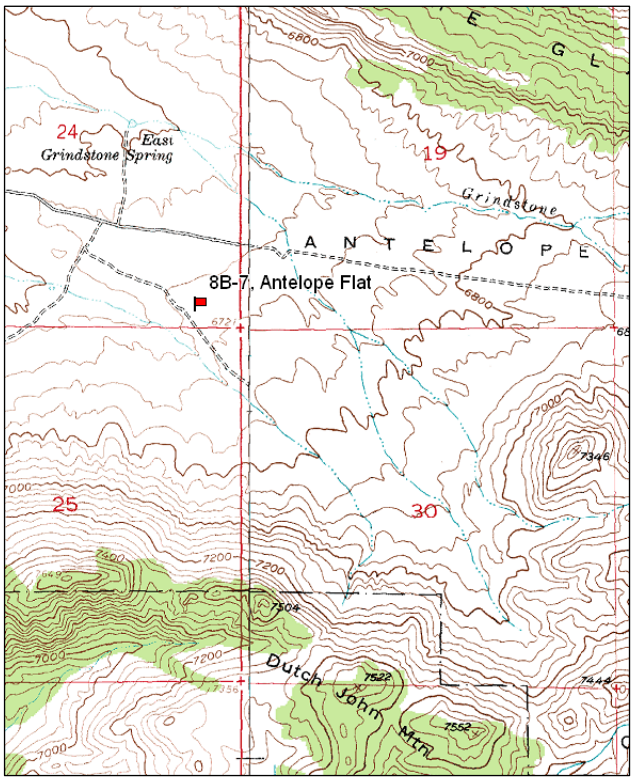
ANTELOPE FLAT - TREND STUDY NO. 8B-7-10

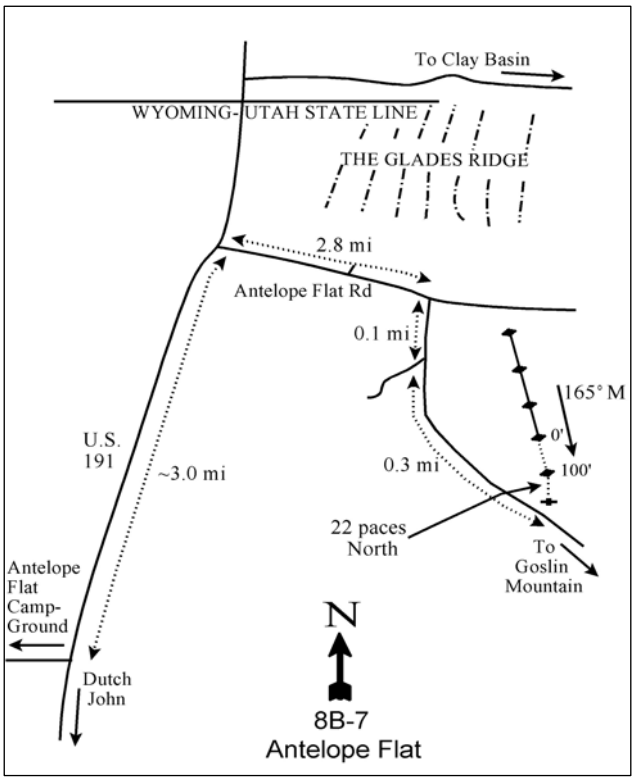
Vegetation Type: Wyoming Big Sagebrush-Grass
Range Type: Substantial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: SANDY (10-14W), R034XY250WY
Land Ownership: BLM
Elevation: 6650 ft. (2027 m)
Aspect: Northwest
Slope: 2%-3%
Transect bearing: 165° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft.), line 4 (71ft). Belt 2 rebar @ 1ft.

Directions:
From Dutch John, proceed north toward Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road towards Goslin Mountain. Go 2.8 miles and turn right towards Goslin Mountain. Go 0.l miles to a fork. Bear left on the main fork toward the mountain and proceed 0.3 miles to a witness post on the north side of the road. From the witness post walk approximately 100 feet (22 paces) north into the sagebrush to the 100-foot end of the baseline. The 0-foot end of the frequency baseline is 100 feet north.

