

UTAH BIG GAME RANGE TREND STUDIES 2010 Volume I Northeast Region



**PUBLICATION NUMBER 11-14
REPORT FOR FEDERAL AID PROJECT W-82-R-55**

**STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES**

**UTAH BIG GAME
RANGE TREND STUDIES
2010 Volume I**

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Performance Report for Federal Aid Project W-82-R-55

Publication No. 11-14

UTAH DEPARTMENT OF NATURAL RESOURCES
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Reports for all regions, with accompanying photographs, are available online at <http://wildlife.utah.gov/range/>.

PROGRAM NARRATIVE

State: UTAH

Project Number: W-82-R-55

Grant Title: Wildlife Habitat Research and Monitoring

Project Title: Wildlife Habitat Monitoring/Range Trend Studies

Need: The ability to detect changes in vegetation composition (range trend) on big game winter ranges is an important part of the Division's big game management program. The health and vigor of big game populations are closely correlated to the quality and quantity of forage in key areas. The majority of the permanent range trend studies will be located on deer and elk winter ranges, however on certain management units, studies will be located on spring and/or summer ranges, if vegetation composition on these ranges is the limiting factor for big game populations. Range trend data are used by wildlife biologists for habitat improvement planning purposes, reviewing BLM and USFS allotment management plans, and as one of several sources of information for revising deer and elk herd unit management plans.

Objective: Monitor, evaluate, and report range trend at designated key areas throughout the state, and inform Division biologists, public land managers and private landowners of significant changes in plant community composition in these areas.

Expected Results or Benefits: Range trend studies in each region will be reread every five years, and vegetation condition and trend assessments will be made for key areas. DWR biologists, land management personnel from the USFS and BLM, and private landowners will use the range trend database to evaluate the impact of land management programs on big game habitat. Annual reports will be readily available on the Division's website, on CDs, and in hard copies located in DWR regional offices, BLM and USFS offices, and public libraries. Special studies (habitat project monitoring and big game/livestock forage utilization studies) will give DWR biologists and public land managers additional information to address local resource management problems.

REMARKS

The work completed during the 2010 field season and reported in this publication involves the reading of interagency range trend studies in the DWR Northeast and Southeast Regions. Most trend studies surveyed in these management units were established in the 1980's and reread at 5 year intervals.

The following Bureau of Land Management and U.S. Forest Service offices provided information and/or assistance in completion of the trend studies which add to the value of this interagency report:

Bureau of Land Management

- Price Field Office
- Vernal Field Office
- Moab Field Office

Ashley National Forest

- Vernal Ranger District
- Roosevelt Ranger District
- Duchesne Ranger District
- Flaming Gorge National Recreation Area

Wasatch-Cache National Forest

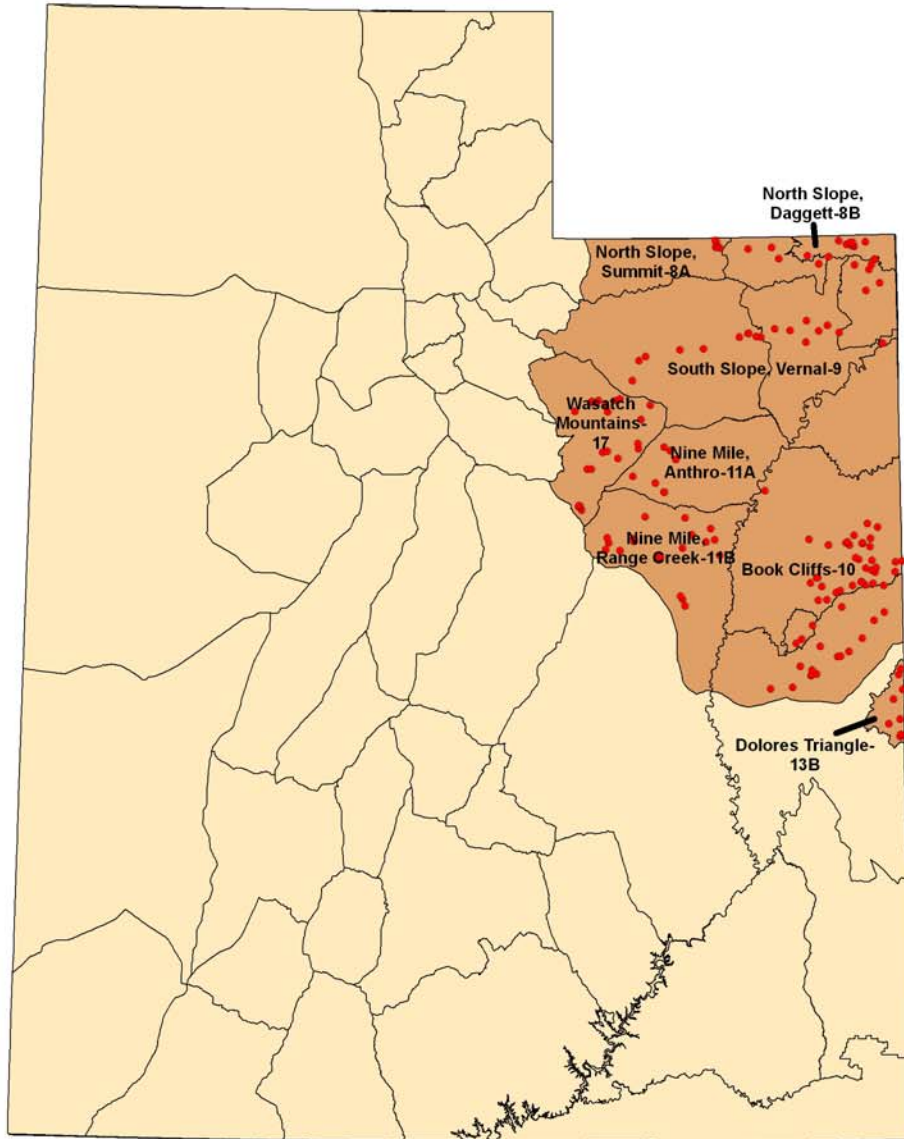
- Mountain View Ranger District

Ute Indian Tribe Natural Resources

- Fort Duchesne, Utah

Private landowners were cooperative in allowing access to study sites located on their land.

Utah Management Units Surveyed in 2010



RANGE TREND STUDY METHODS

Studies monitoring range trend depend greatly on site selection, especially when dealing with large geographic areas such as wildlife management units. Since it is impossible to intensively monitor all vegetation or habitat types within a unit, it is necessary to concentrate on specific sites and/or “key” areas within distinct plant communities on big game ranges. These “key” areas should be places where big game has demonstrated a definite pattern of use during normal climatic conditions over a long period of time. Trend studies are located within these areas of high use and/or crucial habitat as agreed upon by DWR, BLM, and USFS personnel. Often, range trend studies are established in conjunction with permanently marked pellet group transects. Once a “key” area has been selected, specific placement for sampling is determined. The sampling grid is carefully placed in order to adequately represent the surrounding area. All sampling baselines are permanently marked by half-high steel fence posts. The first, or “0 foot baseline stake”, is marked with a metal tag for proper identification of the transect.

Vegetation Composition

Determining vegetation characteristics for each “key” area is determined by setting up 5 consecutive 100 foot baseline transects in the area of interest. This 500 foot line is the baseline and one, 100 foot belt is placed perpendicular to each 100 foot section of the baseline at random foot marks and centered on the 50 foot mark. The beginning of each belt is marked by a rebar stake to ensure a more precise alignment of the originally sampled belt. A 1/4 m² quadrat is centered every 5 feet along the same side of the belt, starting at the 5 foot mark. Cover and nested frequency values are determined for vegetation, litter, rock, pavement, cryptogams, and bare ground. Cover and nested frequency values are also estimated for all plant species occurring within a quadrat, including annual species. However, prior to 1992 no data was collected for annual species.

Percent Cover: Cover is determined using an ocular cover estimation procedure using 7 cover classes (Bailey and Poulton 1968, Daubenmire 1959). The seven cover classes are: 1) .01-1%, 2) 1.1-5%, 3) 5.1-25%, 4) 25.1-50%, 5) 50.1-75%, 6) 75.1-95%, and 7) 95.1-100% (Figure 1). For example, to estimate vegetation cover with this method, an observer would visualize which cover class all the vegetation would fit into if the plants were moved together until they were touching. To quantify percent cover for bare ground, litter, rock, pavement, and cryptogams, the observer would visually estimate which cover class could accommodate all of the specified cover type within the quadrat. These numbers are then recorded. To determine percent cover for each belt, the midpoint for each cover class value observed is summed and divided by the number of sampling quadrats (20). The mean for the five belts is the average for a given site.

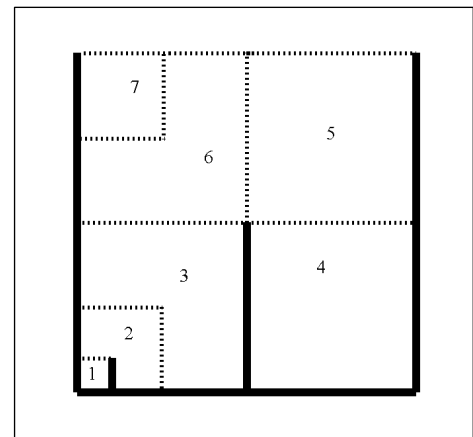


Figure 1. Cover classes of the 1/4 m² sampling quadrat.

Total canopy cover of shrubs or trees is estimated using the line-intercept method (¹U.S. Department of Interior Bureau of Land Management 1999). The distance along each belt covered by a particular species of tree or shrub is divided by the total length of the line to give percent canopy cover. Prior to 2002, only canopy cover above eye level was estimated. After 2002 all canopy cover both above and below eye level was estimated.

Nested Frequency: Nested frequency values for the quadrat range from 1-5 according to which area or sub-quadrat the plant species or cover type is rooted in. The notation for each sub-quadrat is as follows: 5 = 1% of the area, 4 = 5% of the area, 3 = 25% of the area, 2 = 50% of the area, and 1 = the remainder of the quadrat. Each time a particular plant species or cover type occurs within the quadrat, it is scored relative to which of the smallest nested quadrats it is rooted in (in the case of vegetation) or where it first occurs (for all other cover

types). The highest possible score is 5 for each quadrat occurrence and 100 per belt, for a possible score of 500 for each species or cover type at a given site (Figure 2).

Higher nested frequency scores represent a higher abundance for that plant species or cover type. These summed values are used to help determine changes in trend and composition through time. Nested frequency has been found to be a more sensitive measurement for changes taking place within plant communities than quadrat frequency (Smith et al. 1987, Smith et al. 1986, Mosley et al. 1986). Plant cover and density values are not reliable indicators of trend for herbaceous species and can fluctuate greatly with precipitation and time of season sampled. Therefore, plant cover and density values can be misleading if used independently and do not necessarily indicate changes in composition and/or distribution of key plant species.

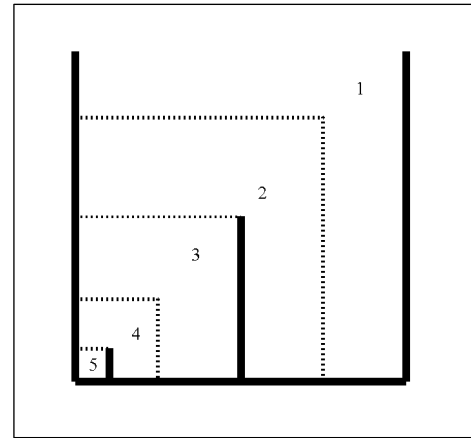


Figure 2. Nested frequency sub-quadrats of the 1/4 m² sampling quadrat.

Nested frequency and average percent cover data for individual grass and forb species are summarized in the “Herbaceous Trends” table of each study discussion. Nested frequency and average cover of vegetation, rock, pavement, litter, cryptogams, and bare ground are summarized in the “Basic Cover” table of each study discussion.

Shrub Density & Characterization: Shrub densities are estimated using five, 1/100th acre strips centered over the length of each 100 foot belt. All shrubs rooted within each strip are counted and categorized using a modified Cole Browse Method (U.S. Department of Interior Bureau of Land Management 1999):

Seedling: Plants up to three years old which have become firmly established, usually less than 1/8-inch diameter.

Young: Larger with more complex branching. Does not show signs of maturity. Usually between 1/8 and 1/4-inch diameter.

Mature: Complex branching, rounded growth form, larger size, seed is produced on healthy plants. Generally larger than 1/4-inch diameter.

Decadent: Plant, regardless of age, that is in a state of decline, usually evidenced by 25% or more dead branches.

Dead: A plant which is no longer living.

Shrubs are also rated according to their availability and the amount of use they display, and placed in one of nine form classes:

1. All available, lightly hedged.
2. All available, moderately hedged.
3. All available, heavily hedged.
4. Largely available, lightly hedged.
5. Largely available, moderately hedged.
6. Largely available, heavily hedged.
7. Mostly unavailable.
8. Unavailable due to height.
9. Unavailable due to hedging.

Lightly hedged: 0 to 40 percent of twigs browsed.

Moderately hedged: 41 to 60 percent of twigs browsed.

Heavily hedged: Over 60 percent of twigs browsed. Degree of hedging is based on leader use over the past three years: current annual growth is not included.

Largely available: One-third to two-thirds of plant available to animal.

Mostly unavailable: Less than one-third of plant available to animal.

Unavailable: In classifying browse to a form class, unavailability may be the result of height, location, or density.

Shrubs are also rated on their health and placed into one of four vigor classes:

1. Normal and vigorous.
2. Insect infested or diseased.
3. Poor vigor - chlorotic or discolored leaves, smaller than normal stems or leaves, flowering restricted, partially trampled, pulled up, or otherwise damaged. Stunted growth, partial crown death.
4. Dying - substantial portion of crown dead (more than 50%), more extreme than 3 above. Probably an irreversible condition.

In addition, each mature shrub species closest to every 10 foot mark along a sampling belt is measured to determine average height and crown. This allows a maximum sample of 50 plants per species to be measured at a given site depending on their respective densities. Annual leader growth is estimated for key browse species at each study site. This is done by measuring five leaders on the closest mature shrub in each quarter (similar to point-center quarter method) from 3 stakes along the study site baseline (0', 200' and 400' stakes). These numbers are then averaged. Tree density is determined using the point-center quarter method (Cottam and Curtis 1956) at 100 foot intervals along the baseline measuring to a maximum of 15 meters. If trees are rare due to a treatment or wildfire, the sampling area is extended to 200 foot intervals measuring to a maximum of 30 meters, and 300 feet is added to the end of the transect so that five, 200 foot point-quarter centers can be read. This allows sampling trees on a much larger scale. The strip method that is used to estimate shrub density can, in most cases, effectively inventory seedling and young tree densities. However, the strip method is less effective at estimating densities of mature trees that are often widely disbursed.

Prior to 1992, shrub frequency was determined using the nested frequency method that was previously described. It was found that nested frequency of shrubs did not usually reflect accurate trends in shrub populations which had particularly low or high densities. Therefore, beginning in mid-1992, each 1/100th acre shrub strip is divided into 20, five foot segments. To give a more accurate measure of shrub frequency, presence or absence of shrub species is determined within these strip segments, and this measurement is termed strip frequency. For example, if a species was rooted in 25 of the 100 shrub strips, strip frequency for this species would be 25%. This data along with shrub cover is recorded in the "Browse Trends" table.

Trend Determination

The methods described above rely on relative and absolute measurements of plant composition as determined from the frequency, cover, and density data. In addition, estimates of plant vigor, average height and crown diameter, form class, and age class are utilized to characterize shrub populations.

Browse: Particular attention is given to woody plants and their important role as indicators on crucial big game winter ranges. A variety of parameters are used to help determine trend for key browse species through time. These include:

- 1) changes in density or number of plants/acre
- 2) proportion of cover contributed by key species
- 3) recruitment or proportion of young plants in population
- 4) proportion of decadent plants
- 5) proportion of plants in poor vigor
- 6) changes in height and crown diameter measurements for mature age class
- 7) changes in browse species composition
- 8) strip frequency values

Herbaceous Understory: Trends in herbaceous plants as a group or as a single “key” species are determined by comparing the sum of nested frequency values between readings. Attention is also given to changes in species composition of grasses and forbs through time. A non-parametric statistical test, the Friedman test (analogous to analysis of variance) (Conover 1980), is conducted on nested frequencies of each species to determine significant changes at $\alpha = 0.10$.

Soil: Ground cover parameters are analyzed and compared in the discussions of the reread studies, but no actual trend is determined. Beginning in 2002, an erosion condition class assessment adapted from the Bureau of Land Management was also completed on each study site to provide additional qualitative information on soil condition.

Data Interpretation

The following tables and partial tables are taken from study number 13A-1 to help illustrate how to read the data and some basic comparisons that can be made with the data.

Herbaceous Understory: The “Herbaceous Trends” table summarizes the average cover and nested frequency data for individual grass and forb species. The table contains all the grass and forb species that have been sampled on study 13A-1. Readings prior to mid-1992 include only nested frequency data for **perennial** species. Beginning in mid-1992, all trend studies have data for **perennial** and **annual** species, as well as cover estimates for individual species. In the following example, trend is determined using the change in the sum of nested frequency and cover of perennial grasses, and the change in composition of grasses determined by each species nested frequency and cover.

As shown in the “Herbaceous Trends” table, the undesirable species bulbous bluegrass (*Poa bulbosa*) was the most common species in nested frequency on the site in all sample years. The subscript letters indicate that the nested frequency value for *P. bulbosa* declined significantly between 1999 and 2004. Cover of *P. bulbosa* was estimated at a high of 8.01% in 1999 to a low of 2.43% in 2004. Trend for this grass species is down over the life of the study due to a significant decline in sum of nested frequency and a decrease in cover, though the decrease in this species is desirable for the grass trend of the site. The more desirable species crested wheatgrass (*A. cristatum*) has also decreased in nested frequency over the life of the study, but the decrease was only significant between the 1987 and 2009 sample years. Grasses had a combined total cover value of 11.52% in 1994, 13.89% in 1999, 11.35% in 2004 and 7.32% in 2009. These changes would indicate a slightly downward perennial grass trend over the life of the study. The forb trend can be determined in a similar manner.

