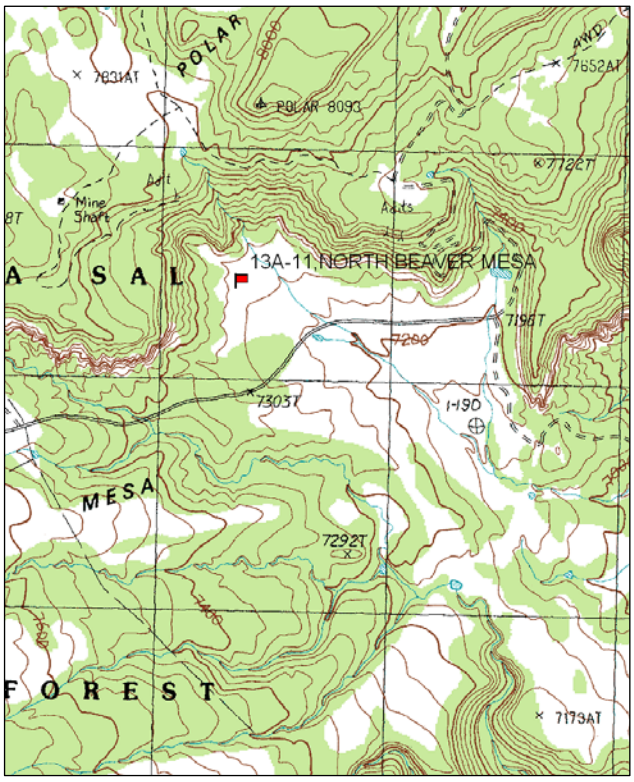
NORTH BEAVER MESA - TREND STUDY NO. 13A-11-09

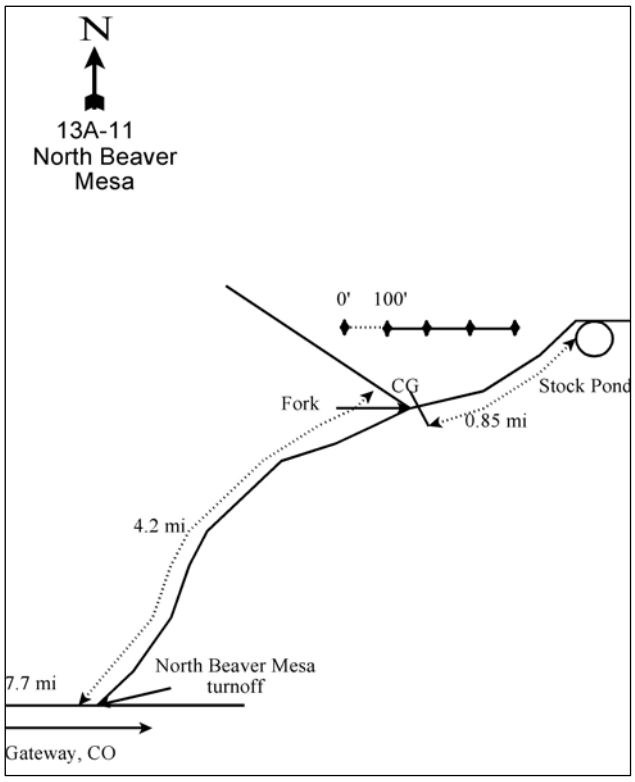
Vegetation Type: Wyoming Big Sagebrush
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Upland Shallow Hardpan (Pinyon-Utah Juniper), R035XY316UT
Land Ownership: US Forest Service
Elevation: 7,300 ft (2,225 m)
Aspect: Southeast
Slope: 5%
Transect bearing: 133 degrees magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:
From the intersection of the La Sal Mountain Loop and Gateway roads, travel east towards Gateway, Colorado for 7.7 miles to the North Beaver Mesa turnoff. Turn left and go 4.2 miles to the Polar Mesa/Fisher Valley Road. Continue straight through this fork, over a cattleguard and 0.85 miles to a stockpond at the head of a large sagebrush valley. The transect is located to the west (300 yards away @ 284°M) towards an alcove. It is marked by l-foot tall fence posts. The 0-foot baseline stake is furthest away and is tagged #7842.