Map Name: Dutch John



Diagrammatic Sketch:



Township: 3N Range: 22E Section: 24

GPS: NAD 83, UTM 12T 636313 E 4537522 N

ANTELOPE FLAT - TREND STUDY NO. 8B-7

Site Information

Site Description: This study was established on Antelope Flat, a long sagebrush (*Artemisia spp.*) covered valley that stretches from Flaming Gorge Reservoir, east to Goslin Mountain. The study is located at the base and north side of Dutch John and the Goslin Mountains. The area was treated by lop and scatter in the fall of 2006 as part of the Goslin Mountain P/J Encroachment Removal (WRI Project #297) to remove encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Deer and antelope can be found in the valley year round, while elk from Goslin Mountain also utilize the lower valleys as winter range. Due to difficulties in differentiating between species, deer and antelope pellets were all classified as deer. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Goslin Mountain allotment. Pellet group transect data has estimated light use by elk, deer/antelope, and cattle since 2000. Grouse pellets have also been sampled along the transect and grouse sign has been noted in multiple years (Table - Pellet Group Data).

Browse: The site supports a moderately dense stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), which provides the majority of the browse cover on the site (Table - Browse Trends). The Wyoming big sagebrush is a moderately used mature population with moderate to high decadence over the sample years. Poor vigor of sagebrush has been low to moderate in most years, but was high in 2010. Recruitment of young sagebrush plants has generally been fairly poor, but was excellent in 2010. Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) is also numerous and is the only other abundant browse on the site. Small numbers of slenderbush eriogonum (*Eriogonum microthecum*), broom snakeweed (*Gutierrezia sarothrae*) and prickly pear cactus (*Opuntia sp.*) are also found on the site (Table - Browse Characteristics). The small number of Utah juniper (*Juniperus osteosperma*) trees that were scattered over the site had been cut down between 2005 and 2010.

Herbaceous Understory: Grasses are diverse and fairly abundant for a Wyoming big sagebrush site. Cheatgrass (*Bromus tectorum*) has fluctuated in frequency and abundance over the sample years, but was the dominant grass species in 2010. Perennial grass species are generally found growing in close proximity to sagebrush plants. The most abundant perennial grasses include Sandberg bluegrass (*Poa secunda*), mutton bluegrass (*P. fendleriana*) and thickspike wheatgrass (*Agropyron dasystachyum*). A variety of forbs are found on the site, but few of the species are abundant. The most common perennial forb is Hoods phlox (*Phlox hoodii*) (Table - Herbaceous Trends).

Soil: The surface soil is a sandy loam with a neutral reaction (pH 7.0). Phosphorus may have limited availability for plant growth and development at 4.9 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderate, with most occurring in the shrub interspaces, though it decreased in 2010 with a large increase of cheatgrass cover in the shrub interspaces. Cover is also relatively high for cryptogams (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1988 to 1995 - stable (0):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of Wyoming big sagebrush decreased from 47% to 22%, though recruitment of young plants also decreased slightly from 14% to 10%.
- **1995 to 2000 - stable (0):** There was a slight increase in the density of Wyoming big sagebrush, and cover increased from 16% to 20%. However, decadence of sagebrush increased to 46% of the population and poor vigor from 7% to 20%.

- **2000 to 2005 - slightly down (-1):** The density of Wyoming big sagebrush decreased 14% from 5,820 plants/acre to 5,000 plants/acre, though cover increased to 22%. Decadence decreased to 26% and poor vigor to 16%, but both are still considered to be moderately high.
- **2005 to 2010 - slightly up (+1):** Wyoming big sagebrush density increased by 10% to 5,500 plants/acre, but cover decreased slightly to 20%. Recruitment of young sagebrush plants increased from 8% to 29%, but poor vigor also increased to 40% of the population.

