Institutional Trust Lands Administration (SITLA) until 2006, when it was purchased by Deseret Land and Livestock. This area of rolling hills is dominated by an extensive Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass community that extends for miles before any cover from trees or terrain is discernible. Deer, elk, pronghorn, sage grouse, horses, and cattle all occupy the area. A brood of Hungarian partridge and five winter-killed deer carcasses were also observed at the time of study establishment in 1984. Deer/pronghorn pellet groups have been sampled in moderate to high abundance since 2001. A pronghorn carcass was identified in the area in 2006. Sampled elk and cattle sign has been minimal since 2001 (Table - Pellet Group Data).

Browse: The key browse species is Wyoming big sagebrush, which contributes the majority of the browse cover. However, sagebrush cover (Table - Browse Trends) and density have steadily decreased since 2001. The sagebrush population is a moderately dense stand of generally low stature plants. Utilization of sagebrush has been light to moderate in the majority of the sample years. Decadence of sagebrush has been high throughout the course of the study, and poor vigor has been very high since 2001. Recruitment of young sagebrush plants has fluctuated through the sample years, with a period of poor recruitment from 1996 to 2006. The sagebrush defoliator moth (*Aroga websteri*) was identified in 29% of the population in 2006 and was likely the cause of the decadent/dying appearance of most sagebrush individuals. The study was sampled late in the summer after the moth had defoliated many of the sagebrush individuals. Narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*) is abundant. Mature plants are small, mostly unutilized, and in good vigor. Winterfat (*Ceratoides lanata*) has been sampled in low densities since 1996.

Herbaceous Understory: The herbaceous understory is characterized by an adequate diversity of grasses, but few quality forbs. The most abundant grasses are Sandberg bluegrass (*Poa secunda*) and western wheatgrass (*Agropyron smithii*). Cheatgrass (*Bromus tectorum*) occurs in low frequency and cover. The most abundant forbs include the low growing species Hoods phlox (*Phlox hoodii*), longleaf phlox (*P. longifolia*), and rose pussytoes (*Antennaria rosea*) (Table - Herbaceous Trends).

Soil: The soil is in the Duckree gravelly loam series, which occurs on stream terraces and alluvial fans. Parent material consists of colluvium and/or slope alluvium derived from quartzite, sandstone, and chert. These soils are characterized as very deep, well drained, and moderately permeable (Soil Survey Staff 2011). Soil texture is a clay loam with a moderately alkaline soil reaction (pH 8.0). Phosphorus may have limited availability for plant growth and development at 5.5 ppm (Tiedemann and Lopez 2004). Organic matter is also relatively low at 1.9% (Table - Soil Analysis Data). Ground cover is poor and comes primarily from the shrub crowns. Most shrub interspaces are barren and soil compaction from trampling is evident. Bare ground cover is moderately high (Table - Basic Cover). Sheet and gully erosion is noticeable throughout the area, but is not excessive. The soil erosion condition was classified as slight in 2001, but has been stable since 2006.

### Trend Assessments

#### Browse:

- **1984 to 1990 - stable (0):** There was little change in the density of Wyoming big sagebrush.
- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence of sagebrush decreased from 43% to 31%, but is still considered to be high. Recruitment of young sagebrush decreased from 31% to 2% of the population.

- **1996 to 2001 - stable (0):** Density of sagebrush increased slightly from 3,700 plants/acre to 4,040 plants/acre, and cover increased from 15% to 18%. Decadence decreased slightly to 26%, but recruitment of young plants remained very low at 1%.
- **2001 to 2006 - slightly down (-1):** The density of sagebrush decreased 13% to 3,500 plants/acre, and cover decreased to 10%. Decadence increased to 89%, and poor vigor increased from 3% to 93%. The defoliator moth was identified in 29% of the population and is likely responsible for much of the poor health on the site.
- **2006 to 2011 - stable (0):** Sagebrush density decreased 7% to 3,260 plants/acre, and cover decreased to 8%. Decadence decreased to 50% and poor vigor decreased to 47%, but both are still considered to be very high. Recruitment of young sagebrush plants increased to 10% of the population.