Map Name: Fisher Valley



Diagrammatic Sketch:



Township: 25S, Range: 25E, Section: 10

GPS: NAD 83, UTM 12S 661264 E 4279597 N

NORTH BEAVER MESA - TREND STUDY NO. 13A-11

Site Information

Site Description: The study is in an area on the northeast side of the La Sal Mountains that receives a considerable amount of winter elk use. In 1962, 1,000 acres within the allotment were chained or contour trenched and seeded. A roller-chopper was used to retreat other parts of the allotment in 1985 and 1987, but did not include the study site. The study is located in the upper part of a large sagebrush valley, where the only evidence of vegetative treatments is the partially filled-in contoured trenches and presence of seeded species. The area is administered by the BLM as part of the Beaver allotment with cattle grazing in the spring and fall. Pellet group data has estimated heavy to very heavy use by elk since 1999. Deer use has decreased from moderate use in 1999 to very light use in 2009. Cattle use has ranged from light to moderate on the site since 1999 (Table - Pellet Group Data).

Browse: The key browse on this site is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) which has provided an average of 18% cover since 1994. However, cover of sagebrush has decreased since 1994 (Table - Browse Trends). Density of sagebrush has averaged about 6,700 plants/acre since 1994, and decadence and vigor have been good over that same period. Recruitment of young sagebrush plants has fluctuated over the sample years, but is currently good. Browse use has been mostly moderate on sagebrush (Table - Browse Characteristics).

Pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and Gambel oak (*Quercus gambelii*) dominate the surrounding slopes. Except for a few trees and clusters, they are not abundant in the sagebrush dominated valley bottoms. However, it appears that pinyon is increasing in density on the site (Table - Point-Quarter Tree Data). Other preferred browse that is found on and around the site in limited numbers include Utah serviceberry (*Amelanchier utahensis*), fourwing saltbush (*Atriplex canescens*), and slender bush eriogonum (*Eriogonum microthecum*).

Herbaceous Understory: Since this is elk range, the grass component is especially important. The dominant grass on the site is the seeded species crested wheatgrass (*Agropyron cristatum*), providing almost all of the grass cover on the site. Other perennial grasses are rare on the site. There is a small component of cheatgrass (*Bromus tectorum*) on the site (Table - Herbaceous Trends).

Forbs have good diversity, but provide limited cover on the site. Cover and frequency of perennial forbs has decreased steadily since 1994. The most common forb is hairy goldaster (*Heterotheca villosa*). There are also randomly scattered patches of alfalfa (*Medicago sativa*) which were seldom picked up in the sampling design (Table - Herbaceous Trends).

Soil: The soil is a reddish-brown, sandy loam with an effective rooting depth of 15 inches. The soil is neutral to slightly alkaline (7.4 pH). In contrast, to the east and west of the contour trenches, there are some natural gullies, especially further down in the valley. The trenches unquestionably help to slow down water and soil movement. These water and soil catchments also support the greatest grass cover. The soil erosion condition classification was rated as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1987 to 1994 - stable (0):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. There was little change in decadence or vigor of the sagebrush population. Recruitment of young sagebrush plants remained very good.
- **1994 to 1999 - slightly up (+1):** Density of sagebrush increased by 34% to 8,200 plants/acre, though cover decreased from 24% to 19%. Most of the change in density is from the recruitment of young

sagebrush plants which comprised 22% of the population. Many of these plants may not survive to maturity.

- **1999 to 2004 - slightly down (-1):** Density of sagebrush decreased by 28% to 5,900 plants/acre, and cover decreased to 15%. Most of the decrease in density came from the loss of young plants as the density of mature plants actually increased. Recruitment of young sagebrush plants comprised only 1% of the population.
- **2004 to 2009 - slightly up (+1):** Density of sagebrush increased by 10% to 6,480 plants/acre with little change in cover. Recruitment of young sagebrush plants increased to 12% of the population.

Grass:

- **1987 to 1994 - stable (0):** There was a slight change in the composition of grasses with a significant increase in nested frequency of intermediate wheatgrass (*Agropyron intermedium*) and a significant decrease in nested frequency of crested wheatgrass. There was little change in the sum of nested frequency of perennial grasses.
- **1994 to 1999 - slightly up (+1):** Sum of nested frequency of perennial grasses increased by 16%, and cover increased from 10% to 14%. The nested frequency of crested wheatgrass increased significantly.
- **1999 to 2004 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 19%, and cover decreased slightly to 13%. There was a significant decrease in the nested frequency of intermediate wheatgrass.
- **2004 to 2009 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 11%, and cover increased to 18%.