Grass:

- **1988 to 1995 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 15%.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover increased from 6% to 10%. Cheatgrass increased significantly in nested frequency and was one of the dominant grasses on the site.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased to 12%. Cheatgrass decreased in cover from 3% to less than 1%, but nested frequency remained similar.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial grasses decreased by 21% and cover decreased to 9%. There was a significant increase in the nested frequency of cheatgrass and cover increased to 10%. Cheatgrass was the dominant grass on the site.

Forb:

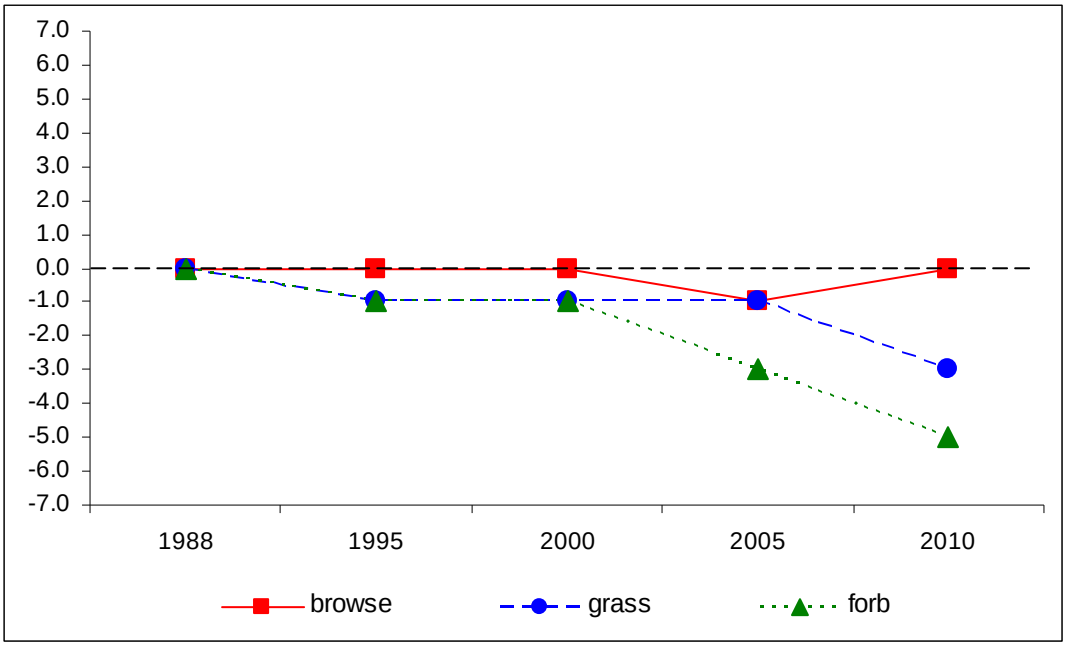
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 14%.
- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover increased slightly from 3% to 5%.
- **2000 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased by 36% and cover decreased to 3%.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 52% and cover decreased slightly to 2%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 8B, study no: 7