Grass:

- **1984 to 1990 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1990 to 1996 - stable (0):** The sum of nested frequency of perennial grasses increased by 12%, but the increase is likely due to the increased sample area.
- **1996 to 2001 - stable (0):** The sum of nested frequency of perennial grasses of perennial grasses remained similar, but cover increased from 6% to 11%.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency of perennial grasses increased 14%, and cover increased to 19%.
- **2006 to 2011 - slightly up (+1):** There was a 12% increase in the sum of nested frequency of perennial grasses, but cover decreased to 13%.

Forb:

- **1984 to 1990 - slightly up (+1):** The forb community increased slightly in sum of nested frequency.
- **1990 to 1996 - stable (0):** There was a slight increase in the sum of nested frequency of perennial forbs, but much of this increase is likely due to the larger sample area.
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased 11%, and cover decreased from 4% to 3%.
- **2001 to 2006 - up (+2):** The sum of nested frequency of perennial forbs increased 42%, and cover increased to 4%.
- **2006 to 2011 - slightly up (+1):** The sum of nested frequency of perennial forbs increased 19%, but cover remained similar at 4%.

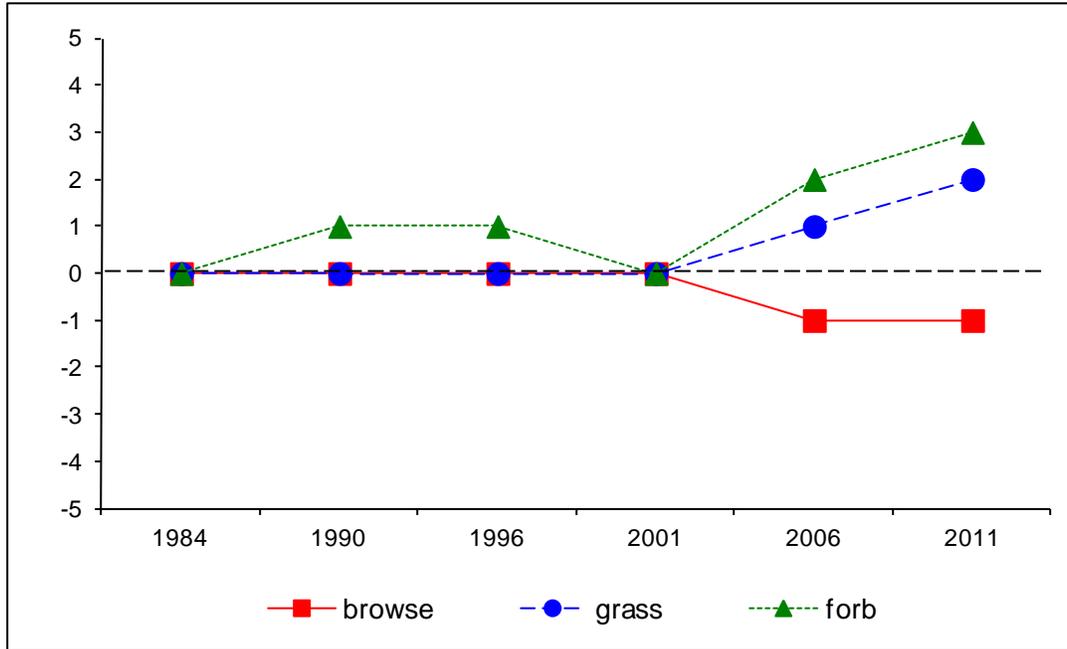
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 4, study no: 14