HERBACEOUS TRENDS--

Management unit 13A, Study no: 1

T y p e	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	b135	ab106	ab100	ab112	a81	2.46	2.50	4.81	2.00
G	Agropyron intermedium	-	-	3	2	3	-	.03	.00	.03
G	Bouteloua gracilis	15	19	17	13	17	1.07	.14	.53	.30
G	Bromus inermis	75	67	63	68	92	.63	2.40	1.00	1.35
G	Bromus tectorum (a)	-	-	3	-	-	-	.00	-	-
G	Hilaria jamesii	-	-	-	2	-	-	-	.03	-
G	Koeleria cristata	b61	a3	a19	a3	a-	.03	.18	.01	-
G	Oryzopsis hymenoides	-	3	3	3	8	.00	.00	.03	.07
G	Poa bulbosa	b220	b256	b250	a129	a136	7.14	8.01	2.43	2.86
G	Poa fendleriana	a-	b16	d53	cd55	bc24	.06	.38	1.24	.33
G	Sitanion hystrix	6	1	-	-	-	.00	-	-	-
G	Stipa comata	b48	a14	bc24	bc30	a21	.11	.23	1.24	.36
Total for Annual Grasses		0	0	3	0	0	0	0.00	0	0
Total for Perennial Grasses		560	485	532	417	382	11.52	13.89	11.35	7.32
Total for Grasses		560	485	535	417	382	11.52	13.90	11.35	7.32
F	Astragalus convallarius	b40	bc17	ab25	b37	a9	.10	.42	.99	.10
F	Calochortus nuttallii	8	-	-	1	-	-	-	.00	-
F	Castilleja chromosa	b38	a4	a-	a-	a-	.01	-	-	-
F	Castilleja linariaefolia	-	2	1	-	-	.01	.03	-	-
F	Comandra pallida	-	-	-	3	-	-	-	.01	-
F	Cordylanthus sp. (a)	-	-	-	5	5	-	-	.16	.01
F	Crepis acuminata	b14	a6	a-	a-	a-	.03	-	-	-
F	Erigeron flagellaris	-	-	3	-	1	-	.15	-	.00
F	Erigeron pumilus	b111	a21	a43	a20	a12	.07	.51	.53	.08
F	Eriogonum racemosum	b63	a30	a34	a25	a28	.14	.30	.35	.21
F	Hymenoxys acaulis	3	-	3	1	-	-	.00	.03	-
F	Lomatium triternatum	b31	a-	a-	a-	a-	-	-	-	-
F	Lupinus argenteus	d162	c57	b20	a-	a-	3.64	.14	-	-
F	Machaeranthera canescens	1	-	2	-	-	-	.01	-	-
F	Penstemon caespitosus	85	2	6	6	5	.01	.03	.07	.02
F	Petradoria pumila	-	-	5	-	-	-	.06	-	-
F	Phlox longifolia	c67	bc53	ab31	a7	a17	.14	.06	.05	.10
F	Polygonum douglasii (a)	-	-	-	-	6	-	-	-	.01
F	Senecio multilobatus	-	1	1	-	-	.00	.00	-	-
F	Sphaeralcea coccinea	58	55	52	49	48	1.24	.38	.60	.59
F	Tragopogon dubius	6	-	-	-	-	-	-	-	-
F	Trifolium gymnocarpon	-	3	3	2	-	.00	.00	.00	-
F	Zigadenus paniculatus	-	-	3	-	1	-	.00	.00	.03
Total for Annual Forbs		0	0	0	5	11	0	0	0.15	0.01
Total for Perennial Forbs		693	251	232	151	121	5.43	2.15	2.66	1.15
Total for Forbs		693	251	232	156	132	5.43	2.15	2.82	1.17

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

Browse: The following “Browse Trends” table summarizes strip frequency and cover for all shrub species occurring on this site. All of the shrubs encountered at study number 13A-1 are listed. For example, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) had a strip frequency of 86 out of a possible 100 in 1994, 82 in 1999 and 85 in 2004 and 2009. Average cover is determined using cover classes in conjunction with the 1/4m² quadrat and estimating the percent of the quadrat covered. In this case, mountain big sagebrush cover was estimated to be 16.28% in 1994, 9.40% in 1999, 10.65% in 2004 and 9.94% in 2009.

BROWSE TRENDS--

Management unit 13A, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	<i>Amelanchier utahensis</i>	18	18	16	20	2.25	3.74	6.50	5.30
B	<i>Artemisia tridentata vaseyana</i>	86	82	85	85	16.28	9.40	10.65	9.94
B	<i>Chrysothamnus depressus</i>	12	26	23	23	.66	.72	1.46	.87
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	86	81	72	72	3.62	4.96	5.00	6.14
B	<i>Coryphantha vivipara arizonica</i>	0	2	5	5	-	.00	.00	.00
B	<i>Eriogonum microthecum</i>	10	16	10	9	.01	.53	.12	.12
B	<i>Gutierrezia sarothrae</i>	0	4	8	4	.01	.04	.15	.03
B	<i>Juniperus osteosperma</i>	0	0	0	0	-	-	-	.15
B	<i>Opuntia</i> sp.	36	35	41	45	.32	.56	1.12	1.33
B	<i>Pinus edulis</i>	0	16	14	10	2.92	3.53	7.21	8.53
B	<i>Purshia tridentata</i>	0	1	1	1	-	.00	.00	.00
B	<i>Quercus gambelii</i>	0	3	3	2	.76	.63	1.48	.76
B	<i>Symphoricarpos oreophilus</i>	3	2	4	2	.00	.00	.00	.00
Total for Browse		251	286	282	278	26.86	24.13	33.72	33.20

To more accurately estimate canopy cover of trees and shrubs, the line-intercept method is used along each 100 foot belt. This data is reported in the “Canopy Cover, Line Intercept” table. For example, mountain big sagebrush had a cover of 13.21% in 2004 and 13.93% in 2009. Compare this to the cover determined using the 1/4m² quadrat cover class method. Prior to 2002, only trees species were sampled in the line-intercept transect above eye level. Beginning in 2002, all woody species were included in the line-intercept transect and a total canopy cover (above and below eye level) value for each was determined.

CANOPY COVER, LINE INTERCEPT--

Management unit 13A, Study no: 1

Species	Percent Cover		
	'99	'04	'09
<i>Amelanchier utahensis</i>	.80	7.25	9.48
<i>Artemisia tridentata vaseyana</i>	-	13.21	13.93
<i>Chrysothamnus depressus</i>	-	1.04	.58
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	4.73	7.25
<i>Eriogonum microthecum</i>	-	.11	.06
<i>Opuntia</i> sp.	-	.65	.71
<i>Pinus edulis</i>	3.59	11.86	13.43
<i>Quercus gambelii</i>	-	1.23	1.43
<i>Symphoricarpos oreophilus</i>	-	-	.08

Beginning in 2002, annual leader growth of the key browse species is measured to get an idea of shrub production and vigor. This data is displayed in the “Key Browse Annual Leader Growth” table. For example, annual leaders on serviceberry (*Amelanchier utahensis*) averaged 1.8 inches and 1.7 inches in length in 2004 and 2009, respectively, while mountain big sagebrush leaders averaged 1.3 inches in both sample years.

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 13A, Study no: 1

Species	Average leader growth (in)	
	'04	'09
<i>Amelanchier utahensis</i>	1.8	1.7
<i>Artemisia tridentata vaseyana</i>	1.3	1.3

The following “Point-Quarter Tree Data” table displays tree density estimates using the point-center quarter method which better estimates density of widely disbursed trees than the shrub density strips. Average basal diameter is also listed in inches. Point-quarter tree data for pinyon estimated 201 trees/acre in 1999, 175 tree/acre in 2004 and 213 trees/acre in 2009, with average basal diameters of 2.1 inches, 2.8 inches and 3.2 inches, respectively.

POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 1

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
<i>Pinus edulis</i>	201	175	213	2.1	2.8	3.2

The “Browse Characteristics” table summarizes characteristics of the shrub community. Only mountain big sagebrush is included in this example. The sagebrush population is characterized by age class, vigor, utilization, and average height and crown for mature plants. Total density in plants/acre for mountain big sagebrush, excluding seedlings, was 3,198 plants/acre in 1987, 4,800 plants/acre in 1994, 4080 plants/acre in 1999, 3,800 plants/acre in 2004 and 3,820 plants/acre in 2009. Seedlings are excluded from the population estimate because with summer drought, many will die by late fall causing great fluctuations in population estimates between sampling dates. Since mid-1992, a larger shrub sample area (more than three times larger) was used to better characterize the shrub populations. Therefore, changes in density (before and after 1992) may not necessarily indicate changes in trend, especially shrub populations that characteristically are clumped and/or have discontinuous distributions. The earlier smaller sample could easily either overestimate or underestimate shrub populations. Other characteristics like percent decadence, percent of the population displaying poor vigor, percent heavy hedging, young recruitment, etc., are given more weight in determining shrub trend when comparing survey years where sample sizes are different.

BROWSE CHARACTERISTICS--

Management unit 13A, Study no: 1

		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>Artemisia tridentata vaseyana</i>										
87	3198	8	79	12	-	42	8	2	13/17	
94	4800	4	54	42	940	13	2	10	18/32	
99	4080	13	63	24	360	41	3	3	21/31	
04	3800	5	73	22	-	33	10	9	15/24	
09	3820	6	68	26	60	34	17	22	17/25	

The data for mountain big sagebrush from study 13A-1 shows the proportion of decadent shrubs in the population was highest in 1994 at 42%, but has been more moderate at an average of 24% since 1999. More seedlings were also encountered in 1994, but recruitment of young plants has been low (< 10%) in all sample years except for 1999. The percentage of plants displaying poor vigor was low in most sample years, but increased to 22% in 2009. Considering all these factors, trend for sagebrush over the life of the study is stable.

Soil: The “Basic Cover” table summarizes average cover of vegetation, rock, pavement, litter, cryptogams, and bare ground. Average cover prior to mid-1992 adds up to only 100%, while cover with the current method (post mid-1992) estimates several layers of plant and ground cover and will usually exceed 100%. For vegetation cover, the previous method only determined basal vegetation cover (15.25% in 1987), while the new method estimates the vertical projection of the crown, or aerial cover (33.38% in 1994, 39.61% in 1999, 42.08% in 2004 and 42.20% in 2009). Therefore, comparisons can be made for all cover measurements except for general vegetation cover.

BASIC COVER--

Management unit 13A, Study no: 1

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	15.25	33.38	39.61	42.08	42.20
Rock	0	.02	.00	.00	.00
Pavement	0	.03	.04	.05	.03
Litter	61.00	46.05	40.37	45.25	50.69
Cryptogams	3.50	1.50	8.07	2.74	2.00
Bare Ground	20.25	32.20	29.56	34.09	22.93

A summary of the soil data is found in the “Soil Analysis Data” table. Effective rooting depth is an average of 25 soil penetrometer readings, 5 of the deepest probes possible near each of the 5 baseline starting stakes. The effective rooting depth is a relative index that can be used for site comparisons with regard to individual species differences, site preferences, and abundance. Chemical and textural characteristics are also listed and were determined by laboratory analysis of a composite soil sample taken near each of the 5 baseline starting stakes.

SOIL ANALYSIS DATA --

Management unit 13A, Study no: 1, Study Name: Two Mile Chaining

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11	6.5	48.2	30.6	21.3	2	8	105.6	0.4

The descriptive terms used for ranges in pH are as follows:

- Ultra acidic < 3.5
- Extremely Acidic 3.5-4.4
- Very Strong Acidic 4.5-5.0
- Strongly Acidic 5.1-5.5
- Moderately Acidic 5.6-6.0
- Slightly Acidic 6.1-6.5
- Neutral 6.6-7.3
- Slightly Alkaline 7.4-7.8
- Moderately Alkaline 7.9-8.4
- Strongly Alkaline 8.5-9.0
- Very Strongly Alkaline > 9.1

Percent organic matter (% OM) refers to the amount of organic matter in the top 12 inches of the soil profile. Parts per million (ppm) of phosphorus (P) and potassium (K) are also included. Values for phosphorus and potassium less than 6 ppm and 60 ppm, respectively, are considered to have low availability for plant growth and development (Tiedemann and Lopez 2004).

The electrical conductivity of the soil is reported in decisiemens per meter (dS/m). Electrical conductivity is related to the amount of salts more soluble than gypsum in the soil. The following classes can be used as a reference.

Non saline	0-2
Very slightly saline	2-4
Slightly saline	4-8
Moderately saline	8-16
Strongly saline	>16

Utilization: The “Pellet Group Data” table summarizes the frequency of animal pellets sampled within the 100 quadrats placed along the sampling belts as well as data from a pellet group transect read parallel to the study site baseline. Quadrat frequency of wildlife and livestock droppings is included in reports done prior to mid-1992. For example in 1994, rabbit pellets were found in 44% of the quadrats placed on study 13A-1, decreasing to just 6% in 1999 and 2004, then increasing again to 34% in 2009. Quadrat frequency of rabbit or big game pellets indicates a relative amount of use by that particular animal. This data can help characterize changes in wildlife use patterns on the site.

It was determined that additional information on pellet groups was necessary. Therefore, a pellet group transect is now sampled in conjunction with the vegetation transects. The pellet group transect utilizes 50, 100ft² circular plots which are placed through the study area. These are usually two parallel transects of 25 plots on each side of the vegetation transect which runs 400 feet to 500 feet in length. The number of recent pellet groups for wildlife (usually deer and elk) and pats for cattle are recorded. That number is then converted to days use per acre (hectare). Rabbit pellet groups are not included in this sample. In the example, elk days use/acre was estimated at 70 in 1999 and decreased steadily to 4 elk days use/acre in 2009.

PELLET GROUP DATA--

Management unit 13A, Study no: 1

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	44	6	6	34
Elk	28	26	11	3
Deer	14	28	15	9
Cattle	-	2	-	1

Days use per acre (ha)		
'99	'04	'09
-	-	-
70 (173)	27 (68)	4 (10)
32 (79)	16 (40)	25 (63)
6 (14)	4 (11)	4 (9)

Desirable Components Index: The desirable components index (DCI) for deer was created by Range Trend Program personnel as a tool to address condition and/or value of winter ranges for mule deer. This index is meant to be a companion to, not a replacement for, the site specific range trend assessments that are found in the annual Utah Big Game Range Trend Studies report. This index was designed to score mule deer winter range based upon several important vegetation components (ie., preferred browse cover, shrub decadence, shrub young recruitment, cover of perennial grasses, cover of perennial forbs, cover of annual grasses and cover of noxious weeds). Although the index may be useful for assessing habitat for other species (ie. sage grouse and elk), the rating system was devised to specifically address mule deer winter range requirements.

This index is used primarily to determine if a particular site has the vegetation components necessary to be a good winter range for mule deer. It can also be used to identify areas where habitat restoration projects may be needed and assist land managers in determining possible rehabilitation options. Because it does not take into account factors such as soil stability, hydrologic function, and other environmental factors, it should not be used to assess a sites function and/or condition as typically used by the Federal land management agencies. Desirable mule deer winter range provides 12-20% of preferred browse cover, 20% or less shrub decadency, and 10% or more of the shrub population is young. The herbaceous understory contains 8-15% perennial grasses cover, 5% perennial forb cover, and less than 5% annual grass cover. Based on these criteria, communities are scored in a 100 point scale using the following system:

Preferred Browse (60 points)

(Preferred Browse species are favorable or crucial to deer and are broken into three categories; Highly Preferred, Preferred and Key).

Preferred Browse Cover (30 pts. possible)

- Highly Preferred species = 1.5 points for each 1% of cover, Preferred species = 1.25 points for each 1% of cover and Key species = 1 point for each 1% of cover (maximum 30 points)

Percent Decadence (15 points possible)

- 0.3 points for each 1% under 50% decadence and -0.3 points for each 1% over 50% decadence (maximum 15 points or minimum -15 points)

Percent Young (15 points possible)

- 0.5 points for each 1% of young

Herbaceous Understory (40 points)

Perennial Grass Cover (30 points possible)

- 2 points for each 1% cover

Perennial Forb Cover (10 points possible)

- 2 points for each 1% cover

Annual Grass Cover (-20 points possible)

- -0.75 points for each 1% cover

Noxious Weeds (State List)

- -2 points for each species present

The Desirable Components Index Ratings are divided into three categories because of different ecological potentials of communities. These categories include low potential (Wyoming Big Sagebrush – Cliffrose – Desert shrubs), mid-level potential (Mountain Big Sagebrush) and high potential (Mountain Brush) categories. The three categories are scored based on the above criteria as follows:

Low potential scale (Wyoming Big Sagebrush – Cliffrose – Desert shrubs)

> 65	Excellent
45-64	Good
25-44	Fair
10-24	Poor
< 10	Very Poor

Mid-level potential scale (Mountain Big Sagebrush)

> 80	Excellent
79-65	Good
64-50	Fair
49-35	Poor
< 35	Very Poor

High potential scale (Mountain Brush)

> 90	Excellent
89-70	Good
69-55	Fair
54-40	Poor
< 39	Very Poor

Black sagebrush (*Artemisia nova*) and Basin big sagebrush (*A. tridentata* ssp. *tridentata*) communities are placed within the low potential or mid-level potential scales based on precipitation and elevation.

Other Information: Management background information, photographs, and knowledgeable plant identification add to the database for each site. Management and background information for each site is obtained from the administering agency. Permanently located photographs are taken including a general view down and back up the baseline. A close-up of each half-high baseline post further characterizes individual sites. Correct plant identification is critical for a complete and accurate site analysis. Species identification mostly follows "A Utah Flora" (Welsh et al. 2003). In some cases, most notably *Agropyron* spp. and *Purshia* spp., the species names used by the Range Trend Study Plant Species List (Giunta 1983), Intermountain Flora (Cronquist et al. 1977) and the Intermountain Range Plant Names and Symbols (Plummer et al. 1977) are retained to maintain continuity and alleviate confusion with earlier published reports.

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REPORT FORMAT

An introductory segment at the beginning of each wildlife management unit categorizes the trend studies and provide references to further information on winter range limits, land ownership patterns, livestock management practices, and management unit objectives.