Forb:

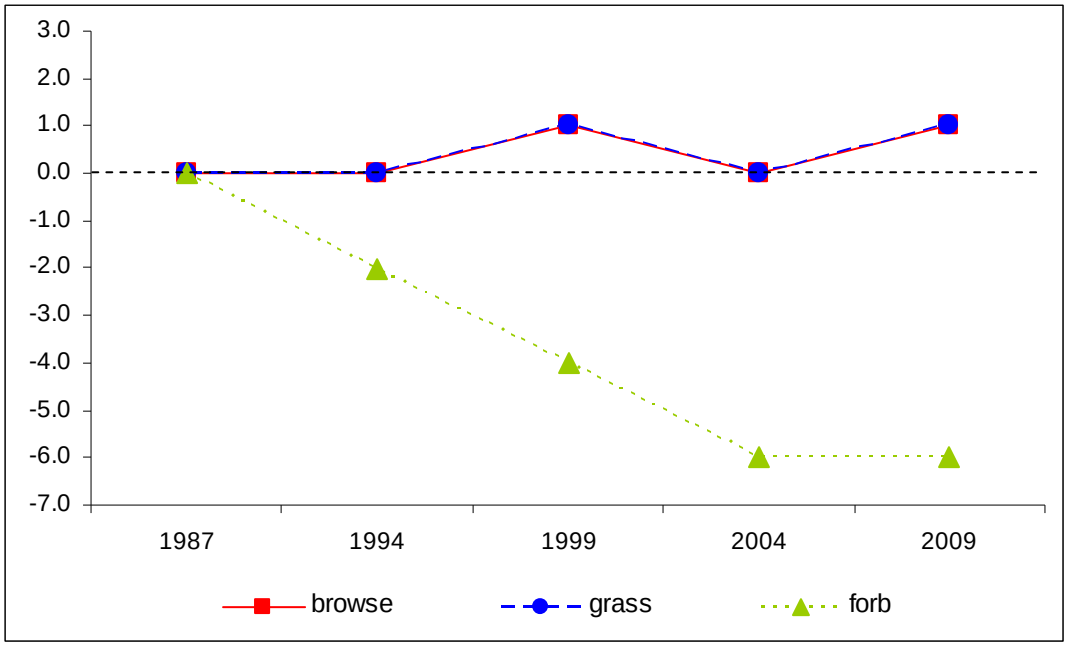
- **1987 to 1994 - down (-2):** The sum of nested frequency of perennial forbs decreased by 33%. There was a significant decrease in the nested frequency of the dominant forb hairy goldaster.
- **1994 to 1999 - down (-2):** The sum of nested frequency of perennial forbs decreased by 29% with a slight decrease in cover.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial forbs continued to decrease by 44%, and cover decreased from 4% to 3%. There was a significant decrease in the nested frequency of the dominant forb hairy goldaster.
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover decreased slightly.

DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 13A, study no: 11

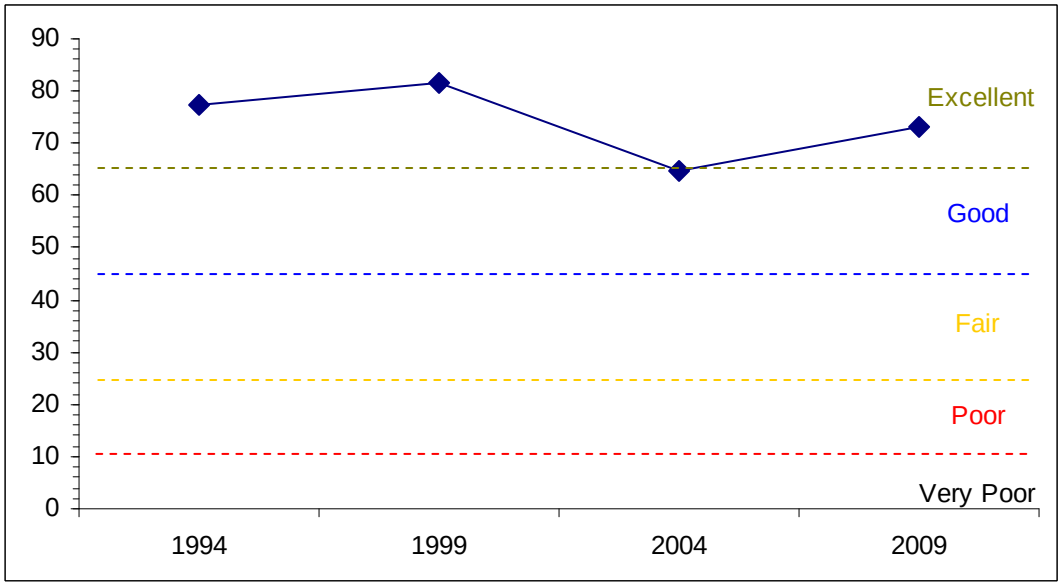
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
94	30	12	9	19	-1	9	0	**77**	Excellent
99	26	10	11	28	0	8	0	**82**	Excellent
04	20	11	2	26	0	6	0	**65**	Good
09	20	12	6	30	0	4	0	**73**	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 13A, Study no: 11



DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE
Management unit 13A, Study no: 11



HERBACEOUS TRENDS--
Management unit 13A, Study no: 11

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	$_{b}$258	$_{a}$232	$_{b}$291	$_{b}$259	$_{b}$283	7.13	12.09	11.28	16.77
G	Agropyron intermedium	$_{a}$41	$_{b}$67	$_{b}$70	$_{a}$34	$_{a}$31	1.58	1.15	1.12	.68
G	Bouteloua gracilis	5	8	5	3	6	.33	.30	.15	.06
G	Bromus inermis	24	13	14	16	22	.36	.24	.25	.46
G	Bromus tectorum (a)	-	42	36	37	24	1.66	.52	.26	.13
G	Sporobolus cryptandrus	$_{a}$-	$_{b}$10	$_{a}$4	$_{a}$-	$_{a}$4	.08	.01	-	.03
G	Stipa comata	-	6	4	4	4	.01	.18	.18	.15
G	Vulpia octoflora (a)	-	2	-	-	-	.00	-	-	-
Total for Annual Grasses		0	44	36	37	24	1.66	0.52	0.26	0.13
Total for Perennial Grasses		328	336	388	316	350	9.50	13.98	13.00	18.17
Total for Grasses		328	380	424	353	374	11.16	14.51	13.26	18.31
F	Alyssum sp. (a)	-	3	-	-	-	.00	-	-	-
F	Arabis sp.	-	1	-	-	3	.00	-	-	.00
F	Artemisia ludoviciana	-	9	3	-	-	.18	.03	-	-
F	Aster sp.	-	-	5	-	3	-	.01	-	.00
F	Astragalus convallarius	8	16	12	22	24	.36	.07	.88	.31
F	Astragalus sp.	8	7	6	10	1	.02	.01	.08	.00
F	Calochortus nuttallii	1	-	-	-	-	-	-	-	-
F	Castilleja linariaefolia	-	-	2	-	-	-	.00	-	-
F	Chenopodium album (a)	-	-	-	3	3	-	-	.01	.06
F	Cruciferae	$_{b}$28	$_{a}$-	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-	-
F	Delphinium nuttallianum	1	-	-	-	-	-	-	-	-
F	Draba reptans (a)	-	4	1	2	-	.01	.00	.03	-
F	Erigeron pumilus	$_{b}$25	$_{ab}$14	$_{b}$18	$_{a}$-	$_{a}$1	.06	.19	.03	.03
F	Eriogonum cernuum (a)	-	2	-	-	-	.00	-	-	-
F	Eriogonum racemosum	27	47	39	34	29	.30	.69	.66	.30
F	Euphorbia sp.	1	-	-	-	-	-	-	-	-
F	Fritillaria atropurpurea	$_{a}$-	$_{b}$10	$_{a}$-	$_{a}$-	$_{a}$-	.02	-	-	-
F	Gayophytum ramosissimum(a)	-	3	-	-	-	.01	-	-	-
F	Heterotheca villosa	$_{c}$214	$_{b}$102	$_{b}$78	$_{a}$26	$_{a}$28	2.76	2.44	.28	.92
F	Lactuca serriola	4	-	-	-	-	-	-	-	-
F	Lepidium densiflorum (a)	-	3	-	-	-	.00	-	-	-
F	Lesquerella ludoviciana	3	2	3	1	-	.01	.00	.00	-
F	Lithospermum ruderale	$_{a}$-	$_{b}$14	$_{a}$-	$_{a}$-	$_{a}$-	.20	-	-	-
F	Machaeranthera canescens	$_{ab}$15	$_{b}$26	$_{ab}$16	$_{ab}$5	$_{a}$4	.05	.31	.04	.06
F	Medicago sativa	-	10	4	10	8	.42	.18	.69	.23
F	Microsteris gracilis (a)	-	$_{ab}$29	$_{a}$17	$_{b}$50	$_{ab}$36	.06	.03	.27	.14
F	Oenothera coronopifolia	$_{c}$39	$_{b}$11	$_{a}$-	$_{a}$-	$_{a}$-	.03	-	-	-
F	Oxybaphus linearis	-	1	-	-	-	.00	-	-	-
F	Petradoria pumila	1	-	-	-	-	-	-	-	-
F	Phlox longifolia	9	4	6	2	8	.01	.03	.01	.04
F	Polygonum douglasii (a)	-	$_{a}$1	$_{a}$8	$_{b}$31	$_{a}$6	.00	.01	.15	.02
F	Ranunculus testiculatus (a)	-	$_{a}$-	$_{a}$-	$_{a}$4	$_{b}$14	-	-	.01	.10