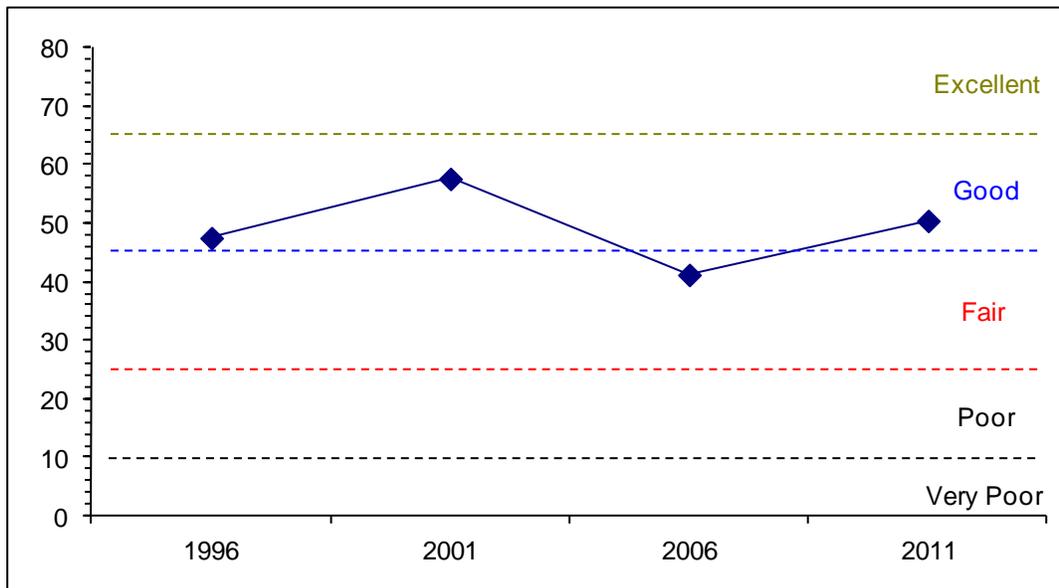
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	18.8	5.8	1.2	12.9	0.0	8.9	0.0	<b>47.5</b>	Good
01	22.9	7.2	0.5	21.7	0.0	5.3	0.0	<b>57.6</b>	Good
06	12.9	-10.9	1.0	30.0	0.0	8.2	0.0	<b>41.2</b>	Fair
11	10.7	0.5	5.1	26.0	0.0	8.1	0.0	<b>50.4</b>	Good

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 4 Study no: 14



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--  
 Management unit 4, Study no: 14



HERBACEOUS TRENDS--  
Management unit 04, Study no: 14

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	a-	a-	a-	ab2	ab1	b5	.00	.15	.15	.18
G	Agropyron smithii	a206	a220	a202	ab215	bc256	c289	1.81	2.99	9.06	5.59
G	Agropyron spicatum	b30	a13	a-	a1	a6	a-	-	.00	.33	-
G	Bromus tectorum (a)	-	-	a-	b16	a-	b28	-	.04	-	.06
G	Oryzopsis hymenoides	a4	ab11	b27	ab19	b24	ab12	.21	.21	1.24	.69
G	Poa fendleriana	-	-	-	7	-	1	-	.06	-	.03
G	Poa secunda	ab205	a178	b234	b231	b244	ab227	4.33	7.26	7.30	5.48
G	Sitanion hystrix	a15	a1	a13	a-	a8	b57	.07	-	.33	.72
G	Stipa comata	a-	a3	a-	a6	ab9	b25	-	.18	.09	.29
Total for Annual Grasses		0	0	0	16	0	28	0	0.04	0	0.06
Total for Perennial Grasses		460	426	476	481	548	616	6.43	10.87	18.53	13.01
Total for Grasses		460	426	476	497	548	644	6.43	10.92	18.53	13.07
F	Agoseris glauca	-	-	-	-	-	5	-	-	-	.01
F	Allium sp.	-	-	-	-	-	7	-	-	-	.04
F	Alyssum alyssoides (a)	-	-	a19	b164	c212	d328	.04	.44	.87	2.17
F	Antennaria rosea	c38	bc38	ab9	a4	c32	c37	.24	.18	.73	1.18
F	Arabis drummondii	-	-	2	-	1	1	.01	-	.00	.00
F	Arenaria sp.	3	-	-	-	-	-	-	-	-	-
F	Aster sp.	-	-	-	-	-	1	-	-	-	.03
F	Astragalus convallarius	-	5	-	1	2	6	-	.01	.03	.06
F	Astragalus sp.	a7	a7	a3	a8	a6	b21	.00	.12	.01	.33
F	Astragalus utahensis	-	1	-	-	-	6	-	-	-	.09
F	Chorispora tenella (a)	-	-	-	-	-	1	-	-	-	.00
F	Cordylanthus ramosus (a)	-	-	-	2	-	-	-	.03	-	-
F	Cryptantha sp.	11	14	4	-	5	5	.06	-	.06	.06
F	Cymopterus sp.	a-	a-	a3	a5	ab11	b24	.01	.04	.02	.07
F	Descurainia pinnata (a)	-	-	-	7	3	7	-	.02	.01	.01
F	Draba sp. (a)	-	-	-	1	-	1	-	.00	-	.00
F	Erigeron pumilus	-	5	7	11	4	10	.01	.12	.01	.02
F	Haplopappus acaulis	1	4	3	1	1	2	.03	.03	.15	.15
F	Lappula occidentalis (a)	-	-	-	5	-	1	-	.01	-	.00
F	Microsteris gracilis (a)	-	-	-	6	-	-	-	.01	-	-
F	Phlox hoodii	a71	ab108	c145	bc110	bc124	abc108	3.79	1.88	2.45	1.28
F	Phlox longifolia	a16	a6	b56	b64	c104	c110	.28	.24	.62	.69
F	Ranunculus testiculatus (a)	-	-	a8	ab17	b39	c197	.02	.03	.08	1.62
F	Senecio integerrimus	-	-	-	1	-	2	-	.00	-	.00
F	Senecio multilobatus	-	-	-	-	2	-	-	-	.03	-
F	Trifolium sp.	5	7	-	1	-	2	-	.00	-	.00
F	Unknown forb-perennial	-	2	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	27	202	254	535	0.07	0.55	0.96	3.82
Total for Perennial Forbs		152	197	232	206	292	347	4.44	2.65	4.12	4.05
Total for Forbs		152	197	259	408	546	882	4.51	3.20	5.08	7.88