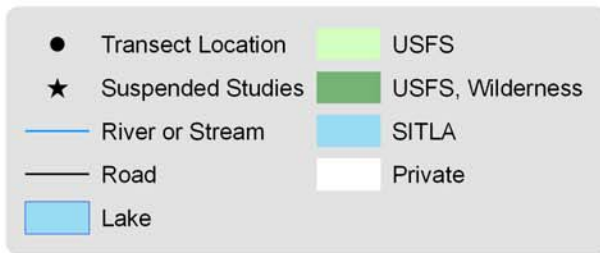
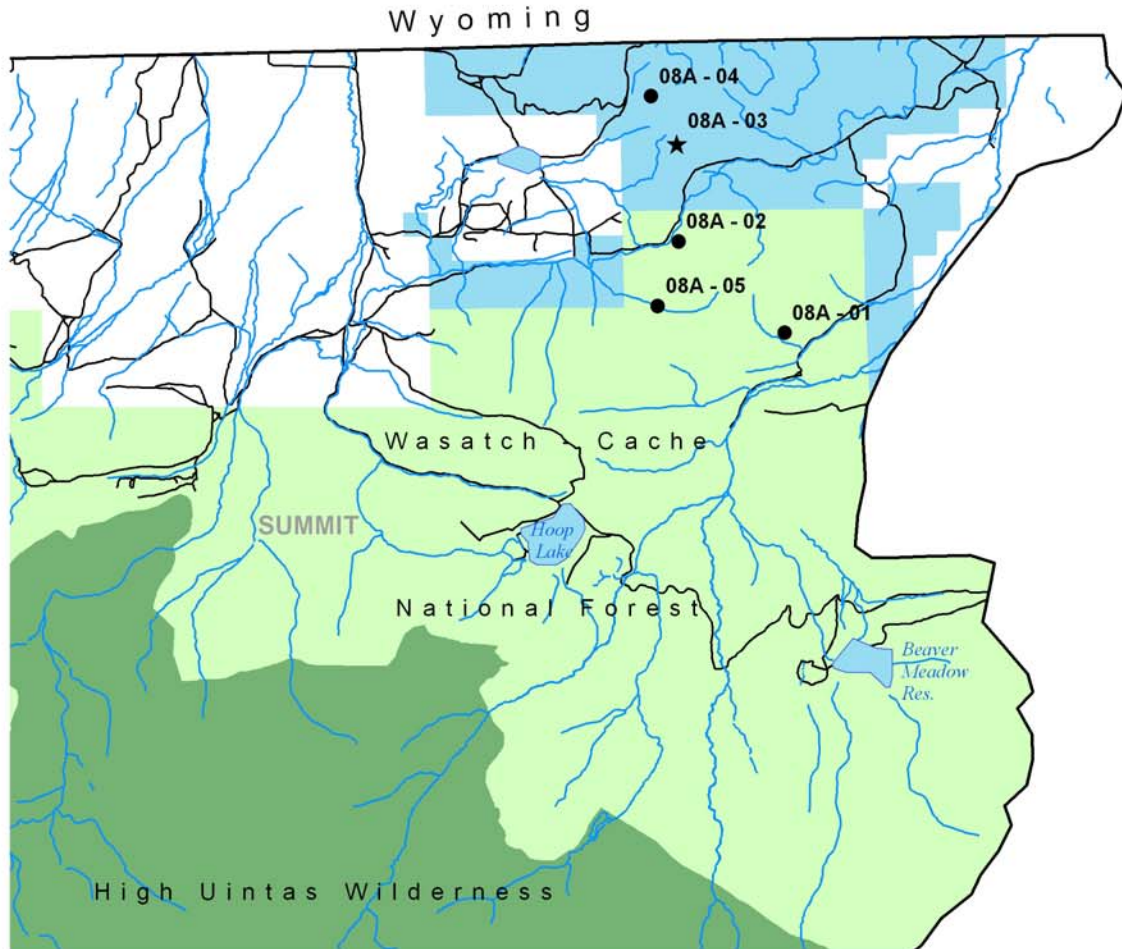
The name and directions for locating the site are given on the location page. Also included on this page are the vegetation type, range type, NRCS ecological site description, land ownership, elevation, aspect, slope, arrangement and diagrammatic sketch of the baseline, and the location on a topographical map. The 7.5 minute topographical map name and public land survey description are located below the map. In addition, UTM coordinates follow the public land survey location. Compass bearings are in degrees relative to magnetic north, unless specified as true north (T).

A discussion of the study site includes descriptions of the site's historic characteristics, soil, ground cover, vegetation community, and species composition. The trend assessment is based upon the comparison of the recent year and the previous years data. Additional assessment is made by comparing photographs from year to year.

Tables with the compiled data follow the study discussions. A computer-generated data summary presents the pooled data for nested frequency, quadrat frequency, basic ground cover, soil characterization, shrub density, and shrub characterization. A nonparametric statistical analysis, the Friedman test, is performed on the nested frequency values between years. This analysis indicates significance levels between species over time at $\alpha = 0.10$. Significant changes are indicated in the herbaceous trends table with subscript letters.

Summaries and evaluations at the end of each management unit address range trends in these key areas. This report will serve to identify and verify changes that are occurring on key areas for big game.

Management Unit 8A



Unit Location



WILDLIFE MANAGEMENT UNIT 8A - NORTH SLOPE, SUMMIT

Boundary Description

Summit County - Boundary begins at the junction of Highway SR-150 and the Summit-Duchesne county line (summit of the Uinta Mountains); north along SR-150 to the Utah-Wyoming state line; east along this state line to the Brunt Fork-Birch Creek drainage divide; south along this drainage divide to the Burnt Fork-Sheep Creek drainage divide; south along this drainage divide to the Summit-Duchesne county line (summit of the Uinta Mountains); west along this county line to SR-150 and beginning point.

Management Unit Description

The North Slope, Summit Wildlife Management Unit is located along the north slope of the Uinta Mountains in Summit County. Unit 8A is a subunit of the North Slope Wildlife Management Unit. The other subunit, 8B, covers Daggett County. Elevation of Unit 8A ranges from 7,500 feet to over 13,000 feet. Habitat varies from sagebrush and mountain brush communities to alpine tundra above the timberline which includes vast expanses of lodgepole pine. Several major drainages are located within the unit including Bear River, Black's Fork, Smith's Fork, Henry's Fork and Burnt Fork. Deer winter range on the Utah side of the border is a major limiting factor on the unit, with many deer wintering in Wyoming.

In previous reports, the four trend study sites in this unit were included in Herd Unit 9 - Daggett. The study areas in Herd Unit 8A emphasize areas around Widdop Mountain and the Bald Range which are just west of the herd units' eastern boundary and the Burnt Fork-Birch Creek drainage divide. This area is considered important winter range for elk, which summer on the north slope of the High Uinta mountains. There is approximately 358,000 acres of crucial elk summer range on the unit, 92% of which is administered by the U.S. Forest Service. Private land owners own the remaining 8%. There is also about 44,600 acres of crucial elk winter range on the unit. The majority of the winter range, just under 50%, is privately owned, 36% is administered by the Forest Service and the state owns approximately 15%.

The key areas for elk winter range are found on the mountain mahogany slopes of Phil Pico Mountain, Bald Range, Widdop Mountain, and Jessen Butte. These areas are mostly public land, although there is a considerable amount of private land in the Birch Creek and Beaver Creek drainages below the U.S. Forest Service boundary. The state of Utah owns several large sections, containing the study areas on Phil Pico Mountain and the Bald Range. Phil Pico Mountain was included with this unit at the outset of studies in the area, but is now within sub-unit 8B and will be discussed in that section. The study sites on Widdop Mountain are in the Wasatch-Cache National Forest.

Range Trend Studies

To meet the need for vegetation trend data on key elk winter ranges on the North Slope of the Uinta Mountains east of Beaver Creek, four interagency range trend studies were established in the area in September 1988 and have continued to be monitored through 2010. All range trend studies in the unit [Widdop Mountain South Slope (8A-1), Widdop Mountain North Slope (8A-2), Bald Range (8A-4) and Telephone Hollow (8A-5)] sample true (birchleaf) mountain mahogany communities. These studies provide a good representation of a majority of the true mountain mahogany winter range in the area. The majority of the studies are located on south-facing slopes, except for the Widdop Mountain North Slope study which is situated on a north slope. These slopes tend to be moderately steep with rocky soil, typical of the dry, coarse, shallow soils.

The study sites receive moderate to heavy use by elk in the winter. Deer use is light to moderate in the winter with some summer use. Most of the sites also show light winter use by moose, and year round antelope use. Degree of winter use by antelope and deer is dependent on weather conditions. All areas are permitted for

livestock grazing. While the valleys are often heavily used by cattle, on-site observations indicate light use or no use on the steep, mountain brush hillsides.

WIDDOP MOUNTAIN SOUTH SLOPE - TREND STUDY NO. 8A-1-10

Vegetation Type: True Mountain Mahogany

Range Type: Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 8666 ft. (2642 m)

Aspect: South

Slope: 26%

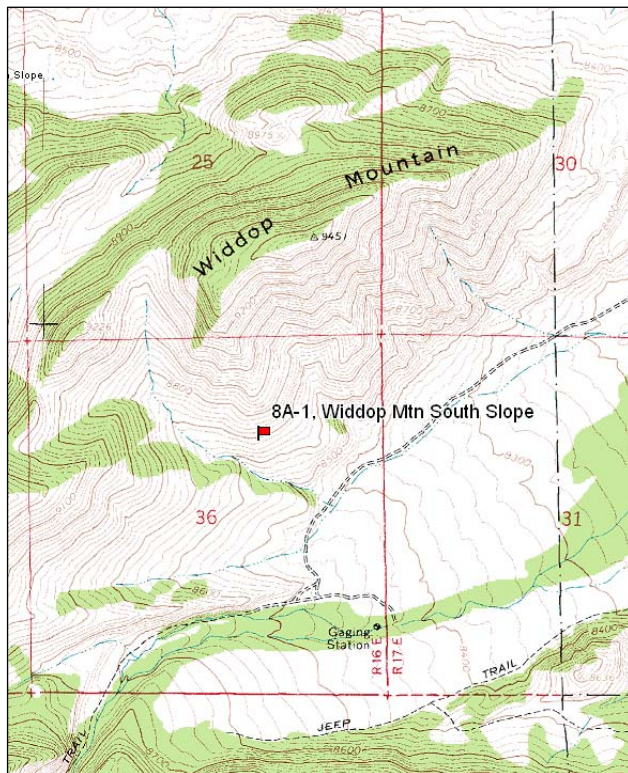
Transect bearing: 154° magnetic

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

Directions:

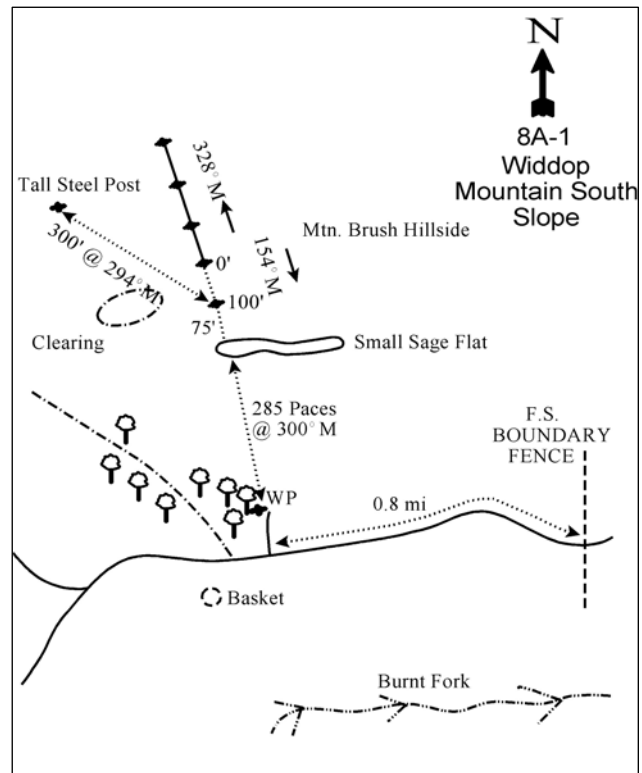
Two miles south of the Wyoming-Utah state line, on the Hoop Lake Road along the Middle Fork of Beaver Creek, turn east toward Gregory Basin. Go 0.6 miles to a private property fence. Continue east 1.1 miles, past a cabin, to a fence. Go 0.1 miles to a fork, continue straight. Go 0.4 miles to an old 4-way intersection south of Gregory Basin. Continue east for 0.7 miles to the Forest Service (FS) boundary fence. Go 0.9 miles (past study 8A-2-00) to another FS fence. Continue 1.8 miles to a gate. Go through the gate and 0.4 miles to a fork. Bear right. Go 2.3 miles southwest back to a FS boundary fence. Proceed 0.8 miles to a faint fork. Turn right and pull up about 50 yards along a small drainage. Stop by a witness post (tall green fencepost) next to a clump of aspens. From here, walk 285 paces at 300°M up the slope. The 0-foot baseline stake is marked by browse tag #7155.

Map Name: Hoop Lake



Township: 3N Range: 16E Section: 36

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 578061 E 4534013 N

WIDDOP MOUNTAIN SOUTH SLOPE - TREND STUDY NO. 8A-1

Site Information

Site Description: The study is located on an open mountain mahogany (*Cercocarpus montanus*) slope that overlooks large sagebrush (*Artemisia spp.*) parks in the Burnt Fork drainage on the south side of Widdop Mountain. The land is administered by the U.S. Forest Service and as part of the Burnt Fork allotment. Cattle that graze the area tend to stay in the valley bottom near water, so livestock use is light on the steep brushy mountain slopes. Slopes similar to the study site receive mostly use from wintering elk. Pellet group transect data has estimated decreasing use by elk from heavy use in 2000 to moderate use in 2010. Estimated deer use was light in 2000 and heavy in 2010, with no deer sign sampled in 2005. Moose also use the site infrequently. Cattle use has been estimated to be light since 2000 (Table - Pellet Group Data).

Browse: True mountain mahogany is the key browse species and provides the majority of the browse cover on the site (Table - Browse Trends). Mahogany is comprised of a dense stand of heavily used plants. Recruitment of young mahogany plants has been excellent throughout the study years, and decadence and poor vigor have been low in the population. Additional preferred browse is provided by serviceberry (*Amelanchier utahensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), winterfat (*Ceratoides lanata*) and bitterbrush (*Purshia tridentata*), but densities are low for these species. Patches of sagebrush tend to dominate the more level areas on the hillside. Smaller plants like mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), gray horsebrush (*Tetradymia canescens*) and broom snakeweed (*Gutierrezia sarothrae*) are fairly common, but are unimportant as forage (Table - Browse Characteristics).

Herbaceous Understory: Grasses on the site are abundant and diverse, with the native perennial species bluebunch wheatgrass (*Agropyron spicatum*) being the dominant grass species. Two other grass species, sedge (*Carex sp.*) and Indian ricegrass (*Oryzopsis hymenoides*), are also prevalent. These three species provide the majority of the grass cover with other grasses being less abundant on the site. Forbs are diverse, but no forb species is very abundant. Thistle (*Cirsium sp.*) and cryptantha (*Cryptantha sp.*) were fairly abundant at the outset of the study, but both significantly decreased in 2005 (Table - Herbaceous Trends).

Soil: The soil is a sandy loam and a neutral soil reaction (pH 6.6) (Table - Soil Analysis Data). Parent material consists of limestone and sandstone from colluvial deposits from Widdop Mountain. The soil profile contains a light colored horizon at approximately 3 to 6 inches in depth that contains calcium carbonate particles. Bare ground cover is low, with large amounts of vegetation and litter cover. Rock cobble and gravel are also common on the soil surface (Table - Basic Cover). Some limited soil movement is apparent in the form of soil pedestals on the uphill side of shrubs and some terracing on the steeper slopes, but erosion does not appear to be a problem on the site due to the abundant vegetation and litter cover. The erosion condition class determined soil movement 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. The population of true mountain mahogany remained healthy with low decadence and good vigor. Recruitment of young plants decreased, but remained excellent at 27% of the population.
- **1995 to 2000 - slightly up (+1):** The density of true mountain mahogany increased by 19% from 4,320 plants/acre to 5,160 plants/acre and cover increased from 22% to 24%. Decadence increased slightly, but remained moderately low at 10%. The mahogany population continued to display good vigor and recruitment of young plants remained excellent.

- **2000 to 2005 - stable (0):** There was little change in the density or cover of true mountain mahogany. Decadence decreased to 2%, vigor remained good, and recruitment of young plants remained excellent.
- **2005 to 2010 - stable (0):** The true mountain mahogany density remained similar. Decadence and poor vigor remained low, and recruitment of young plants remained excellent.

Grass:

- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial grasses remained similar, though cover increased slightly from 16% to 20%.
- **2000 to 2005 - stable (0):** The perennial grass sum of nested frequency remained similar despite a decrease in cover to 12%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased to 17%.

Forb:

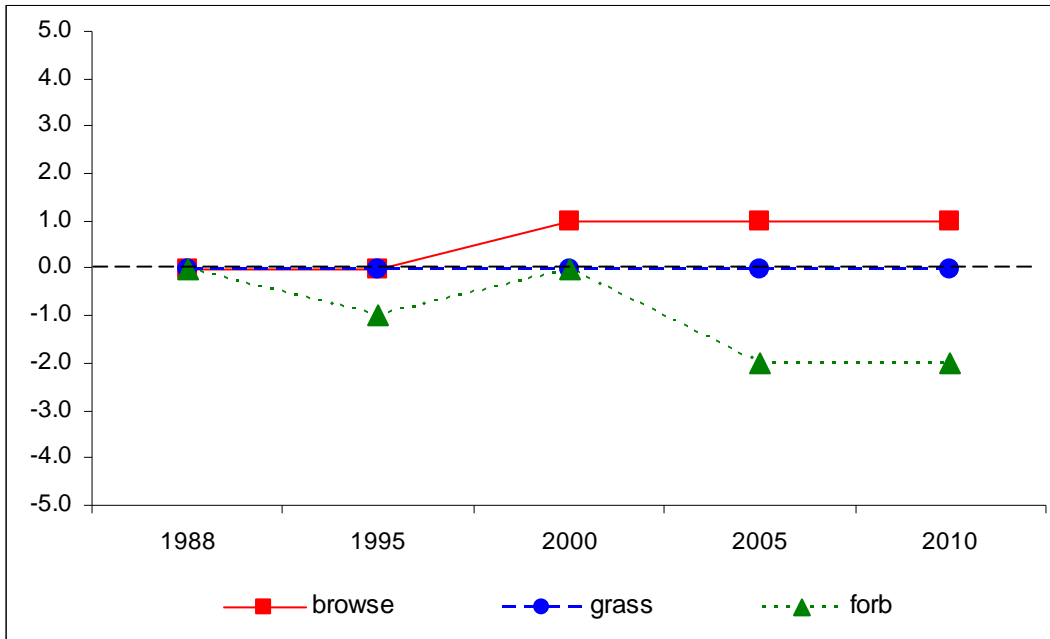
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 14%.
- **1995 to 2000 - slightly up (+1):** The perennial forb sum of nested frequency increased by 13% and cover increased from 4% to 5%.
- **2000 to 2005 - down (-2):** There was a 25% decrease in the sum of nested frequency of perennial forbs and cover decreased to 4%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover decreased to 3%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
Management unit 8A, study no: 1

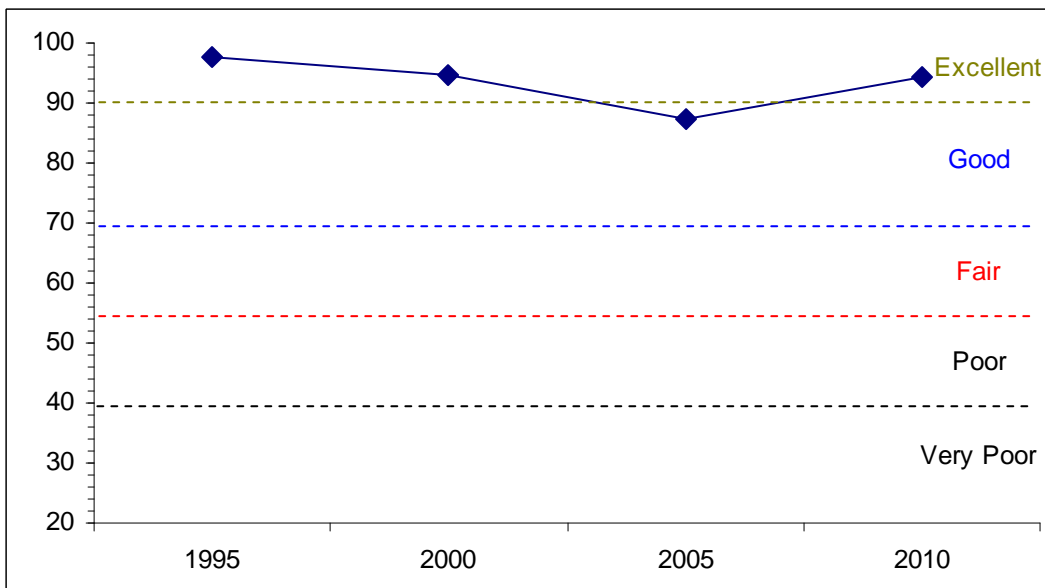
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	15.0	14.1	30.0	0.0	8.6	0.0	97.6	Excellent
00	30.0	11.4	13.1	30.0	0.0	10.0	0.0	94.6	Excellent
05	30.0	13.9	12.7	23.2	0.0	7.7	0.0	87.5	Good
10	30.0	14.6	13.7	30.0	0.0	5.9	0.0	94.2	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 8A, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 8A, Study no: 1