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
F	Senecio multilobatus	3	-	-	-	-	-	-	-	-
F	Sphaeralcea coccinea	11	12	13	5	6	.05	.14	.18	.18
F	Stellaria jamesiana	-	-	-	-	3	-	-	-	.03
F	Tragopogon dubius	$_{b}$17	$_{a}$4	$_{a}$-	$_{a}$-	$_{a}$1	.01	-	-	.03
F	Trifolium sp.	4	-	-	-	-	-	-	-	-
F	Unknown forb-perennial	$_{b}$11	$_{a}$-	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-	-
Total for Annual Forbs		0	45	26	90	59	0.11	0.05	0.47	0.32
Total for Perennial Forbs		430	290	205	115	119	4.54	4.13	2.87	2.16
Total for Forbs		430	335	231	205	178	4.65	4.19	3.34	2.49

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

BROWSE TRENDS--
Management unit 13A, Study no: 11

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	5	3	0	1	.15	.03	-	.00
B	Artemisia frigida	2	4	1	1	.00	.00	.00	.00
B	Artemisia tridentata wyomingensis	77	96	93	94	23.59	19.26	14.63	15.20
B	Atriplex canescens	2	2	2	1	.00	.15	.15	.03
B	Ceratoides lanata	0	0	1	0	-	-	.00	-
B	Chrysothamnus nauseosus	8	6	3	4	.49	.24	.18	.68
B	Eriogonum microthecum	11	14	13	11	.21	.25	.36	.28
B	Gutierrezia sarothrae	30	14	26	28	1.81	.57	2.15	.64
B	Juniperus osteosperma	0	0	0	0	-	-	-	.03
B	Opuntia sp.	8	6	14	18	.11	.09	.21	.49
B	Pinus edulis	0	4	5	4	.53	2.07	1.85	.98
B	Quercus gambelii	0	0	1	1	.85	-	.85	.85
B	Symphoricarpos oreophilus	0	0	2	0	-	-	.00	-
Total for Browse		143	149	161	163	27.76	22.68	20.40	19.19

CANOPY COVER, LINE INTERCEPT--
Management unit 13A, Study no: 11

Species	Percent Cover		
	'99	'04	'09
Amelanchier utahensis	-	-	.25
Artemisia tridentata wyomingensis	-	20.91	23.98
Atriplex canescens	-	-	.30
Chrysothamnus nauseosus	-	.61	.60
Eriogonum microthecum	-	.28	.26
Gutierrezia sarothrae	-	2.11	1.14
Juniperus osteosperma	-	-	.06
Opuntia sp.	-	.50	.08
Pinus edulis	.80	2.73	1.63
Quercus gambelii	.40	.60	.56

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 13A, Study no: 11

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata wyomingensis	1.8	1.0
Ceratoides lanata	3.5	-

POINT-QUARTER TREE DATA--
Management unit 13A, Study no: 11

Species	Trees per Acre		
	'99	'04	'09
Juniperus osteosperma	23	26	24
Pinus edulis	42	53	72

Average diameter (in)		
'99	'04	'09
6.8	3.2	4.3
1.3	2.1	2.0

BASIC COVER--
Management unit 13A, Study no: 11

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	15.75	40.55	40.91	38.89	39.02
Rock	0	.15	.15	.15	.15
Pavement	0	.42	.11	.02	.03
Litter	43.50	41.52	40.15	43.83	54.77
Cryptogams	3.50	1.58	3.35	2.40	2.57
Bare Ground	37.25	30.21	29.78	30.00	23.43