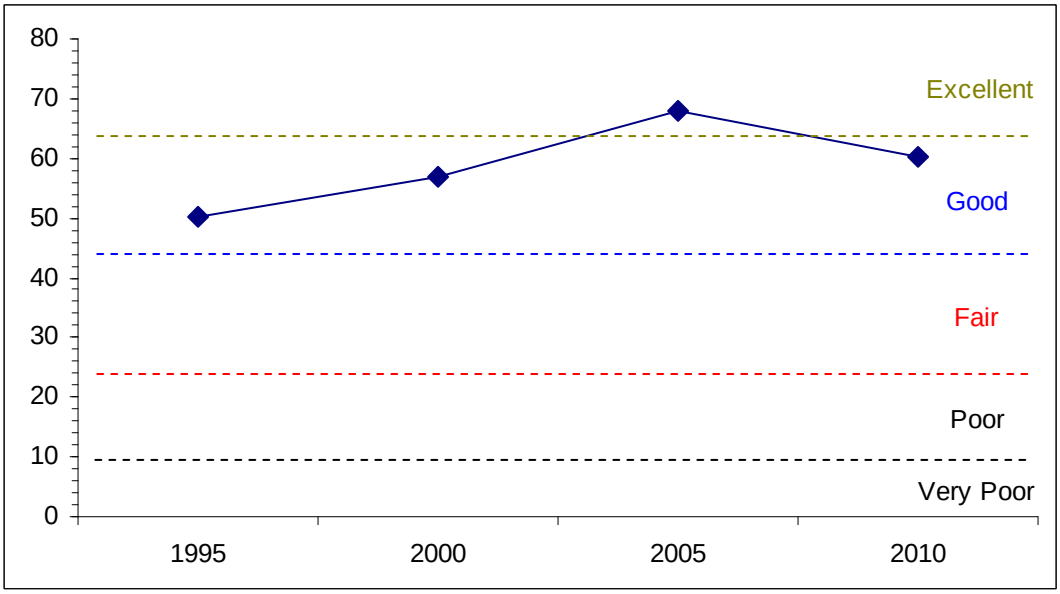
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
95	20.2	8.4	5.0	11.3	-0.4	5.6	0.0	**50.1**	Good
00	24.4	1.2	4.1	19.3	-2.1	10.0	0.0	**56.9**	Good
05	28.1	7.2	4.0	23.9	-0.6	5.4	0.0	**67.9**	Excellent
10	25.1	6.9	14.5	17.2	-7.5	3.9	0.0	**60.1**	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8B, Study no: 7