HERBACEOUS TRENDS--
Management unit 08A, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a-	a3	ab12	bc25	c46	.03	.10	.28	.29
G	Agropyron spicatum	a233	b286	b276	a230	ab245	9.56	12.51	5.66	9.63
G	Bromus inermis	-	10	2	3	-	.06	.00	.01	-
G	Carex sp.	b188	a136	ab157	ab172	ab159	3.57	6.02	4.34	5.04
G	Festuca ovina	-	-	4	-	-	-	.03	-	-
G	Koeleria cristata	c60	bc45	ab26	a21	ab34	.58	.23	.20	.35
G	Leucopoa kingii	c23	ab10	b10	a-	b12	.02	.07	-	.10
G	Oryzopsis hymenoides	b65	ab59	ab42	ab51	a37	1.72	1.34	.73	1.63
G	Poa fendleriana	a-	b14	a-	ab5	ab9	.08	-	.04	.16
G	Poa secunda	-	-	1	3	2	-	.00	.06	.03
G	Stipa comata	b40	a6	a-	ab17	a4	.09	-	.26	.06
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		609	569	530	527	548	15.72	20.34	11.60	17.30
Total for Grasses		609	569	530	527	548	15.72	20.34	11.60	17.30
F	Arabis sp.	a-	a3	a-	ab4	b14	.03	-	.01	.03
F	Aster chilensis	10	4	-	-	2	.06	-	-	.03
F	Astragalus sp.	3	-	1	1	4	-	.03	.03	.03
F	Calochortus nuttallii	-	7	2	2	-	.07	.00	.00	-
F	Castilleja sp.	-	-	-	1	-	-	-	.00	-
F	Chaenactis douglasii	-	1	6	1	-	.00	.01	.00	-
F	Chenopodium leptophyllum(a)	-	2	-	-	8	.01	-	-	.01
F	Cirsium sp.	b59	b43	b57	a9	a8	1.62	1.47	.26	.25
F	Comandra pallida	1	1	-	3	3	.03	-	.03	.00
F	Cryptantha sp.	ab42	c90	bc71	a25	a35	1.04	.94	.46	.28
F	Cymopterus sp.	-	-	1	-	-	-	.00	-	-
F	Descurainia pinnata (a)	a14	b54	a1	a-	a-	.22	.03	-	-
F	Eriogonum umbellatum	-	-	1	4	-	-	.00	.03	-
F	Hymenoxys acaulis	2	-	-	1	2	-	-	.00	.00
F	Lesquerella alpina	ab40	a19	b40	a15	b51	.05	.31	.07	.22
F	Leucelene ericoides	21	10	15	18	18	.02	.13	.13	.11
F	Linum lewisii	a2	a5	ab21	b24	ab18	.03	.12	.36	.04
F	Lithospermum ruderaie	a8	b26	ab28	ab26	ab22	.39	.40	.41	.45
F	Machaeranthera canescens	-	-	1	-	-	-	.00	-	-
F	Machaeranthera grindelioides	a4	ab18	b25	b24	ab18	.20	.48	.90	.70
F	Penstemon humilis	b96	a38	a30	a37	a47	.24	.45	.26	.44
F	Phlox hoodii	b51	ab34	ab34	ab37	a16	.42	.60	.67	.11
F	Physaria sp.	-	-	-	17	-	-	-	.04	-
F	Senecio multilobatus	b30	a6	b26	a6	a-	.01	.37	.04	-
F	Taraxacum officinale	a-	ab10	a2	ab7	b16	.03	.03	.02	.11
F	Tragopogon dubius	-	-	1	-	2	-	.00	-	.03
F	Trifolium sp.	-	-	-	-	2	-	-	-	.06
F	Zigadenus paniculatus	4	6	1	9	1	.01	.00	.05	.00
Total for Annual Forbs		14	56	1	0	8	0.23	0.03	0	0.01

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
	Total for Perennial Forbs	373	321	363	271	279	4.29	5.38	3.84	2.94
	Total for Forbs	387	377	364	271	287	4.52	5.41	3.84	2.96

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

BROWSE TRENDS--

Management unit 08A, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	6	5	7	7	1.06	1.52	1.79	.71
B	Artemisia frigida	7	10	8	10	.03	.18	.21	.21
B	Artemisia tridentata vaseyana	5	6	7	2	.66	1.00	.53	.33
B	Ceratoides lanata	2	1	1	1	.01	-	-	-
B	Cercocarpus montanus	93	93	96	95	21.65	24.07	25.18	27.54
B	Chrysothamnus depressus	1	0	0	0	-	-	-	-
B	Chrysothamnus nauseosus hololeucus	0	1	1	1	-	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	23	24	14	14	.48	.33	.63	.54
B	Eriogonum microthecum	16	12	12	13	.12	.34	.16	.36
B	Gutierrezia sarothrae	26	60	66	49	.62	1.49	2.56	1.16
B	Purshia tridentata	1	1	1	1	.03	.15	.03	.38
B	Symphoricarpos oreophilus	4	3	3	4	.15	.41	.38	.06
B	Tetradymia canescens	34	32	28	31	.81	.77	1.10	1.11
	Total for Browse	218	248	244	228	25.66	30.29	32.59	32.43

CANOPY COVER, LINE INTERCEPT--

Management unit 08A, Study no: 1

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	.93	1.91
Artemisia frigida	.28	.11
Artemisia tridentata vaseyana	.20	.06
Cercocarpus montanus	26.58	32.95
Chrysothamnus viscidiflorus lanceolatus	.25	.35
Eriogonum microthecum	.01	.20
Gutierrezia sarothrae	2.75	1.73
Symphoricarpos oreophilus	.50	.25
Tetradymia canescens	.50	.53

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08A, Study no: 1

Species	Average leader growth (in)	
	'05	'10
Cercocarpus montanus	3.2	4.1

BASIC COVER--

Management unit 08A, Study no: 1

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	8.00	39.14	51.17	45.63	55.04
Rock	3.75	6.31	5.54	4.87	3.75
Pavement	18.50	13.45	18.63	17.74	18.45
Litter	57.00	47.96	43.00	34.52	34.65
Cryptogams	0	.00	0	.30	.06
Bare Ground	12.75	10.57	15.58	14.50	8.28

SOIL ANALYSIS DATA --

Management unit 8A, Study no: 1, Study Name: Widdop Mountain South Slope

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.8	6.6	72.0	13.4	14.6	7.0	19.6	208.0	0.6

PELLET GROUP DATA--

Management unit 08A, Study no: 1

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	1	1	-	-	-	-	-
Moose	4	3	9	2	9 (23)	13 (32)	3 (7)
Elk	40	28	23	10	66 (162)	48 (177)	25 (61)
Deer	20	-	4	17	15 (36)	-	52 (127)
Cattle	-	2	3	-	2 (4)	4 (11)	3 (7)

BROWSE CHARACTERISTICS--

Management unit 08A, Study no: 1

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier utahensis									
88	0	0	0	0	-	0	0	0	-/-
95	200	50	50	0	-	30	20	0	27/31
00	120	0	67	33	20	33	50	0	20/28
05	180	0	89	11	-	11	89	0	24/33
10	140	14	71	14	-	29	57	14	25/29

		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>Artemisia frigida</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	140	14	86	-	-	14	0	0	3/8	
00	280	21	79	-	40	0	0	0	2/6	
05	160	13	88	-	-	13	0	0	5/8	
10	260	0	100	-	-	0	15	0	4/7	
<i>Artemisia tridentata vaseyana</i>										
88	332	40	60	0	-	0	0	0	9/15	
95	120	33	67	0	-	50	0	0	7/14	
00	140	0	71	29	-	71	0	14	8/15	
05	160	0	50	50	-	38	38	25	8/16	
10	80	0	25	75	-	50	50	25	8/15	
<i>Ceratoides lanata</i>										
88	66	0	100	-	-	100	0	0	5/4	
95	40	0	100	-	-	0	0	0	6/4	
00	20	0	100	-	-	0	0	0	6/11	
05	20	0	100	-	-	0	100	0	8/7	
10	20	0	100	-	-	0	0	0	15/10	
<i>Cercocarpus montanus</i>										
88	6731	56	38	6	399	32	39	2	26/38	
95	4320	27	72	0	40	44	34	2	31/50	
00	5160	29	60	10	140	29	57	3	23/37	
05	4920	28	70	2	140	8	88	.81	28/43	
10	5120	29	71	0	140	30	27	3	28/40	
<i>Chrysothamnus depressus</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	20	100	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	-/-	
<i>Chrysothamnus nauseosus hololeucus</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	16/16	
10	20	0	100	-	-	0	0	0	14/18	
<i>Chrysothamnus viscidiflorus lanceolatus</i>										
88	398	17	67	17	-	17	0	17	10/11	
95	820	20	80	0	-	0	0	0	9/12	
00	660	0	97	3	-	0	0	0	6/11	
05	420	5	95	0	20	5	0	0	7/13	
10	560	0	100	0	-	0	0	0	8/12	

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>Eriogonum microthecum</i>									
88	0	0	0	0	-	0	0	0	-/-
95	600	3	97	0	-	0	0	0	4/10
00	420	0	90	10	60	0	0	5	4/7
05	300	7	80	13	-	0	0	0	5/10
10	380	0	100	0	-	0	0	0	4/8
<i>Gutierrezia sarothrae</i>									
88	9465	8	92	1	-	0	0	.70	7/5
95	780	3	97	0	-	0	0	0	7/6
00	2520	3	94	2	240	0	0	.79	5/8
05	3800	3	97	0	-	0	0	0	7/11
10	2000	2	98	0	40	1	0	0	7/9
<i>Leptodactylon pungens</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	5/8
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
88	0	0	0	-	-	0	0	0	-/-
95	20	100	0	-	-	100	0	0	-/-
00	20	100	0	-	-	100	0	100	-/-
05	20	0	100	-	-	0	100	0	4/14
10	20	0	100	-	-	0	0	0	6/19
<i>Symphoricarpos oreophilus</i>									
88	0	0	0	-	-	0	0	0	-/-
95	80	0	100	-	-	0	0	0	8/21
00	120	33	67	-	-	33	0	0	9/35
05	60	0	100	-	-	0	0	0	14/30
10	100	0	100	-	-	0	0	0	12/19
<i>Tetradymia canescens</i>									
88	865	46	54	0	66	23	0	8	7/7
95	1280	6	94	0	-	3	0	0	6/8
00	1240	8	81	11	-	8	5	3	6/10
05	960	13	83	4	-	48	27	2	6/11
10	1200	2	98	0	-	17	2	0	7/11

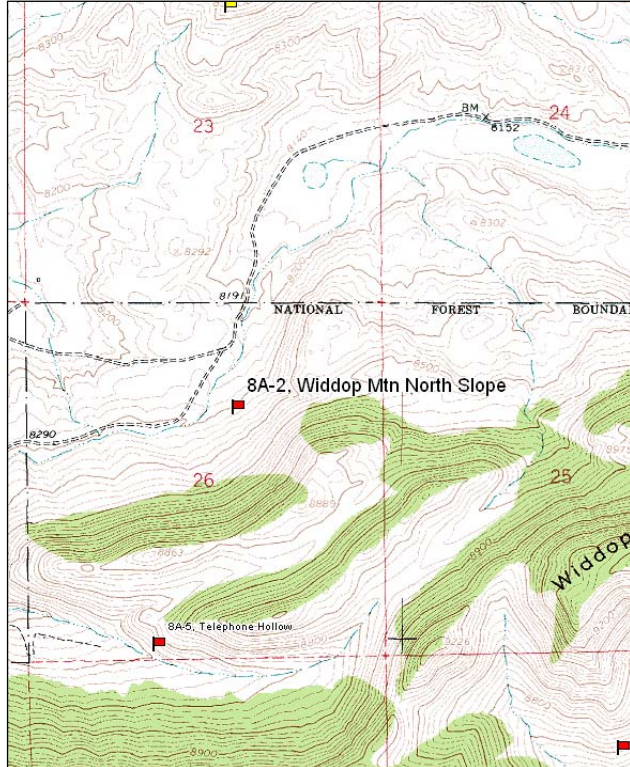
WIDDOP MOUNTAIN NORTH SLOPE - TREND STUDY NO. 8A-2-10

Vegetation Type: True Mountain Mahogany
Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8333 ft. (2541 m)
Aspect: West
Slope: 23%
Transect bearing: 146° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft.), line 4 (71ft).

Directions:

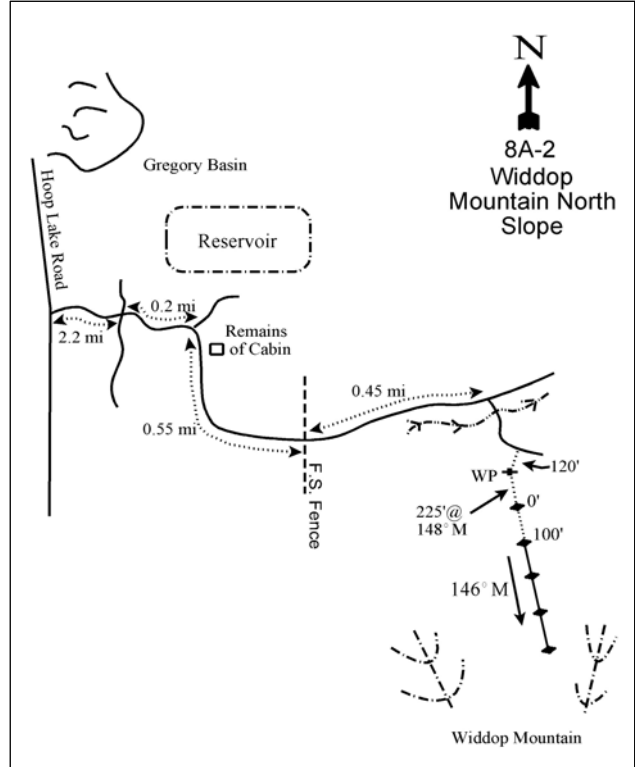
Two miles south of the Wyoming-Utah state line, on the Hoop Lake Road along the Middle Fork of Beaver Creek, turn east toward Gregory Basin. Go 0.6 miles to a private property fence. Continue east 1.1 miles, past a cabin, to a fence. Go 0.1 miles to a fork, continue straight. Go 0.4 miles to an old 4-way intersection south of Gregory Basin. Continue straight east 0.2 miles to an old cabin, bear right. Proceed 0.55 miles to the Forest Service boundary fence. Go along the bottom 0.45 miles to a faint fork. Bear right and go across the stream. Continue east 0.1 miles toward the base of Widdop Mountain. On the south side of the road, look for a witness post in the sagebrush. The 0-foot baseline stake is 225 feet south of the witness post at 148°M.

Map Name: Hoop Lake



Township: 3N Range: 16E Section: 26

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 576306 E 4535528 N

WIDDOP MOUNTAIN NORTH SLOPE - TREND STUDY NO. 8A-2

Site Information

Site Description: The study is located on the opposite side of the mountain from the Widdop Mountain South Slope study site (8A-1). This site samples a true mountain mahogany (*Cercocarpus montanus*) community on a hillside of Widdop Mountain. There is excellent thermal and escape cover provided by a dense conifer stand nearby. The area is managed by the U.S. Forest Service as part of the Burnt Fork allotment. Pellet group transect data has estimated moderate use by elk and light use by deer since 2000. Pellet group data also indicates that moose frequent the area, though use is fairly light. Estimated use by cattle has been light since 2000 (Table - Pellet Group Data).

Browse: The slope is dominated by true mountain mahogany in association with snowberry (*Symphoricarpos oreophilus*). The two species provide the majority of the browse cover on the site (Table - Browse Trends). True mountain mahogany is comprised of a dense population moderately to heavily used plants. The population is a mixture of young and mature plants, with low decadence and good vigor. Snowberry also has a dense population, but has displayed light use over the course of the study. Other preferred browse species include pockets of black sagebrush (*Artemisia nova*), and occasional mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) and serviceberry (*Amelanchier utahensis*). Black sagebrush is found at moderate density, but has displayed little use during the study. Mountain big sagebrush occurs at low density with mostly light use, but has displayed several years of moderate use. Serviceberry has a moderately dense population with moderate to heavy use. The serviceberry population is comprised primarily of young and mature plants, but the proportion of decadent plants has been moderately high in several sample years (Table - Browse Characteristics).

Herbaceous Understory: Perennial grasses are diverse and are moderately abundant. Prominent species include sedge (*Carex* sp.), bluebunch wheatgrass (*Agropyron spicatum*), mutton bluegrass (*Poa fendleriana*) and needle-and-thread (*Stipa comata*). Forbs are diverse and fairly abundant, but common species tend to be low growing forbs like Hoods phlox (*Phlox hoodii*), rose pussytoes (*Antennaria rosea*), sandwort (*Arenaria* sp.) and sulfur eriogonum (*Eriogonum umbellatum*). Desirable species sampled on the site also include yellow Indian paintbrush (*Castilleja flava*), Lewis flax (*Linum lewisii*) and low penstemon (*Penstemon humilus*) (Table - Herbaceous Trends).

Soil: The soil has a loam texture with a slightly alkaline soil reaction (pH 7.4) with relatively high organic matter content. Phosphorus may have limited availability for plant growth and development at 3.4 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). The ground surface is well covered by vegetation and litter, leaving little exposed bare ground (Table - Basic Cover). Aside from some mild soil pedestals around the base of shrubs, there is little soil movement or erosion on the site. The soil erosion condition was classified as stable in 2010, but was slight in 2005 because of pedestals and surface rock movement.

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. Recruitment of young true mountain mahogany plants decreased, but still comprised 44% of the population. The density of young plants and seedlings was very high in 1988. Decadence and vigor remained similar in the mahogany population.
- **1995 to 2000 - stable (0):** The density and cover of true mountain mahogany remained similar. Decadence, vigor, and recruitment of young plants also remained similar.
- **2000 to 2005 - stable (0):** There was a slight increase in the density of true mountain mahogany, but a slight decrease in cover. The other parameters of the mahogany population remained similar.