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

BROWSE TRENDS--

Management unit 04, Study no: 14

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata wyomingensis	88	84	84	81	14.79	18.32	10.03	8.25
B	Atriplex gardneri falcata	7	14	13	12	.53	.09	.37	.49
B	Ceratoides lanata	8	8	8	8	.21	-	.30	.30
B	Chrysothamnus viscidiflorus stenophyllus	82	83	83	86	5.54	4.51	5.53	6.84
B	Opuntia sp.	13	4	9	9	.21	.53	.53	.69
B	Tetradymia canescens	1	2	2	3	-	.15	.15	.15
Total for Browse		199	195	199	199	21.29	23.60	16.92	16.72

CANOPY COVER, LINE INTERCEPT--

Management unit 04, Study no: 14

Species	Percent Cover	
	'06	'11
Artemisia tridentata wyomingensis	10.73	8.51
Atriplex gardneri falcata	.15	.01
Ceratoides lanata	.11	.15
Chrysothamnus viscidiflorus stenophyllus	5.40	10.33
Opuntia sp.	-	-
Tetradymia canescens	.08	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 04, Study no: 14

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata wyomingensis	1.1	-	3.7

BASIC COVER--

Management unit 04, Study no: 14

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	2.00	8.50	28.93	38.24	40.44	35.03
Rock	0	.25	.07	.06	.00	.03
Pavement	0	.75	.63	1.22	.79	.09
Litter	43.25	31.00	27.83	31.87	25.71	28.36
Cryptogams	10.00	18.25	12.77	21.15	12.23	12.52
Bare Ground	44.75	41.25	40.43	31.89	32.98	33.97

SOIL ANALYSIS DATA --

Management unit 04, Study no: 14, Study Name: Chapman Canal

Effective rooting depth (in)	pH	Clay-Loam			%OM	PPM P	PPM K	ds/m
		% sand	% silt	% clay				
10.7	8.0	44.8	26.0	29.3	1.9	5.5	67.2	0.7