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 8B, Study no: 7



HERBACEOUS TRENDS--
Management unit 08B, Study no: 7

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	238	190	158	200	170	.83	2.54	2.62	2.22
G	Agropyron spicatum	$_{b}$18	$_{c}$110	$_{b}$22	$_{b}$36	$_{a}$-	.61	.32	.61	-
G	Bromus tectorum (a)	-	$_{a}$66	$_{b}$120	$_{b}$147	$_{c}$272	.50	2.74	.84	10.04
G	Carex sp.	9	-	3	-	-	-	.03	-	-
G	Koeleria cristata	$_{c}$55	$_{a}$-	$_{b}$36	$_{a}$7	$_{a}$1	-	.62	.21	.00
G	Oryzopsis hymenoides	13	20	12	14	7	.20	.25	.29	.04
G	Poa fendleriana	$_{a}$5	$_{a}$32	$_{c}$113	$_{b}$74	$_{a}$8	.43	2.86	2.31	.07
G	Poa secunda	$_{ab}$184	$_{a}$159	$_{ab}$173	$_{a}$165	$_{b}$217	3.00	1.90	4.47	5.52
G	Sitanion hystrix	$_{c}$67	$_{ab}$34	$_{ab}$35	$_{bc}$41	$_{a}$10	.30	1.06	.73	.08
G	Stipa comata	$_{c}$87	$_{b}$31	$_{a}$5	$_{ab}$24	$_{b}$33	.28	.03	.66	.65
G	Vulpia octoflora (a)	-	1	3	9	-	.00	.01	.02	-
Total for Annual Grasses		0	67	123	156	272	0.50	2.75	0.85	10.04
Total for Perennial Grasses		676	576	557	561	446	5.65	9.63	11.93	8.59
Total for Grasses		676	643	680	717	718	6.17	12.39	12.79	18.63
F	Agoseris glauca	$_{a}$-	$_{b}$22	$_{a}$1	$_{a}$6	$_{a}$-	.05	.01	.02	-
F	Allium sp.	$_{ab}$4	$_{b}$11	$_{a}$-	$_{a}$-	$_{ab}$1	.04	-	-	.00
F	Antennaria rosea	$_{c}$62	$_{a}$1	$_{b}$28	$_{a}$2	$_{a}$-	.00	.54	.00	-
F	Arabis sp.	9	10	7	2	2	.02	.01	.00	.00
F	Astragalus convallarius	31	23	29	28	13	.25	.28	.54	.25
F	Chenopodium leptophyllum(a)	-	-	-	1	-	-	-	.00	-
F	Collinsia parviflora (a)	-	$_{c}$57	$_{b}$24	$_{c}$72	$_{a}$1	.25	.14	.25	.00
F	Cordylanthus ramosus (a)	-	$_{d}$187	$_{c}$57	$_{b}$16	$_{a}$-	6.05	.27	.26	-
F	Crepis acuminata	-	3	-	-	-	.00	-	-	-
F	Cymopterus longipes	$_{a}$15	$_{a}$15	$_{b}$39	$_{b}$38	$_{a}$9	.03	.32	.13	.02
F	Descurainia pinnata (a)	-	3	-	-	-	.00	-	-	-
F	Erigeron eatonii	$_{a}$7	$_{a}$19	$_{b}$47	$_{a}$11	$_{a}$8	$_{a}$.08	.51	.05	.06
F	Eriogonum umbellatum	$_{a}$-	$_{a}$-	$_{a}$3	$_{a}$1	$_{b}$12	-	.03	.03	.23
F	Gayophytum ramosissimum(a)	-	$_{b}$17	$_{a}$-	$_{a}$2	$_{a}$2	.03	-	.01	.00
F	Gilia inconspicua (a)	-	10	1	2	-	.02	.00	.00	-
F	Lepidium sp. (a)	-	$_{a}$3	$_{a}$-	$_{a}$-	$_{b}$22	.00	-	-	.09
F	Machaeranthera canescens	-	5	-	-	-	.03	-	-	-
F	Microsteris gracilis (a)	-	$_{c}$118	$_{b}$40	$_{c}$105	$_{a}$4	.42	.08	.38	.00
F	Penstemon humilis	$_{b}$60	$_{b}$54	$_{a}$24	$_{a}$18	$_{a}$2	.45	.11	.25	.06
F	Phlox hoodii	$_{c}$139	$_{b}$95	$_{b}$90	$_{a}$41	$_{a}$44	1.23	2.40	.63	.99
F	Phlox longifolia	$_{d}$153	$_{c}$97	$_{c}$82	$_{b}$41	$_{a}$3	.22	.31	.15	.00
F	Polygonum douglasii (a)	-	$_{b}$45	$_{a}$7	$_{a}$-	$_{a}$-	.09	.01	-	-
F	Ranunculus testiculatus (a)	-	$_{a}$-	$_{a}$3	$_{b}$36	$_{a}$-	-	.00	.10	-
F	Schoencrambe linifolia	$_{a}$-	$_{b}$12	$_{ab}$5	$_{ab}$1	$_{a}$-	.02	.04	.00	-
F	Sphaeralcea coccinea	40	26	26	27	28	.18	.31	.39	.28
F	Trifolium gymnocarpon	$_{a}$-	$_{c}$55	$_{d}$74	$_{d}$76	$_{b}$18	.15	.49	.45	.04
F	Zigadenus paniculatus	-	-	-	-	-	-	-	.00	-
Total for Annual Forbs		0	440	132	234	29	6.88	0.51	1.01	0.10
Total for Perennial Forbs		520	448	455	292	140	2.79	5.37	2.68	1.97

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
Total for Forbs		520	888	587	526	169	9.67	5.89	3.69	2.08

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

BROWSE TRENDS--
Management unit 08B, Study no: 7

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	97	100	96	95	16.13	19.50	22.42	20.11
B	Chrysothamnus viscidiflorus viscidiflorus	90	89	87	84	5.16	6.06	5.94	4.57
B	Eriogonum microthecum	2	4	1	1	.01	.04	.03	-
B	Gutierrezia sarothrae	1	8	5	14	-	.09	.00	.06
B	Opuntia sp.	18	20	17	18	.36	.84	.45	.46
Total for Browse		208	221	206	212	21.67	26.54	28.85	25.22