- **2005 to 2010 - slightly down (-1):** The true mountain mahogany density decreased by 17% from 7,960 plants/acre to 6,620 plants/acre, but cover increased slightly to 19%. Decadence and poor vigor remained low, and recruitment of young plants remained excellent.

Grass:

- **1988 to 1995 - stable (0):** The perennial grass sum of nested frequency remained similar.
- **1995 to 2000 - stable (0):** There was a slight decrease in the sum of nested frequency, but cover increased from 13% to 15%.
- **2000 to 2005 - stable (0):** The sum of nested frequency of perennial grasses increased slightly, but cover decreased to 12%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased to 16%.

Forb:

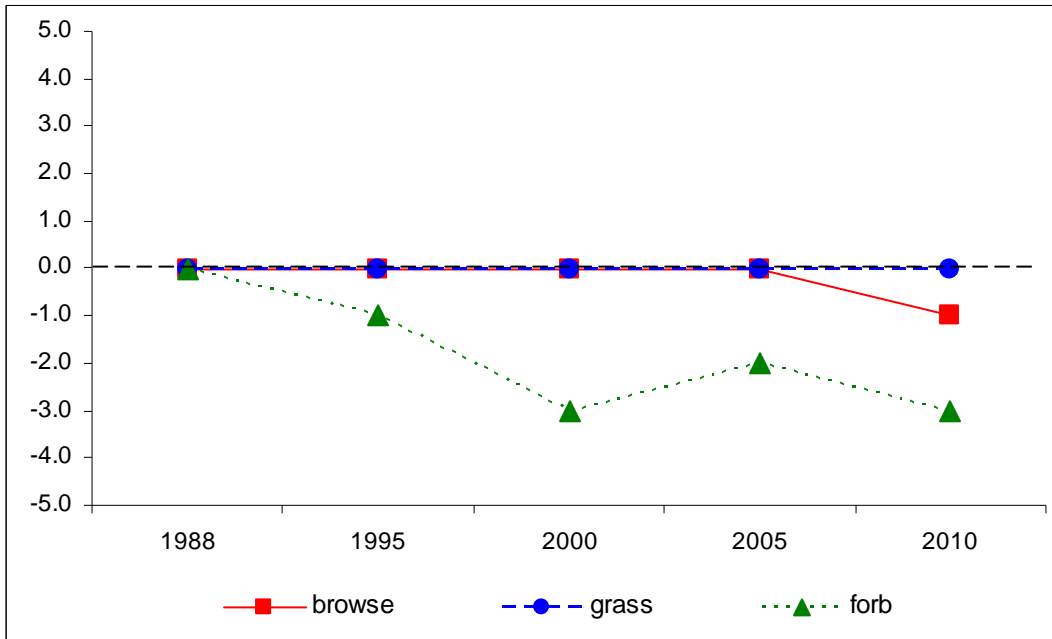
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 18%.
- **1995 to 2000 - down (-2):** There was a 22% decrease in the sum of nested frequency of perennial forbs, but cover remained similar.
- **2000 to 2005 - slightly up (+1):** The perennial forb sum of nested frequency increased by 17% and cover remained similar.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 15%, returning to 2000 levels, despite an increase in cover from 8% to 10%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
Management unit 8A, study no: 2

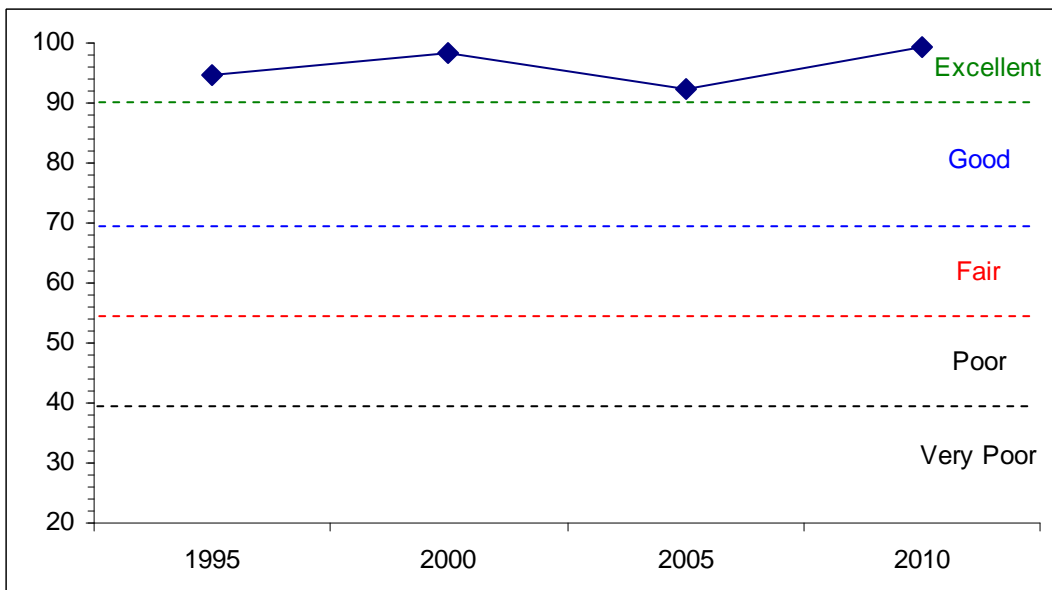
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	14.4	15.0	25.4	0.0	10.0	0.0	94.7	Excellent
00	30.0	13.2	15.0	30.0	0.0	10.0	0.0	98.2	Excellent
05	30.0	13.4	15.0	23.8	0.0	10.0	0.0	92.2	Excellent
10	30.0	14.6	15.0	30.0	-0.1	10.0	0.0	99.5	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8A, Study no: 2



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 8A, Study no: 2



HERBACEOUS TRENDS--
Management unit 08A, Study no: 2

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a-	a-	a7	b36	b36	-	.04	.25	.20
G	Agropyron spicatum	ab151	b154	b169	ab127	a110	2.74	5.26	1.82	2.51
G	Bromus inermis	a-	a3	a-	b20	ab15	.01	-	.11	.42
G	Bromus tectorum (a)	-	-	-	-	3	-	-	-	.15
G	Carex sp.	a59	b115	bc132	b114	c161	2.68	5.48	4.72	7.43
G	Koeleria cristata	a-	b29	b17	b35	b29	.16	.18	.53	.87
G	Leucopoa kingii	c26	bc9	a18	abc2	13	.04	.43	.00	.11
G	Oryzopsis hymenoides	-	3	3	-	-	.15	.03	-	-
G	Poa fendleriana	c104	a17	ab42	a29	b55	.28	2.90	.79	2.27
G	Poa secunda	a-	bc32	bc37	c46	b15	.14	.25	.84	.16
G	Stipa comata	b174	b148	a43	a89	a63	6.46	.67	2.77	2.05
Total for Annual Grasses		0	0	0	0	3	0	0	0	0.15
Total for Perennial Grasses		514	510	468	498	497	12.68	15.27	11.88	16.05
Total for Grasses		514	510	468	498	500	12.68	15.27	11.88	16.20
F	Agoseris glauca	-	-	-	4	5	-	-	.03	.03
F	Allium sp.	-	3	-	-	-	.00	-	-	-
F	Androsace septentrionalis (a)	-	a1	a2	b9	c21	.00	.00	.04	.15
F	Antennaria rosea	17	39	22	12	14	.25	.29	.25	.66
F	Arabis sp.	c33	bc23	ab5	c37	a2	.08	.03	.19	.00
F	Arenaria sp.	bc96	bc101	a58	c111	ab60	1.25	.54	.92	.58
F	Aster sp.	-	-	-	-	6	-	-	-	.01
F	Astragalus convallarius	a-	ab3	b10	ab5	ab6	.03	.15	.04	.04
F	Astragalus sp.	17	25	14	7	14	.20	.06	.07	.07
F	Calochortus nuttallii	-	5	-	3	3	.02	-	.00	.00
F	Castilleja flava	b21	ab10	a6	ab13	ab15	.11	.04	.11	.31
F	Chenopodium leptophyllum(a)	-	8	-	4	-	.01	-	.01	-
F	Crepis acuminata	5	-	-	-	-	-	-	-	-
F	Cruciferae	2	-	-	-	-	-	-	-	-
F	Cryptantha sp.	ab4	a-	b8	ab1	ab7	-	.05	.00	.04
F	Cymopterus sp.	-	-	-	2	-	-	-	.00	-
F	Descurainia pinnata (a)	-	a-	ab5	ab3	b26	-	.01	.00	.22
F	Erigeron eatonii	b90	a32	a22	a15	a14	.08	.11	.12	.06
F	Eriogonum umbellatum	24	25	49	28	30	.62	.68	.96	.68
F	Heuchera parvifolia	b8	ab1	a-	ab5	ab4	.03	-	.04	.07
F	Hymenoxys acaulis	-	7	3	-	4	.03	.15	-	.06
F	Lesquerella alpina	b46	a8	ab23	ab22	ab25	.03	.12	.13	.11
F	Leucelene ericoides	-	-	-	-	7	-	-	-	.04
F	Linum lewisii	ab2	b10	ab5	ab6	a-	.10	.07	.06	-
F	Lithospermum sp.	-	-	-	7	1	-	-	.01	.00
F	Lupinus sp.	b21	a-	a-	a-	a-	-	-	-	-
F	Lychnis drummondii	-	2	3	1	-	.00	.00	.00	-
F	Machaeranthera canescens	a-	ab8	ab6	ab1	b13	.19	.18	.03	.08
F	Machaeranthera grindelioides	-	-	1	5	4	-	.03	.18	.06

T y p e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Microsteris gracilis (a)	-	-	-	-	3	-	-	-	.15
F	Penstemon humilis	_b 92	_b 90	_a 39	_b 81	_{ab} 68	1.05	.64	1.28	1.11
F	Penstemon sp.	-	3	-	-	-	.00	-	-	-
F	Petradoria pumila	3	-	-	-	-	-	-	-	-
F	Phlox hoodii	144	133	113	113	131	3.98	3.90	3.26	5.13
F	Phlox longifolia	_d 143	_c 75	_{bc} 70	_{ab} 36	_a 33	.40	.58	.16	.35
F	Potentilla gracilis	_a -	_c 21	_b 14	_{bc} 16	_c 23	.08	.05	.11	.10
F	Schoenocrambe linifolia	_a -	_a -	_a -	_c 35	_b 8	-	-	.16	.04
F	Sedum lanceolatum	-	-	1	-	-	-	.03	-	-
F	Senecio multilobatus	-	-	7	8	3	-	.09	.10	.06
F	Taraxacum officinale	_a -	_{ab} 1	_a -	_b 8	_{ab} 9	.00	-	.02	.18
F	Zigadenus paniculatus	_b 36	_b 32	_b 32	_{ab} 17	_a 2	.12	.14	.14	.03
Total for Annual Forbs		0	9	7	16	50	0.01	0.01	0.05	0.52
Total for Perennial Forbs		804	657	511	599	511	8.70	7.98	8.44	9.97
Total for Forbs		804	666	518	615	561	8.72	8.00	8.49	10.49

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

BROWSE TRENDS--

Management unit 08A, Study no: 2

T y p e	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	21	29	29	32	1.14	1.81	1.57	1.02
B	Artemisia frigida	0	0	1	0	-	-	-	-
B	Artemisia nova	40	25	30	30	1.20	.97	1.09	1.05
B	Artemisia tridentata vaseyana	3	8	7	6	.41	.66	.53	.78
B	Cercocarpus montanus	97	97	95	94	19.55	19.04	17.77	18.67
B	Chrysothamnus viscidiflorus lanceolatus	80	73	68	76	3.75	3.28	3.94	3.84
B	Eriogonum microthecum	80	78	67	57	2.24	3.62	3.52	1.33
B	Gutierrezia sarothrae	23	16	17	22	.11	.39	.68	.37
B	Mahonia repens	1	2	3	3	-	.03	-	-
B	Pediocactus simpsonii	0	0	1	1	-	-	-	-
B	Pinus flexilis	0	0	1	1	-	-	.00	.03
B	Symphoricarpos oreophilus	82	85	82	83	13.37	12.45	11.01	10.30
B	Tetradymia canescens	26	27	27	30	.34	.45	.21	.44
Total for Browse		453	440	428	435	42.15	42.73	40.36	37.87

CANOPY COVER, LINE INTERCEPT--

Management unit 08A, Study no: 2

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	1.81	1.06
Artemisia nova	.88	.93
Cercocarpus montanus	20.01	26.45
Chrysothamnus viscidiflorus lanceolatus	2.71	4.28
Eriogonum microthecum	3.06	2.56
Gutierrezia sarothrae	.26	.06
Mahonia repens	-	.21
Symphoricarpos oreophilus	16.56	18.93
Tetradymia canescens	.33	.53

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08A, Study no: 2

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	1.8	2.2
Cercocarpus montanus	3.6	4.3

BASIC COVER--

Management unit 08A, Study no: 2

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	12.75	53.54	60.28	57.32	60.35
Rock	2.75	2.89	1.05	1.89	.89
Pavement	15.25	3.31	7.23	6.55	7.18
Litter	57.25	57.47	59.54	40.15	57.68
Cryptogams	0	.15	.33	.11	.21
Bare Ground	12.00	6.32	13.68	16.10	13.11

SOIL ANALYSIS DATA --

Management unit 8A, Study no: 2, Study Name: Widdop Mountain North

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.8	7.4	43.3	34.2	22.6	5.5	3.4	115.2	0.9

PELLET GROUP DATA--

Management unit 08A, Study no: 2

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	-	-	3	1	-	-	-
Moose	8	14	12	3	16 (38)	19 (47)	12 (30)
Elk	19	17	27	22	44 (109)	31 (78)	37 (91)
Deer	4	1	3	12	3 (7)	7 (18)	11 (28)
Cattle	-	1	3	2	12 (30)	12 (30)	15 (36)

BROWSE CHARACTERISTICS--
Management unit 08A, Study no: 2

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>Amelanchier utahensis</i>									
88	598	78	11	11	133	11	22	11	39/31
95	660	48	45	6	20	42	12	3	39/42
00	740	46	38	16	120	35	22	3	28/22
05	740	51	30	19	120	11	43	8	22/19
10	900	44	47	9	20	40	13	27	20/18
<i>Artemisia frigida</i>									
88	266	0	100	-	-	0	0	25	5/4
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	9/11
<i>Artemisia nova</i>									
88	5331	35	49	16	1266	5	0	5	10/7
95	1740	16	79	5	220	28	1	1	8/13
00	1280	16	81	3	60	2	2	0	9/14
05	1220	20	67	13	140	3	0	11	10/13
10	1100	27	67	5	100	18	11	7	10/15
<i>Artemisia tridentata vaseyana</i>									
88	0	0	0	0	-	0	0	0	-/-
95	80	0	100	0	-	25	0	0	12/11
00	160	13	75	13	-	0	0	0	15/20
05	200	0	80	20	60	0	20	20	17/26
10	140	0	100	0	-	86	0	0	14/24
<i>Cercocarpus montanus</i>									
88	24331	89	8	2	6599	20	12	.82	25/18
95	6880	44	53	2	2440	47	19	.29	26/37
00	7360	44	50	6	1180	27	41	2	22/30
05	7960	40	56	4	3420	12	70	3	24/32
10	6620	52	48	1	720	45	14	4	25/37
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
88	4064	54	44	2	-	2	0	7	11/9
95	4100	5	95	0	40	0	0	0	13/15
00	3020	3	92	5	-	2	0	2	10/11
05	2940	7	90	3	60	18	0	1	12/15
10	3080	12	87	1	-	0	0	3	12/14

		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>Eriogonum microthecum</i>										
88	10465	40	59	1	333	1	0	17	6/7	
95	5060	2	98	0	180	.79	2	0	8/11	
00	3880	5	94	1	20	3	0	2	7/11	
05	3560	2	98	1	60	10	0	.56	7/12	
10	2480	15	85	0	-	4	0	0	6/11	
<i>Gutierrezia sarothrae</i>										
88	4731	34	63	3	399	0	0	1	5/3	
95	740	19	81	0	-	0	0	0	6/5	
00	420	0	100	0	-	0	0	0	6/7	
05	640	0	100	0	80	0	0	0	6/10	
10	860	9	91	0	-	0	0	0	7/7	
<i>Mahonia repens</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	60	0	100	-	-	0	0	0	5/4	
00	120	0	100	-	-	0	0	0	3/6	
05	160	50	50	-	-	0	0	0	3/5	
10	380	68	32	-	-	0	0	0	4/4	
<i>Pediocactus simpsonii</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	4/4	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	5/4	
10	20	0	100	-	-	0	0	0	5/4	
<i>Pinus flexilis</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	20	100	0	-	20	0	0	0	-/-	
<i>Pseudotsuga menziesii</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	20	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
88	5931	37	44	19	399	10	3	6	11/10	
95	5140	16	84	0	180	6	4	0	12/31	
00	4080	7	90	3	160	2	0	10	11/25	
05	6800	21	77	1	140	4	.88	.88	11/22	
10	6240	29	71	0	80	21	0	0	11/22	

		Age class distribution			Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Tetradymia canescens									
88	2999	58	38	4	-	9	0	0	11/6
95	880	14	86	0	80	16	0	0	9/9
00	780	13	74	13	20	15	0	3	7/8
05	780	41	59	0	20	13	0	0	8/11
10	780	36	64	0	-	15	0	0	8/11

BALD RANGE - TREND STUDY NO. 8A-4-10

Vegetation Type: True Mountain Mahogany

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Winter

NRCS Ecological Site Description: SHALLOW LOAMY (10-14W), R034XY262WY

Land Ownership: SITLA

Elevation: 8463 ft. (2580 m)

Aspect: South

Slope: 21%

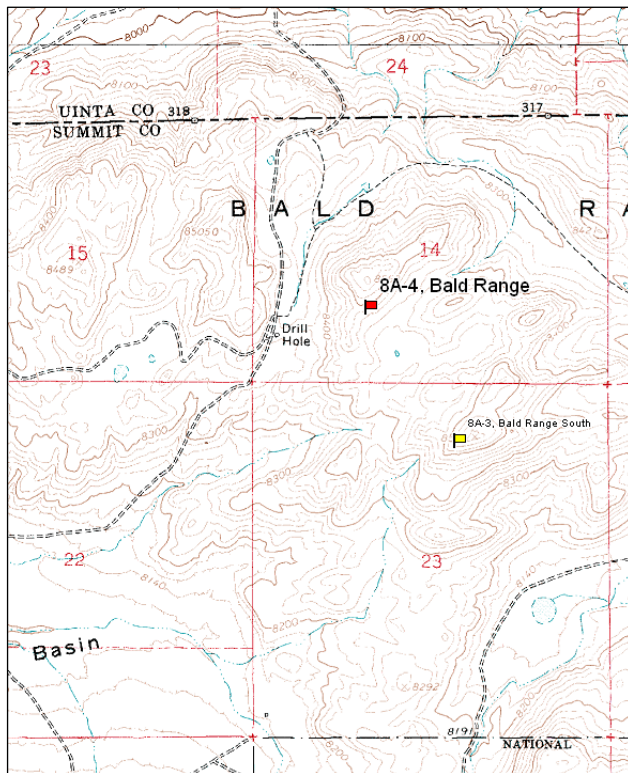
Transect bearing: 158° magnetic

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

Directions:

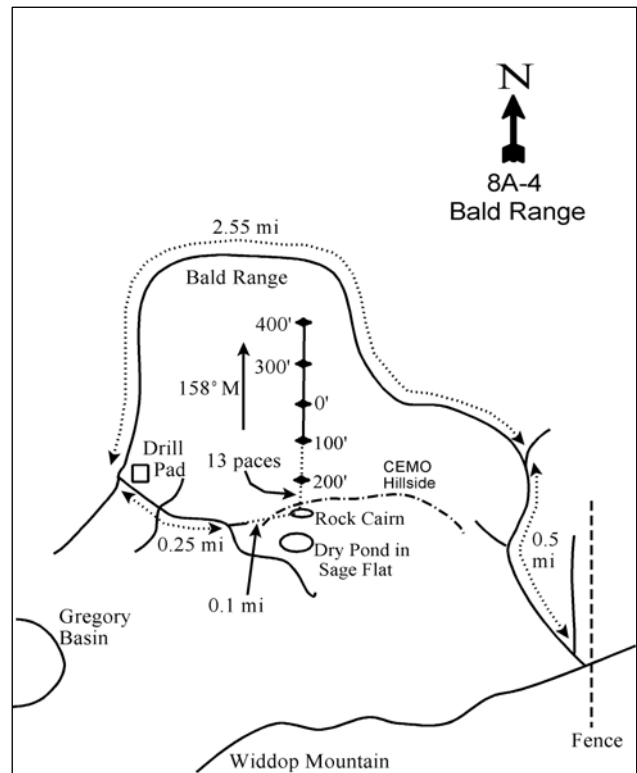
From the Hoop Lake-Beaver Creek Road, turn off east toward Gregory Basin. Go 0.6 miles to a gate onto private land. Continue past the cabins for 1.1 miles to a fence. Go along a canal 0.5 miles to the 4-way intersection. Proceed east 0.7 miles to a cattle guard at the boundary, and 0.9 miles more to the eastern Forest Service boundary fence. Continue 1.8 miles to another fence. Just on the west side of the fence, make a 45° turn to the left and follow the jeep road northwest up the drainage about 0.5 miles to a fork at the top. Continue on the main jeep road 2.55 miles to an old drill pad. Just past the pad, turn left onto a faint road that goes east about 0.25 miles to the top of a ridge. From the ridge, walk about 0.1 miles along the edge of the sage and mahogany to a rock cairn. From there it is 13 paces north to the 200 foot baseline stake. The 0-foot baseline stake is marked by browse tag #9076.