PELLET GROUP DATA--

Management unit 04, Study no: 14

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	9	28	38	41	-	-	-
Grouse	-	-	1	1	-	8.7 Groups/Acre	-
Elk	5	2	7	15	5 (13)	15 (38)	11 (26)
Deer/Pronghorn	24	25	56	34	30 (74)	126 (311)	47 (116)
Cattle	1	-	2	9	5 (13)	3 (7)	-

BROWSE CHARACTERISTICS--

Management unit 04, Study no: 14

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata wyomingensis</i>									
84	<b>6798</b>	22	31	47	933	29	60	18	13/19
90	<b>6865</b>	31	26	43	-	50	16	4	15/18
96	<b>3700</b>	2	67	31	20	32	2	9	18/34
01	<b>4040</b>	1	73	26	-	43	3	3	19/33
06	<b>3500</b>	2	10	89	140	3	.57	93	16/29
11	<b>3260</b>	10	39	50	-	34	7	47	14/25
<i>Atriplex canescens</i>									
84	<b>0</b>	0	0	-	-	0	0	0	-/-
90	<b>0</b>	0	0	-	-	0	0	0	-/-
96	<b>0</b>	0	0	-	-	0	0	0	-/-
01	<b>0</b>	0	0	-	-	0	0	0	22/36
06	<b>0</b>	0	0	-	-	0	0	0	-/-
11	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Atriplex gardneri falcata</i>									
84	<b>0</b>	0	0	-	-	0	0	0	-/-
90	<b>0</b>	0	0	-	-	0	0	0	-/-
96	<b>600</b>	0	100	-	-	0	0	0	4/9
01	<b>840</b>	52	48	-	-	2	0	0	3/7
06	<b>840</b>	40	60	-	-	10	0	0	3/7
11	<b>540</b>	0	100	-	-	0	0	0	8/11
<i>Ceratoides lanata</i>									
84	<b>0</b>	0	0	-	-	0	0	0	-/-
90	<b>0</b>	0	0	-	-	0	0	0	-/-
96	<b>300</b>	27	73	-	60	13	0	0	5/7
01	<b>240</b>	8	92	-	-	17	17	0	6/10
06	<b>240</b>	0	100	-	-	33	67	0	5/8
11	<b>220</b>	18	82	-	-	0	0	18	13/15

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Chrysothamnus viscidiflorus stenophyllus</b>									
84	<b>4199</b>	17	75	8	-	6	0	0	10/11
90	<b>4598</b>	19	55	26	-	43	4	3	5/7
96	<b>4260</b>	1	75	23	-	.93	0	4	10/17
01	<b>4240</b>	0	73	26	-	.94	0	4	8/15
06	<b>4180</b>	4	80	15	-	3	1	11	9/14
11	<b>5060</b>	0	99	0	20	0	0	.39	11/18
<b>Leptodactylon pungens</b>									
84	<b>0</b>	0	0	-	-	0	0	0	-/-
90	<b>0</b>	0	0	-	-	0	0	0	-/-
96	<b>0</b>	0	0	-	-	0	0	0	-/-
01	<b>0</b>	0	0	-	-	0	0	0	-/-
06	<b>0</b>	0	0	-	-	0	0	0	-/-
11	<b>0</b>	0	0	-	-	0	0	0	7/19
<b>Opuntia sp.</b>									
84	<b>266</b>	0	100	0	-	0	0	0	4/9
90	<b>466</b>	71	29	0	-	0	0	29	5/3
96	<b>480</b>	0	92	8	-	0	0	0	4/15
01	<b>80</b>	0	75	25	-	0	0	0	3/11
06	<b>200</b>	20	70	10	-	0	0	0	4/9
11	<b>300</b>	0	100	0	-	0	0	0	4/13
<b>Tetradymia canescens</b>									
84	<b>133</b>	0	100	0	-	100	0	0	7/14
90	<b>0</b>	0	0	0	-	0	0	0	-/-
96	<b>20</b>	0	0	100	-	0	0	100	8/7
01	<b>40</b>	0	100	0	-	0	0	0	7/10
06	<b>40</b>	0	100	0	-	0	50	50	8/21
11	<b>60</b>	0	100	0	-	0	0	0	11/22