CANOPY COVER, LINE INTERCEPT--
Management unit 08B, Study no: 7

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	21.91	23.95
Chrysothamnus viscidiflorus viscidiflorus	4.63	5.15
Eriogonum microthecum	-	.03
Gutierrezia sarothrae	.05	.23
Opuntia sp.	.16	.15

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 08B, Study no: 7

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.4	0.9

BASIC COVER--
Management unit 08B, Study no: 7

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	10.25	36.86	47.01	37.95	44.31
Rock	0	.19	.01	.06	.07
Pavement	1.00	.55	.36	.88	.88
Litter	45.50	42.59	46.87	26.57	39.61
Cryptogams	6.00	7.77	5.06	5.35	3.72
Bare Ground	37.25	26.36	35.77	42.08	27.47

SOIL ANALYSIS DATA --
Management unit 8B, Study no: 7, Study Name: Antelope Flat

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.0	7.0	65.4	17.0	17.6	1.7	4.9	118.4	0.8

PELLET GROUP DATA--
Management unit 08B, Study no: 7

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	8	4	55	3	-	-	-
Elk	5	5	8	-	22 (55)	9 (22)	4 (10)
Deer/Antelope	38	1	11	2	8 (19)	8 (20)	13 (31)
Cattle	1	1	6	1	9 (23)	16 (39)	15 (36)
Grouse	-	-	-	2	9/acre	-	-

BROWSE CHARACTERISTICS--
Management unit 08B, Study no: 7

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis									
88	**7197**	14	39	47	533	36	43	6	15/17
95	**5620**	10	68	22	60	54	35	7	18/32
00	**5820**	8	46	46	20	22	4	20	19/31
05	**5000**	8	66	26	7100	5	.80	16	20/29
10	**5500**	29	44	27	560	31	.72	40	20/31
Ceratoides lanata									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	3/7
00	**0**	0	0	-	-	0	0	0	-/-
05	**0**	0	0	-	-	0	0	0	-/-
10	**0**	0	0	-	-	0	0	0	-/-
Chrysothamnus nauseosus									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	-/-
00	**0**	0	0	-	-	0	0	0	-/-
05	**0**	0	0	-	-	0	0	0	22/30
10	**0**	0	0	-	-	0	0	0	-/-
Chrysothamnus viscidiflorus viscidiflorus									
88	**7198**	21	36	43	133	19	9	8	9/8
95	**5840**	12	87	1	60	2	.34	1	10/16
00	**6000**	5	82	13	-	0	0	8	9/15
05	**4700**	3	85	12	-	0	0	3	9/13
10	**4260**	8	76	15	-	0	0	15	12/16

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Eriogonum microthecum									
88	**0**	0	0	-	-	0	0	0	-/-
95	**60**	0	100	-	20	0	0	0	6/8
00	**80**	75	25	-	-	0	0	0	5/4
05	**20**	0	100	-	-	0	0	0	5/5
10	**40**	0	100	-	-	0	0	0	6/6
Gutierrezia sarothrae									
88	**999**	7	93	0	133	0	0	7	5/4
95	**20**	0	100	0	-	0	0	0	9/13
00	**480**	0	100	0	-	0	0	0	5/7
05	**180**	0	100	0	20	0	0	0	6/6
10	**560**	7	86	7	-	0	0	7	10/11
Leptodactylon pungens									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	-/-
00	**0**	0	0	-	-	0	0	0	-/-
05	**0**	0	0	-	-	0	0	0	-/-
10	**0**	0	0	-	-	0	0	0	6/13
Opuntia sp.									
88	**798**	33	42	25	133	0	0	8	4/7
95	**560**	4	96	0	-	0	0	0	3/12
00	**520**	4	85	12	20	0	0	12	4/9
05	**620**	0	84	16	-	0	0	0	5/12
10	**500**	0	100	0	-	0	0	0	5/13