Map Name: Hoop Lake



Township: 3N Range: 16E Section: 14

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 576277 E 4537129 N

BALD RANGE - TREND STUDY NO. 8A-4

Site Information

Site Description: The study is located on a south-facing mountain mahogany (*Cercocarpus montanus*) slope on the Bald Range. At the time the study was established in 1988, the area was exceptionally dry and water often limits livestock grazing in the area. The area is managed by the Utah State Institutional Trust Lands Administration (SITLA) with cattle use in the spring, when the nearby stock ponds contain water. Elk sign is concentrated on the rocky, windswept ridges where they bed down. Pellet group transect data has indicated moderately heavy to very heavy use by elk since 2000. Deer use has been estimated to be light with occasional use by moose since 2000. Estimated use by cattle has also been light since 2000 (Table - Pellet Group Data).

Browse: True mountain mahogany is the key browse species on this site providing the majority of the browse cover (Table - Browse Trends). The mahogany population is comprised of a fairly dense stand of moderately to heavily used plants. The population is healthy with low decadence and good vigor, and is comprised of a mixture of young and mature plants. Other desirable browse species are limited to a few scattered serviceberry (*Amelanchier utahensis*) and a moderately dense population of black sagebrush (*Artemisia nova*). Serviceberry has displayed mostly moderate use while the population of black sagebrush has shown evidence of mostly light use over the course of the study. Snowberry (*Symphoricarpos oreophilus*) and broom snakeweed (*Gutierrezia sarothrae*) are also fairly common on the site (Table - Browse Characteristics).

Herbaceous Understory: Grass composition is very similar to other mahogany sites on the unit with good diversity and moderate abundance. The dominant grasses include bluebunch wheatgrass (*Agropyron spicatum*), thickspike wheatgrass (*A. dasystachyum*), sedge (*Carex sp.*), Indian ricegrass (*Oryzopsis hymenoides*), needle-and-thread (*Stipa comata*) and prairie junegrass (*Koeleria cristata*). Forbs are diverse and moderately abundant, but contain mostly low growing species. The dominant forbs include low growing species like sulfur eriogonum (*Eriogonum umbellatum*), low penstemon (*Penstemon humilus*) and Hoods phlox (*Phlox hoodii*) (Table - Herbaceous Trends).

Soil: The soil has a sandy loam texture with a slightly alkaline soil reaction (pH 7.5). Phosphorus may have limited availability for plant growth and development at 3.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). The soil surface is covered by a high percentage of rock and gravel. Bare ground cover is moderately low with a good amount of vegetation and litter cover (Table - Basic Cover). Areas with open interspaces that lack litter and vegetative cover do display noticeable past patterns of erosion. The surface soil is loose and it appears it can be easily disturbed, which would make it more susceptible to erosion. 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 true mountain mahogany decreased from 18% to 1%, but poor vigor increased from 5% to 14%. Recruitment of young mahogany plants decreased, but remained excellent at 25% of the population.
- **1995 to 2000 - stable (0):** Density of true mountain mahogany increased slightly despite a slight decrease in cover from 21% to 16%. Decadence of mahogany remained low, poor vigor decreased to 4% and recruitment remained excellent at 21%.
- **2000 to 2005 - stable (0):** True mountain mahogany density remained similar with a slight increase in cover to 19%. Decadence and vigor of mahogany remained similar. The proportion of young plants in the population increased to 40%.

- **2005 to 2010 - stable (0):** Density of true mountain mahogany remained similar with a slight increase in cover to 21%. Decadence, vigor and recruitment of young plants remained similar.

Grass:

- **1988 to 1995 - stable (0):** The perennial grass sum of nested frequency remained similar.
- **1995 to 2000 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 13% despite an increase in cover from 11% to 15%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover decreased to 8%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover increased to 13%.

Forb:

- **1988 to 1995 - down (-2):** The perennial forb sum of nested frequency decreased by 24%.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial forbs remained similar, but cover increased slightly from 4% to 6%.
- **2000 to 2005 - up (+2):** There was a 21% increase in the sum of nested frequency of perennial forbs, though cover decreased slightly to 5%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover increased to 7%.

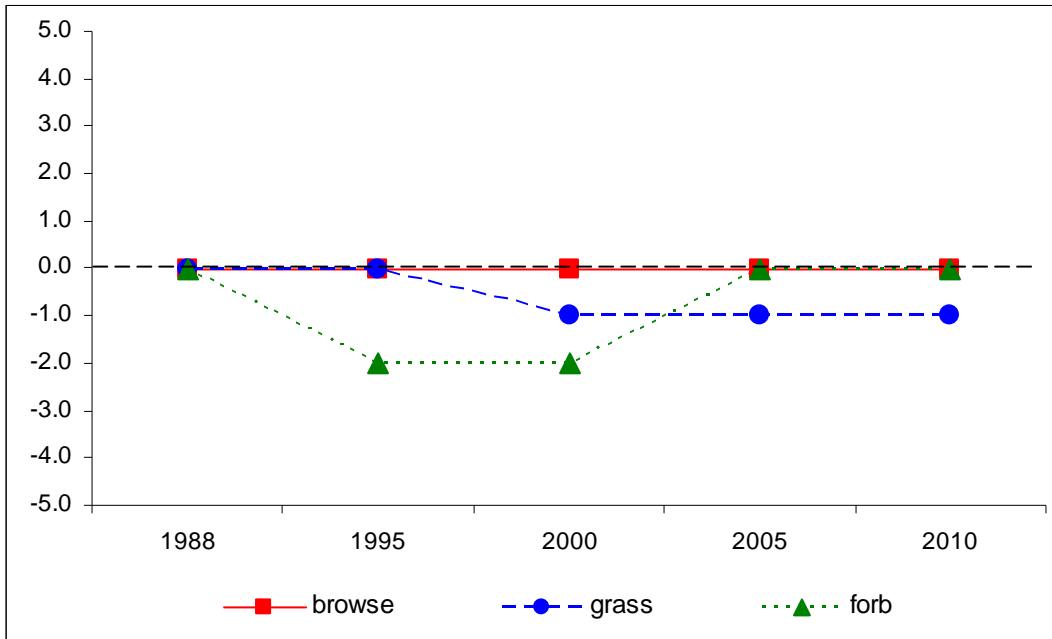
DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

Management unit 8A, study no: 4

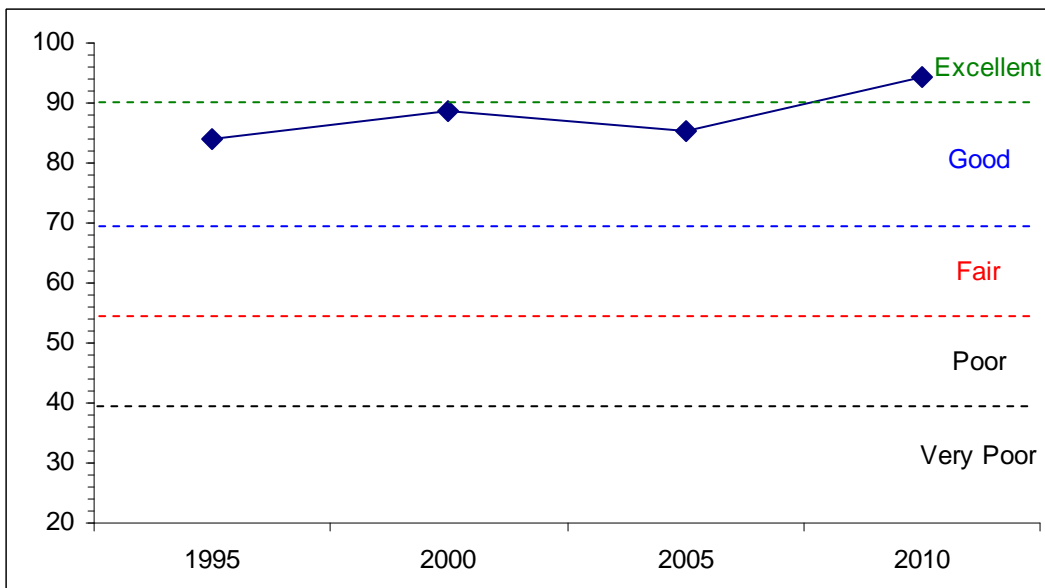
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	14.5	10.9	21.1	0.0	7.5	0.0	83.9	Good
00	26.0	12.8	10.0	30.0	0.0	10.0	0.0	88.8	Good-Excellent
05	30.0	13.6	15.0	16.8	0.0	9.8	0.0	85.2	Good
10	30.0	14.2	15.0	25.3	0.0	10.0	0.0	94.5	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8A, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 8A, Study no: 4



HERBACEOUS TRENDS--

Management unit 08A, Study no: 4

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a37	a50	b106	a51	b115	.44	1.18	.31	2.36
G	Agropyron spicatum	b158	c217	bc187	b146	a57	3.98	6.72	2.16	2.10
G	Carex sp.	a94	b136	ab123	b136	b128	3.55	5.14	4.00	3.64
G	Koeleria cristata	c54	ab22	a1	ab18	bc37	.22	.00	.25	1.26
G	Leucopoa kingii	a-	a-	a9	b25	b30	-	.33	.25	.66
G	Oryzopsis hymenoides	c96	bc65	a5	b55	b42	1.89	.18	.63	1.12
G	Poa fendleriana	a-	ab8	b13	b8	ab12	.04	.36	.05	.23
G	Poa secunda	b27	ab19	ab10	a4	a-	.17	.07	.03	-
G	Stipa comata	b49	ab27	a19	ab39	ab38	.22	.96	.67	1.24
G	Stipa lettermani	-	-	-	1	1	-	-	.03	.00
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		515	544	473	483	460	10.53	14.98	8.42	12.66
Total for Grasses		515	544	473	483	460	10.53	14.98	8.42	12.66
F	Antennaria rosea	a13	a8	a5	b48	a6	.21	.03	.47	.53
F	Arabis sp.	2	3	-	2	-	.01	-	.00	-
F	Arenaria hookeri	-	-	-	5	-	-	-	.04	-
F	Arenaria sp.	a-	a-	b14	ab4	b10	-	.20	.01	.05
F	Astragalus sp.	a5	b51	a7	a6	a5	.64	.05	.04	.04
F	Calochortus nuttallii	-	1	-	12	-	.00	-	.02	-
F	Chaenactis douglasii	a-	a-	a-	b9	b13	-	-	.03	.03
F	Chenopodium leptophyllum(a)	-	b10	a-	a-	ab2	.05	-	-	.00
F	Cirsium sp.	26	12	15	9	8	.11	.10	.34	.37
F	Cryptantha sp.	-	1	3	-	8	.03	.00	-	.04
F	Descurainia pinnata (a)	-	b78	a-	a2	a-	.31	-	.00	-
F	Eriogonum umbellatum	a-	a8	c61	b40	bc51	.09	1.48	1.39	.93
F	Hackelia patens	-	-	7	-	3	-	.33	-	.03
F	Haplopappus acaulis	ab7	b15	c24	a-	ab8	.37	.57	-	.02
F	Heterotheca villosa	-	-	1	-	3	-	.00	-	.03
F	Hymenoxys acaulis	a-	ab6	ab5	b13	b-	.04	.03	.24	.48
F	Hymenoxys richardsonii	-	-	3	-	-	-	.15	-	-
F	Ipomopsis aggregata	4	-	-	-	-	-	-	-	-
F	Lappula occidentalis (a)	-	1	-	-	-	.00	-	-	-
F	Lepidium sp. (a)	-	3	-	-	-	.00	-	-	-
F	Lesquerella alpina	b45	c76	a5	a9	a7	.23	.01	.02	.04
F	Leucelene ericoides	a-	ab1	ab1	ab1	b13	.00	.00	.00	.08
F	Linum lewisii	-	-	-	3	3	-	-	.01	.01
F	Lithospermum ruderales	a-	ab6	a2	b8	ab9	.01	.03	.08	.02
F	Machaeranthera canescens	a-	a-	ab8	b16	ab9	-	.04	.28	.10
F	Machaeranthera grindelioides	6	6	10	9	7	.09	.09	.06	.11
F	Penstemon humilis	c150	b79	a37	ab60	b67	.50	.31	.55	1.20
F	Penstemon sp.	-	-	-	-	9	-	-	-	.21
F	Phlox hoodii	61	75	64	66	77	1.21	1.27	.66	1.26
F	Phlox longifolia	c77	a-	b28	b22	b32	-	.05	.06	.10

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Physaria sp.	a ⁻	a ⁻	a ⁻	c ³⁴	b ⁶	-	-	.12	.07
F	Schoenrambe linifolia	-	-	-	1	6	-	-	.00	.03
F	Senecio multilobatus	a ³	a ⁻	b ¹²	ab ⁷	ab ⁹	-	.03	.04	.05
F	Trifolium sp.	c ³⁷	a ⁻	c ³¹	b ⁸	c ⁶¹	-	.61	.22	1.27
F	Unknown forb-perennial	a ⁻	a ⁻	a ⁻	b ¹³	a ⁻	-	-	.05	-
F	Zigadenus paniculatus	c ⁶⁵	b ³¹	b ¹⁸	b ³²	a ⁻	.16	.21	.10	-
Total for Annual Forbs		0	92	0	2	2	0.37	0	0.00	0.00
Total for Perennial Forbs		501	379	361	437	443	3.74	5.67	4.90	7.15
Total for Forbs		501	471	361	439	445	4.11	5.67	4.90	7.16

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

BROWSE TRENDS--

Management unit 08A, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	1	1	3	5	-	-	-	-
B	Artemisia frigida	3	0	1	2	.03	-	.15	.15
B	Artemisia nova	58	54	51	46	3.34	1.33	2.00	1.75
B	Cercocarpus montanus	82	79	84	82	21.40	16.20	18.95	21.33
B	Chrysothamnus viscidiflorus lanceolatus	27	33	32	32	.54	.80	.97	.87
B	Eriogonum microthecum	2	9	10	10	-	.06	.43	.77
B	Gutierrezia sarothrae	17	22	38	45	.40	.10	1.29	.48
B	Leptodactylon pungens	0	1	2	4	-	-	.00	.15
B	Pediocactus simpsonii	0	1	1	1	-	-	-	-
B	Symphoricarpos oreophilus	23	20	17	17	.93	1.19	1.27	1.34
B	Tetradymia canescens	13	11	12	11	.18	.15	.18	.28
Total for Browse		226	231	251	255	26.84	19.86	25.26	27.14

CANOPY COVER, LINE INTERCEPT--

Management unit 08A, Study no: 4

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	.16	.60
Artemisia nova	1.91	2.84
Cercocarpus montanus	25.46	28.50
Chrysothamnus viscidiflorus lanceolatus	.90	1.54
Eriogonum microthecum	.25	.53
Gutierrezia sarothrae	.31	.58
Leptodactylon pungens	-	.15
Symphoricarpos oreophilus	1.35	2.54
Tetradymia canescens	.15	.26

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08A, Study no: 4

Species	Average leader growth (in)	
	'05	'10
Cercocarpus montanus	3.9	3.9

BASIC COVER--

Management unit 08A, Study no: 4

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	6.75	35.36	39.93	35.06	45.79
Rock	2.75	8.05	6.74	5.13	4.90
Pavement	27.50	15.50	16.87	21.13	25.25
Litter	46.00	39.70	36.90	25.77	33.52
Cryptogams	0	.21	.07	.03	.24
Bare Ground	17.00	13.14	22.08	26.37	17.62

SOIL ANALYSIS DATA --

Management unit 8A, Study no: 4, Study Name: Bald Range

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.4	7.5	58.4	24.1	17.6	3.3	3.6	112.0	0.9

PELLET GROUP DATA--

Management unit 08A, Study no: 4

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	1	-	-	1
Moose	-	-	1	-
Elk	21	24	30	26
Deer/Antelope	8	2	2	11
Cattle	2	1	1	-
Sheep	-	-	-	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
-	1 (2)	-
40 (99)	75 (185)	48 (119)
3 (8)	4 (10)	11 (28)
2 (5)	4 (10)	4 (9)
-	-	1 (2)