SOIL ANALYSIS DATA --
Management unit 13A, Study no: 11, Study Name: North Beaver Mesa

Effective rooting depth (in)	pH	sandy loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.1	7.4	70.9	11.8	17.3	1.6	8.9	92.8	0.4

PELLET GROUP DATA--
Management unit 13A, Study no: 11

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	19	5	17	13
Horse	-	1	-	-
Elk	55	52	51	30
Deer	26	20	12	6
Cattle	-	5	-	6

Days use per acre (ha)		
'99	'04	'09
-	-	-
1 (2)	-	-
155 (383)	102 (251)	77 (190)
46 (114)	3 (7)	1 (3)
17 (42)	7 (18)	27 (66)

BROWSE CHARACTERISTICS--
Management unit 13A, Study no: 11

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Amelanchier utahensis									
87	**0**	0	0	-	-	0	0	0	-/-
94	**100**	60	40	-	-	0	20	0	15/11
99	**60**	100	0	-	-	0	0	0	36/34
04	**0**	0	0	-	-	0	0	0	17/15
09	**20**	0	100	-	-	100	0	0	28/24
Artemisia frigida									
87	**599**	100	0	-	66	0	11	0	-/-
94	**100**	0	100	-	-	0	0	0	8/9
99	**100**	0	100	-	-	0	0	0	10/5
04	**20**	0	100	-	-	0	0	0	14/10
09	**20**	0	100	-	-	0	0	0	13/13
Artemisia tridentata wyomingensis									
87	**10332**	49	32	19	733	38	4	2	19/22
94	**6140**	18	70	12	2340	31	4	11	16/28
99	**8200**	22	59	19	460	52	10	5	24/36
04	**5900**	1	87	12	-	45	19	6	18/26
09	**6480**	12	78	9	40	30	10	4	20/29
Atriplex canescens									
87	**0**	0	0	-	-	0	0	0	-/-
94	**60**	33	67	-	-	67	0	0	16/19
99	**80**	75	25	-	-	25	0	0	20/15
04	**40**	0	100	-	-	0	100	0	20/14
09	**60**	0	100	-	-	0	0	0	18/19
Ceratoides lanata									
87	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	-/-
04	**20**	0	100	-	-	0	100	0	14/4
09	**0**	0	0	-	-	0	0	0	7/4

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Chrysothamnus nauseosus									
87	**331**	20	60	20	-	20	20	40	34/25
94	**240**	25	67	8	20	0	0	17	29/26
99	**200**	40	40	20	-	0	0	0	20/32
04	**100**	0	80	20	-	0	0	0	20/20
09	**100**	0	80	20	-	0	0	20	28/33
Eriogonum microthecum									
87	**599**	100	0	0	-	0	0	0	-/-
94	**620**	23	77	0	60	13	0	0	11/8
99	**540**	15	78	7	-	7	19	0	7/6
04	**380**	0	95	5	-	11	37	5	10/8
09	**440**	14	86	0	20	0	0	0	12/10
Gutierrezia sarothrae									
87	**665**	90	10	0	-	0	0	0	6/5
94	**1820**	8	91	1	400	0	0	1	10/11
99	**1200**	13	87	0	-	50	0	0	8/8
04	**1540**	0	100	0	-	0	0	0	10/12
09	**2220**	4	95	2	-	0	0	2	7/10
Opuntia sp.									
87	**266**	0	100	0	66	0	0	50	4/14
94	**280**	0	100	0	-	0	0	0	4/9
99	**160**	38	63	0	-	0	0	0	5/13
04	**460**	0	100	0	-	0	0	0	5/15
09	**560**	7	89	4	20	0	0	11	4/10
Pinus edulis									
87	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**80**	75	25	-	20	0	0	0	-/-
04	**100**	80	20	-	-	0	0	0	-/-
09	**80**	75	25	-	20	0	0	0	-/-
Quercus gambelii									
87	**0**	0	0	0	-	0	0	0	-/-
94	**0**	0	0	0	-	0	0	0	-/-
99	**0**	0	0	0	-	0	0	0	-/-
04	**180**	56	22	22	-	22	0	22	29/28
09	**100**	20	80	0	-	0	0	0	-/-
Symphoricarpos oreophilus									
87	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	-/-
04	**40**	50	50	-	-	0	0	0	13/17
09	**0**	0	0	-	-	0	0	0	-/-