BROWSE CHARACTERISTICS--
Management unit 08A, Study no: 4

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>Amelanchier utahensis</i>									
88	0	0	0	-	-	0	0	0	-/-
95	20	0	100	-	-	100	0	0	20/34
00	20	0	100	-	-	100	0	100	31/62
05	60	0	100	-	-	33	67	0	18/45
10	140	57	43	-	20	57	0	0	33/53
<i>Artemisia frigida</i>									
88	66	0	100	-	-	0	0	0	1/5
95	100	0	100	-	40	0	0	0	2/5
00	0	0	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	6/8
10	40	0	100	-	-	50	50	0	9/13
<i>Artemisia nova</i>									
88	864	54	23	23	-	0	0	0	9/8
95	2300	2	91	7	60	35	6	4	8/14
00	2340	9	78	13	100	5	.85	4	6/12
05	1700	19	69	12	60	5	6	4	7/14
10	1440	6	81	14	-	26	1	10	9/14
<i>Cercocarpus montanus</i>									
88	5598	55	27	18	66	37	45	5	24/27
95	3340	25	75	1	320	59	25	14	29/48
00	3560	21	71	7	160	22	69	4	29/44
05	3720	40	56	4	1440	11	66	3	29/46
10	3600	41	57	2	520	46	6	2	32/48
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
88	666	50	50	0	-	0	0	0	7/10
95	800	0	100	0	-	0	0	0	10/16
00	1220	2	82	16	-	3	0	13	6/10
05	1020	14	80	6	-	53	4	4	8/13
10	940	0	100	0	-	0	0	4	10/14
<i>Eriogonum microthecum</i>									
88	0	0	0	0	-	0	0	0	-/-
95	40	0	100	0	-	0	0	0	8/14
00	600	23	77	0	-	0	0	0	6/9
05	740	30	68	3	-	0	0	3	5/10
10	580	7	93	0	20	0	0	0	5/9

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>Gutierrezia sarothrae</i>									
88	19199	11	89	0	-	0	0	0	6/6
95	480	8	92	0	-	0	0	0	5/6
00	800	3	98	0	-	0	0	5	5/6
05	1580	5	94	1	40	0	0	1	6/8
10	1400	3	97	0	-	0	0	1	7/9
<i>Leptodactylon pungens</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	0	0	0	-/-
05	40	50	50	-	-	0	0	0	2/1
10	200	20	80	-	180	0	0	0	4/4
<i>Pediocactus simpsonii</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	0	0	0	1/2
05	20	0	100	-	-	0	0	0	2/3
10	20	0	100	-	-	0	0	0	2/2
<i>Symphoricarpos oreophilus</i>									
88	199	0	100	0	-	67	0	0	10/15
95	620	16	84	0	20	3	10	0	9/24
00	580	0	93	7	-	0	0	21	12/22
05	680	26	71	3	-	6	0	0	11/29
10	600	20	80	0	-	3	3	0	13/29
<i>Tetradymia canescens</i>									
88	199	33	67	0	-	0	0	0	9/6
95	300	0	100	0	-	7	0	0	6/9
00	380	5	84	11	-	16	5	5	4/9
05	360	11	83	6	-	33	22	6	5/9
10	340	53	41	6	20	24	0	6	5/8

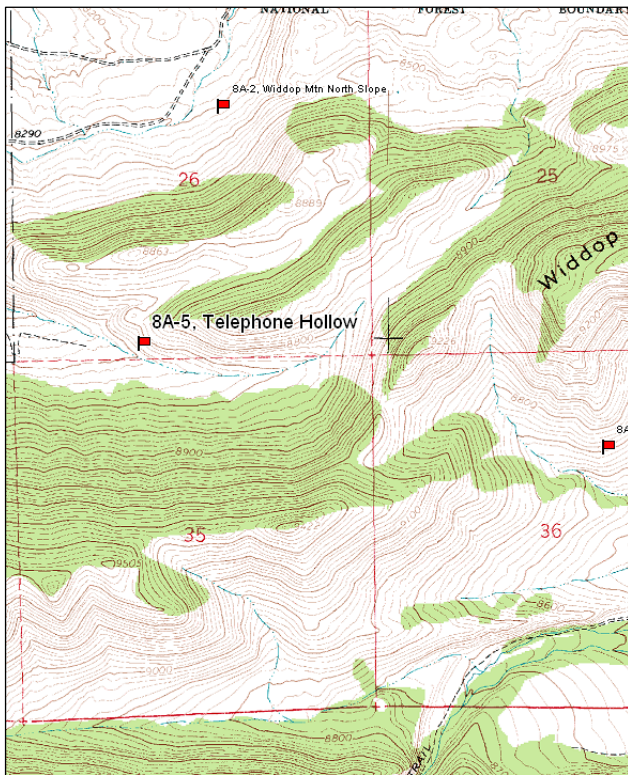
TELEPHONE HOLLOW - TREND STUDY NO. 8A-5-10

Vegetation Type: True Mountain Mahogany
Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8640 ft. (2634 m)
Aspect: South
Slope: 38%-40%
Transect bearing: 22° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft.), line 4 (71ft).

Directions:

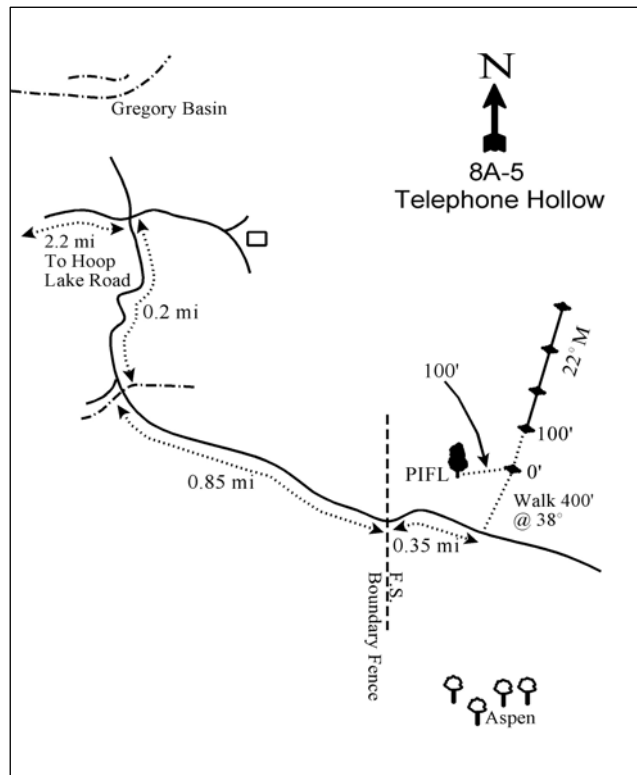
From the Hoop Lake Road along Beaver Creek, proceed east on the road to Gregory Basin. Go 0.6 miles to a gate at a private property line. Continue east 1.7 miles to the 4-way intersection south of Gregory Basin. Turn right and go 0.2 miles to a creek. Cross the creek and drive 0.85 miles to a gate at the Forest Service boundary. Go through the gate and continue for 0.35 miles. Stop across from a lone limber pine (*Pinus flexilis*) tree on the bottom of the south facing slope. The 0-foot stake is approximately 100 feet to the east of the lone limber pine tree. There is a red browse tag, #7148, attached to the green fencepost marking the 0-foot end of the frequency baseline.

Map Name: Hoop Lake



Township: 3N Range: 16E Section: 26

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 575966 E 4534457 N

TELEPHONE HOLLOW - TREND STUDY NO. 8A-5

Site Information

Site Description: The study is located on the southwest side of Widdop Mountain, on land administered by the U.S. Forest Service, with access through state and privately owned land. The study is located on a south slope dominated by true mountain mahogany (*Cercocarpus montanus*), above a seeded hollow. At the study elevation, the valley is generally covered by snow through the winter and much of the spring. These south slopes are important to wintering elk, commonly used by moose, and, to a lesser extent, deer. Thermal cover is provided by conifer on the nearby north-facing slopes. Cattle graze the area as part of the Burnt Fork allotment, but typically graze mostly in the seeded hollow at the base of the slope. Pellet group transect data has indicated moderate use by elk and light use by deer since 2000, though use by deer was higher in 2010. Moose also frequent the area with estimated light use since 2000. Estimated use by cattle has been minimal since 2000 (Table - Pellet Group Data).

Browse: The key browse species is true mountain mahogany which provides the majority of the browse cover (Table - Browse Trends). The mahogany population is comprised of a dense stand of fairly small, heavily used plants. The mahogany stand is a mixture of young and mature plants, with low decadence and good vigor. Insect damage has been noted in the population in several sample years, especially in 1995. Other preferred browse species include serviceberry (*Amelanchier utahensis*) and black sagebrush (*Artemisia nova*). Both species occur at fairly low densities. Serviceberry has displayed moderate to heavy use over the study, but it was noted in 2010 that most serviceberry plants grow within the shelter of mahogany plants. Black sagebrush has displayed mostly light use throughout the study, though use was heavy in 1995 and moderate in 2010. Broom snakeweed (*Gutierrezia sarothrae*) is common on the site (Table - Browse Characteristics), but provides little cover (Table - Browse Trends).

Herbaceous Understory: Grasses on the site are neither particularly diverse nor abundant as the other mahogany sites in the unit. Site potential would not be as high as the other sites due to the steeper slope and the south aspect. Common grass species include bluebunch wheatgrass (*Agropyron spicatum*), sedge (*Carex sp.*) and Indian ricegrass (*Oryzopsis hymenoides*). Forbs are moderately diverse but no one species is very abundant. The most common forbs are low growing species such as cryptantha (*Cryptantha sp.*), low penstemon (*Penstemon humilus*) and Hoods phlox (*Phlox hoodii*) (Table - Herbaceous Trends).

Soil: The soil has a loam texture with a slightly alkaline soil reaction (pH 7.4). Phosphorus and potassium may have limited availability for plant growth and development at 2.8 ppm and 35.2 ppm, respectively (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Parent material is a conglomerate rock formation composed of both limestone and sandstone cobble. Bare ground cover is moderately low with a large amount of rock and pavement cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2010, but was slight in 2005 primarily because of pedestals around plants.

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 true mountain mahogany remained low and vigor remained good in the population, though it was noted that there was a large amount of insect damage on leaves of many plants. Recruitment of young mahogany plants decreased, but remained excellent comprising 29% of the population.
- **1995 to 2000 - stable (0):** There was a slight increase in the density of true mountain mahogany from 6,200 plants/acre to 6720 plants/acre, but cover decreased slightly from 19% to 17%. Decadence remained low, vigor remained good and recruitment of young plants remained excellent.

- **2000 to 2005 - stable (0):** Density of true mountain mahogany increased slightly to 6,980 plants/acre and cover increased to 22%. Decadence of mahogany remained low, vigor remained good and recruitment of young plants remained excellent.
- **2005 to 2010 - slightly up (+1):** The density of true mountain mahogany remained similar to 2005 at 7,240 plants/acre, but density has steadily increased by 17% since 1995. Cover of mahogany decreased slightly to 18%, but decadence remained low, vigor good and recruitment of young plants was excellent.

Grass:

- **1988 to 1995 - stable (0):** The perennial grass sum of nested frequency remained similar.
- **1995 to 2000 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 11% despite an increase in cover from 9% to 12%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency, but cover decreased to 9%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover decreased to 6%.

Forb:

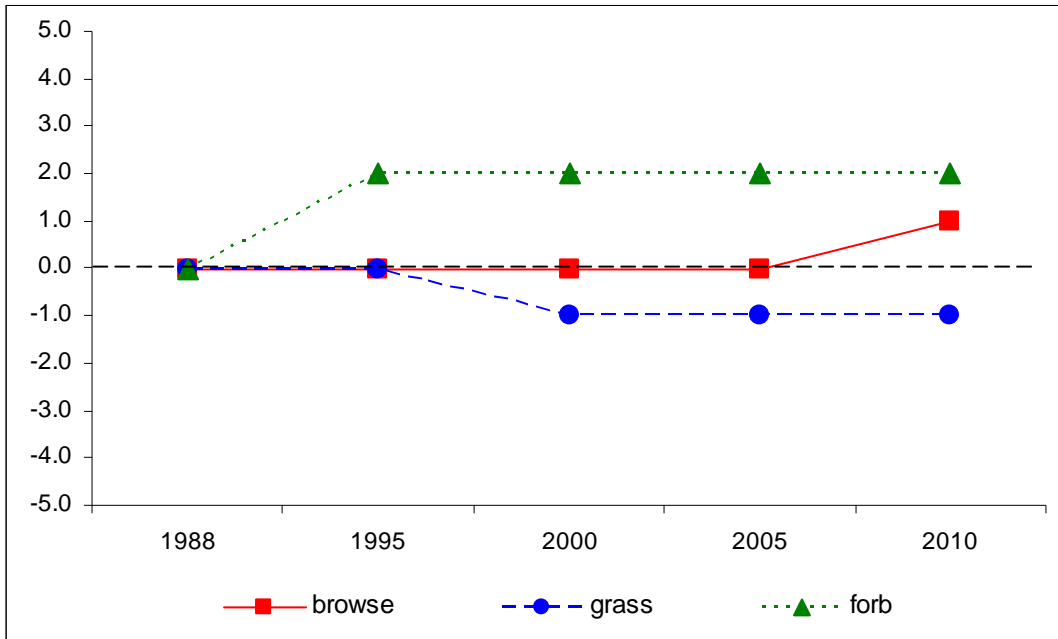
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 53%.
- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover increased from 5% to 7%.
- **2000 to 2005 - stable (0):** The perennial forb sum of nested frequency remained similar and cover increased slightly to 8%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial forbs,, though cover decreased to 6%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

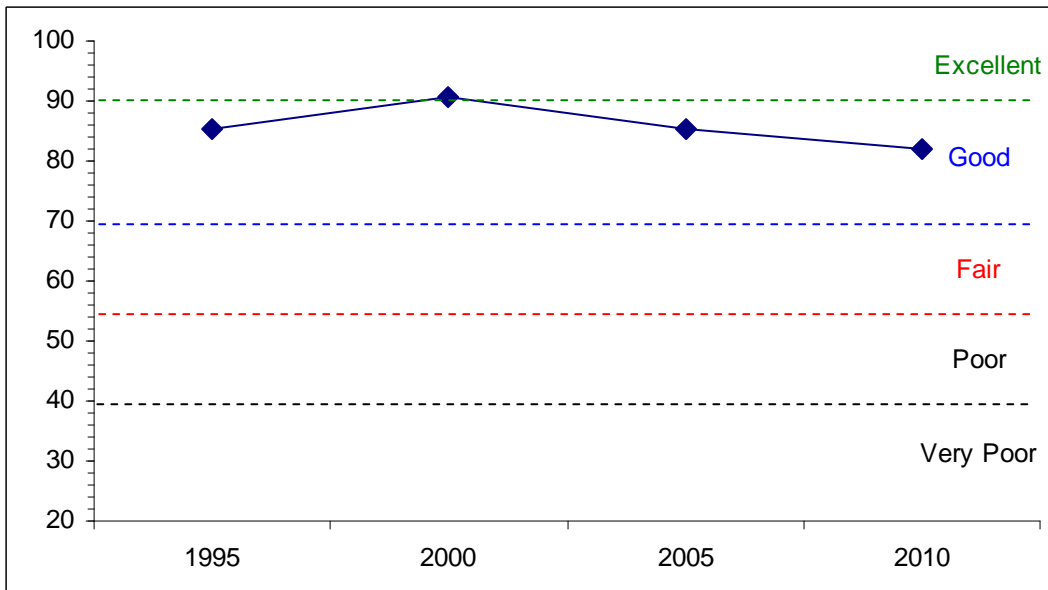
Management unit 8A, study no: 5

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	29.4	14.7	14.1	18.1	0.0	9.2	0.0	85.4	Good
00	29.8	13.6	13.0	24.4	0.0	10.0	0.0	90.8	Good-Excellent
05	30.0	13.3	15.0	17.3	0.0	10.0	0.0	85.5	Good
10	30.0	14.7	15.0	12.3	0.0	10.0	0.0	82.0	Good

Trend Summary



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 8A, Study no: 5



HERBACEOUS TRENDS--
Management unit 08A, Study no: 5

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	-	4	3	4	3	.15	.01	.01	.01
G	Agropyron spicatum	ab200	b215	b229	ab194	a175	4.35	7.43	3.87	3.13
G	Carex sp.	121	162	127	146	164	2.70	3.10	3.03	2.59
G	Koeleria cristata	a-	a6	a8	ab11	b14	.06	.18	.13	.16
G	Leucopoa kingii	-	-	2	-	1	-	.03	-	.00
G	Oryzopsis hymenoides	b78	b67	ab43	ab53	a32	1.71	1.43	1.56	.25
G	Poa fendleriana	-	-	-	-	5	-	-	-	.01
G	Stipa comata	b44	a10	a1	a1	a-	.04	.00	.03	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		443	464	413	409	394	9.03	12.19	8.64	6.17
Total for Grasses		443	464	413	409	394	9.03	12.19	8.64	6.17
F	Antennaria rosea	-	-	3	4	-	-	.03	.01	-
F	Arabis sp.	-	2	-	-	3	.01	-	-	.00
F	Aster sp.	-	-	-	-	1	-	-	-	.00
F	Astragalus sp.	a-	b56	a2	a-	a-	1.50	.18	-	-
F	Castilleja flava	-	-	-	-	3	-	-	-	.03
F	Chenopodium leptophyllum(a)	-	b26	a-	a-	a3	.05	-	-	.00
F	Cirsium sp.	ab21	ab23	b26	ab5	a6	.39	.46	.24	.06
F	Comandra pallida	a2	ab15	abc24	bc28	c35	.06	.54	.42	.52
F	Cryptantha sp.	79	91	97	79	64	.79	.91	.77	.58
F	Erigeron eatonii	-	-	10	-	-	-	.02	-	-
F	Erigeron sp.	-	-	2	-	-	-	.00	-	-
F	Eriogonum umbellatum	-	-	-	-	3	-	-	-	.00
F	Heterotheca villosa	-	-	2	-	-	-	.03	-	-
F	Hymenoxys acaulis	3	13	3	13	19	.03	.01	.23	.09
F	Lesquerella alpina	a13	bc50	c48	a18	ab24	.13	.44	.07	.22
F	Leucelene ericoides	-	-	-	9	8	-	-	.06	.01
F	Linum lewisii	a-	ab10	ab17	ab6	b20	.02	.20	.11	.10
F	Lithospermum incisum	19	12	14	7	10	.11	.16	.04	.08
F	Lychnis drummondii	-	-	-	1	1	-	-	.03	.03
F	Machaeranthera grindelioides	34	46	24	43	27	.26	.34	1.16	.39
F	Microsteris gracilis (a)	-	-	-	-	6	-	-	-	.06
F	Oenothera sp.	-	-	1	-	-	-	.00	-	-
F	Penstemon humilis	63	91	73	97	71	.74	.69	1.01	.46
F	Petradoria pumila	a-	a-	a-	a-	b28	-	-	-	.62
F	Phlox hoodii	61	47	68	58	49	.50	1.53	.68	.39
F	Phlox longifolia	-	-	-	2	3	-	-	.00	.00
F	Physaria sp.	a-	a-	a-	b47	c62	-	-	.23	.62
F	Schoenocrambe linifolia	a-	a-	a-	b14	a6	-	-	.04	.03
F	Taraxacum officinale	-	-	-	1	-	-	-	.00	-
F	Townsendia incana	ab7	a-	ab4	b11	ab2	-	.09	.07	.01
F	Trifolium sp.	a5	a-	b53	c67	c59	-	1.61	2.94	1.29
F	Zigadenus elegans	a-	b13	a-	a3	a-	.03	.00	.00	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
	Total for Annual Forbs	0	26	0	0	9	0.05	0	0	0.07
	Total for Perennial Forbs	307	469	471	513	504	4.61	7.29	8.18	5.61
	Total for Forbs	307	495	471	513	513	4.66	7.29	8.18	5.68

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

BROWSE TRENDS--

Management unit 08A, Study no: 5

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	5	9	9	13	-	1.08	.73	2.00
B	Artemisia frigida	18	22	16	20	.22	.40	.28	.31
B	Artemisia nova	12	14	10	12	.05	1.08	.39	.18
B	Cercocarpus montanus	97	96	99	98	19.10	17.37	21.93	18.00
B	Chrysothamnus nauseosus	0	0	0	1	-	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	1	1	0	1	-	-	-	-
B	Eriogonum microthecum	8	12	9	11	.36	.27	.19	.39
B	Gutierrezia sarothrae	40	82	81	76	.54	2.98	2.66	2.12
B	Pinus flexilis	0	2	2	3	-	-	.00	2.21
B	Tetradymia canescens	8	7	9	5	.03	.06	.00	.00
	Total for Browse	189	245	235	240	20.31	23.27	26.22	25.24

CANOPY COVER, LINE INTERCEPT--

Management unit 08A, Study no: 5

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	2.15	2.41
Artemisia frigida	.25	1.08
Artemisia nova	.71	.16
Cercocarpus montanus	24.88	29.06
Eriogonum microthecum	.33	.35
Gutierrezia sarothrae	4.09	3.28
Pinus flexilis	.46	3.06
Tetradymia canescens	-	.03

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08A, Study no: 5

Species	Average leader growth (in)	
	'05	'10
Cercocarpus montanus	4.4	3.5

BASIC COVER--

Management unit 08A, Study no: 5

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	9.25	32.12	42.25	38.63	42.09
Rock	8.00	16.22	12.11	13.17	9.53
Pavement	45.50	21.33	25.05	22.32	31.24
Litter	32.25	30.12	29.00	17.51	23.62
Cryptogams	0	.12	0	.08	.00
Bare Ground	5.00	7.17	23.39	20.75	13.49

SOIL ANALYSIS DATA --

Management unit 8A, Study no: 5, Study Name: Telephone Hollow

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.9	7.4	49.4	33.0	17.6	4.1	2.8	35.2	0.6

PELLET GROUP DATA--

Management unit 08A, Study no: 5

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	-	-	1	-	-	-	-
Moose	6	9	6	5	16 (39)	11 (26)	6 (16)
Elk	15	12	33	15	31 (76)	29 (73)	34 (84)
Deer	4	-	4	5	3 (8)	3 (7)	23 (56)
Cattle	-	-	-	-	2 (4)	-	-

BROWSE CHARACTERISTICS--

Management unit 08A, Study no: 5

		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									
88	199	67	33	-	-	67	0	0	20/39
95	140	29	71	-	-	57	0	0	20/31
00	200	10	90	-	-	70	30	0	17/25
05	380	47	53	-	-	21	32	0	17/30
10	460	39	61	-	-	39	4	0	21/33
Artemisia frigida									
88	399	0	100	-	-	0	0	0	4/4
95	500	4	96	-	60	0	0	0	4/7
00	700	14	86	-	80	0	0	0	3/6
05	600	3	97	-	-	17	0	0	6/7
10	720	14	86	-	-	11	8	0	3/8

		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>Artemisia nova</i>										
88	66	0	100	0	-	0	0	0	7/8	
95	520	0	100	0	-	0	42	0	6/15	
00	460	4	74	22	-	13	0	4	5/13	
05	280	0	86	14	-	0	0	0	6/18	
10	320	6	63	31	-	44	19	6	7/17	
<i>Ceratoides lanata</i>										
88	66	100	0	-	-	0	0	100	-/-	
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	-/-	
<i>Cercocarpus montanus</i>										
88	7265	55	43	2	66	22	45	.91	25/23	
95	6200	29	70	1	240	68	22	9	21/36	
00	6720	29	67	4	80	17	63	2	18/28	
05	6980	32	62	6	120	6	87	2	19/33	
10	7240	36	64	1	100	23	29	4	19/29	
<i>Chrysothamnus nauseosus</i>										
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	40	100	0	-	-	0	0	0	-/-	
<i>Chrysothamnus viscidiflorus lanceolatus</i>										
88	0	0	0	0	-	0	0	0	-/-	
95	20	0	100	0	-	0	0	0	5/8	
00	20	0	0	100	-	0	0	0	9/13	
05	0	0	0	0	-	0	0	0	9/13	
10	40	0	100	0	-	0	0	0	-/-	
<i>Eriogonum microthecum</i>										
88	0	0	0	0	-	0	0	0	-/-	
95	300	0	100	0	-	0	0	0	5/11	
00	440	5	91	5	-	0	0	0	5/7	
05	320	0	100	0	-	6	0	0	5/11	
10	800	0	100	0	-	0	0	0	4/9	
<i>Gutierrezia sarothrae</i>										
88	16931	7	91	2	-	0	0	.78	7/5	
95	1940	9	91	0	20	0	0	0	5/6	
00	5520	3	95	2	80	0	3	.36	5/9	
05	6300	4	95	1	80	0	0	.95	6/9	
10	6260	1	99	0	-	.31	0	0	6/8	

		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>Pinus flexilis</i>										
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	40	100	0	-	-	0	0	0	-/-	
05	40	50	50	-	-	0	0	0	-/-	
10	60	0	100	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
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	9/12	
<i>Tetradymia canescens</i>										
88	199	67	33	0	-	0	0	0	4/7	
95	200	10	90	0	-	30	0	0	6/11	
00	160	0	100	0	-	25	13	0	7/9	
05	200	10	80	10	-	60	0	10	8/12	
10	160	25	75	0	-	0	0	0	7/13	

SUMMARY

WILDLIFE MANAGEMENT UNIT 8A - NORTH SLOPE, SUMMIT

Community Types

Deer winter range within a unit is summarized into three categories based on ecological potentials which include low potential, mid-level potential and high potential. Low potential sites include desert shrub, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and Cliffrose (*Cowania mexicana* ssp. *stansburiana*) communities. Mid-level potential sites include mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) communities. High potential sites include mountain brush communities. Black sagebrush (*A. nova*) and basin big sagebrush (*A. tridentata* ssp. *tridentata*) communities are placed within the low potential or mid-level potential scales based on precipitation and elevation. Deer summer range is summarized separately from winter range as a fourth category and typically includes aspen (*Populus tremuloides*) and high elevation mountain brush communities. There were four interagency range trend studies sampled in Unit 8A during the summer of 2010. All four of the range trend studies in the unit [Widdop Mountain South Slope (8A-1), Widdop Mountain North Slope (8A-2), Bald Range (8A-4) and Telephone Hollow (8A-5)] sample true (birchleaf) mountain mahogany (*Cercocarpus montanus*) communities and are categorized as high potential sites for deer winter range, though none of the sites are actually classified as deer winter range. All four of the studies are classified as crucial elk winter range and three of the studies (8A-2, 8A-4 and 8A-5) are considered to be in crucial deer summer range that is also fawning habitat.

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Precipitation and Palmer Drought Severity Index (PDSI) data for the unit were compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the Northern Mountains (Division 5). The Northern Mountains had a historic annual mean precipitation of 19.11 inches from 1895 to 2010. The mean annual PDSI of the Northern Mountains displays a cycle of several wet years followed by several drought years, over the course of study years in the unit. Wetter than normal years in the Northern Mountains included 1982-1986, 1993, 1995-1999 and 2005, and drought years included 1987-1992, 2000-2003 and 2007 (Figure 1 and Figure 2) (Time Series Data 2011).

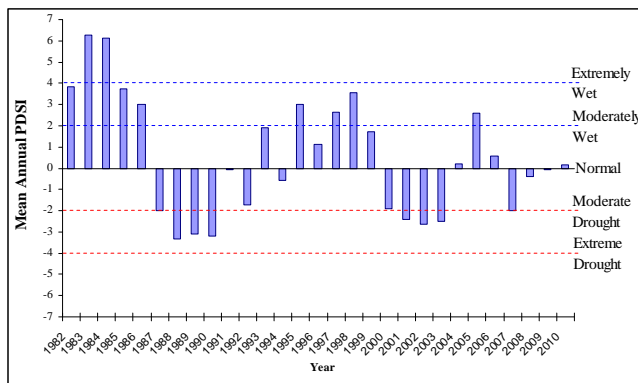


Figure 1. The 29 year mean annual Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

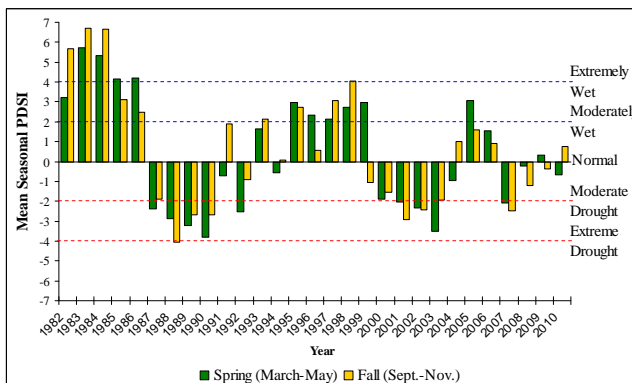


Figure 2. The 29 year mean spring (March-May) and fall (Sept.-Nov.) Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

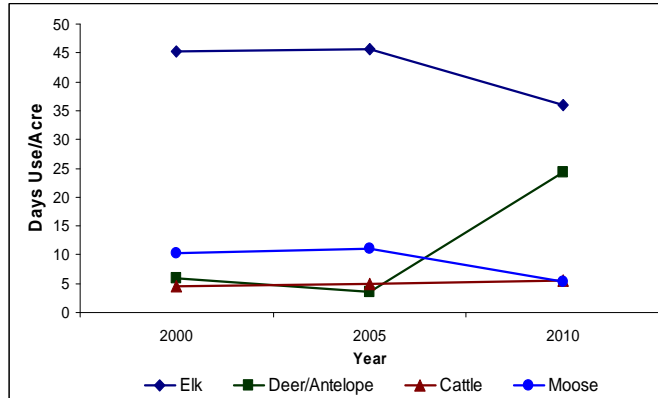


Figure 3. Mean days use/acre of animals by year for WMU 8A, North Slope, Summit.

Mountain Brush Communities (High Potential)

Utilization: Pellet group transect data indicates that elk predominantly use the area. The mean elk days use/acre on the unit has been moderately heavy over the course of the study years. The mean deer/antelope days use/acre has been mostly light on the unit, though use by deer-antelope increased substantially in 2010. The increase in deer/antelope use was due to a large increase in deer-antelope pellets on just one study, Widdop Mountain South Slope (8A-1). There may have been some misidentification between elk and deer/antelope pellets on this study in 2010. Grazing, managed by the U.S. Forest Service, is common in the area, but cattle use appears to be light on the mahogany slopes where the studies are located. Moose appear to use the study areas with regular frequency, but use is light (Figure 3).

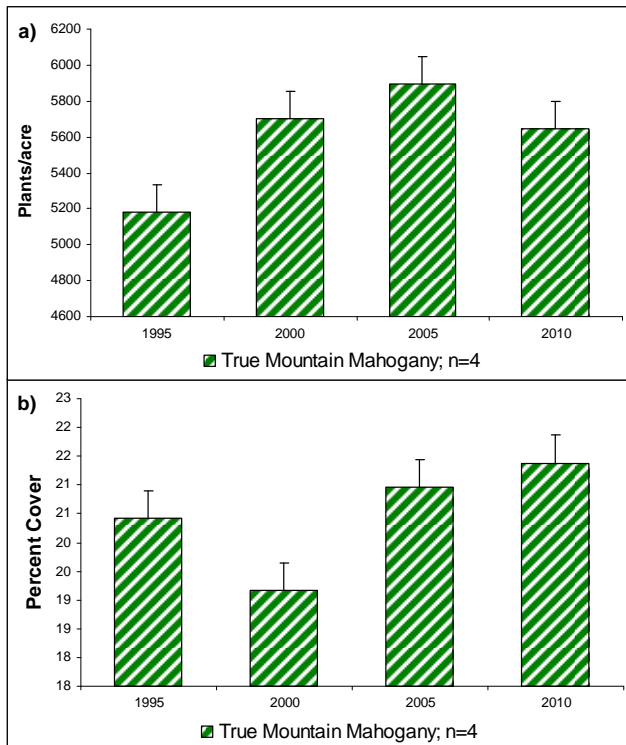


Figure 4. a) Mean density of true mountain mahogany (*Cercocarpus montanus*) by year for WMU 8A, North Slope, Summit. b) Mean cover of true mountain mahogany by year for WMU 8A.

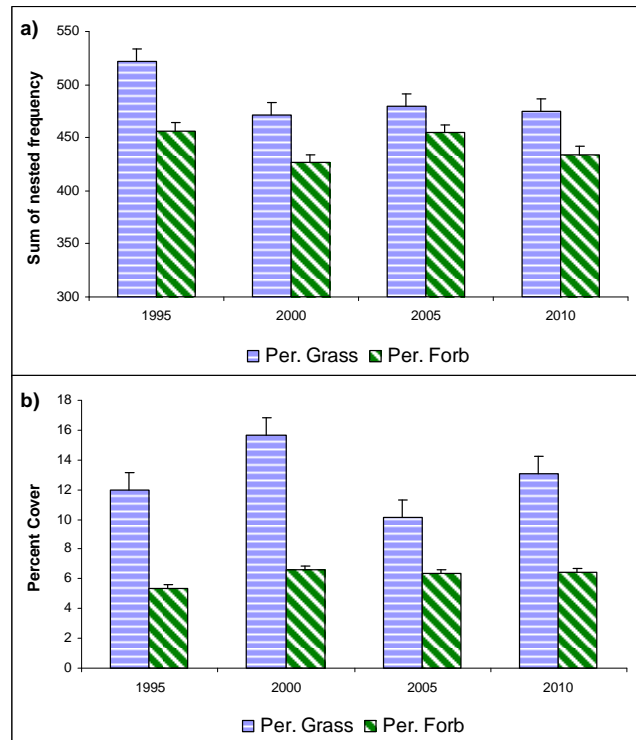


Figure 5. a) Mean perennial grass and perennial forb sum of nested frequency by year for WMU 8A, North Slope, Summit. b) Mean perennial grass and perennial forb cover by year for WMU 8A.

Browse: The cumulative median browse trend of the studies has remained stable over the course of the sample years (Figure 7). The dominant browse species on all four of the studies in Unit 8A is true mountain mahogany. The density of true mountain mahogany is high on all of the studies. The mean density of true mountain mahogany increased significantly in 2000 (Figure 4a). Cover of true mountain mahogany is also high on the unit. There was a significant decrease in cover in 2000, but cover increased again in subsequent sample years (Figure 4b). The decrease in cover in 2000 was primarily due to a decrease in cover on just one study, Bald Range (8A-4), with all of the other studies sampled actually increasing slightly in cover.

Herbaceous Understory: The median cumulative grass trend for the unit has remained fairly stable throughout the sample years (Figure 7). Grasses within these communities are fairly diverse and abundant. The annual species cheatgrass (*Bromus tectorum*) is not common within these communities. Cover of perennial grasses has fluctuated somewhat over the sample years with the highest mean cover in 2000, despite a significant decrease in the sum of nested frequency in that year (Figure 5a and Figure 5b).

The median cumulative forb trend for the unit decreased slightly in 1995, but remained relatively stable throughout the remaining sample years (Figure 7). Perennial forbs are also diverse within the sampled communities, but are not as abundant as perennial grasses. The sum of nested frequency of perennial forbs has fluctuated somewhat over the sample years, but cover has remained similar (Figure 5a and Figure 5b).

Deer Desirable Components Index (DCI): All four of the studies in this unit are categorized as high potential scale deer winter range, though none of the sites are actually classified as deer winter range. The deer DCI has remained relatively similar over the sample years with a ranking of good to excellent (Table 1 and Figure 6). There were no studies that were categorized as low or mid-level potential within Unit 8A.

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	29.8	14.6	13.5	23.6	0.0	8.8	0.0	90.4	Good-Excellent
00	29.0	12.7	12.8	28.6	0.0	10.0	0.0	93.1	Excellent
05	30.0	13.5	14.4	20.3	0.0	9.4	0.0	87.6	Good
10	30.0	14.5	14.7	24.4	0.0	9.0	0.0	92.5	Excellent

Table 1. High potential sites mean deer DCI scores (n=4) by year for WMU 8A, North Slope, Summit. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

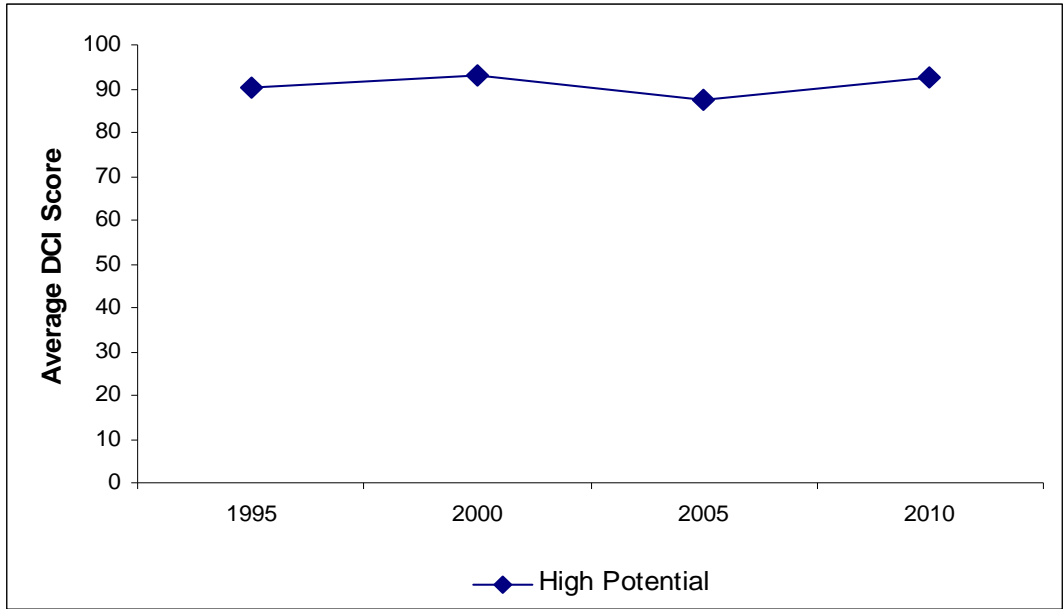


Figure 6. Mean high potential (n=4) scale deer DCI scores by year for WMU 8A, North Slope, Summit. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

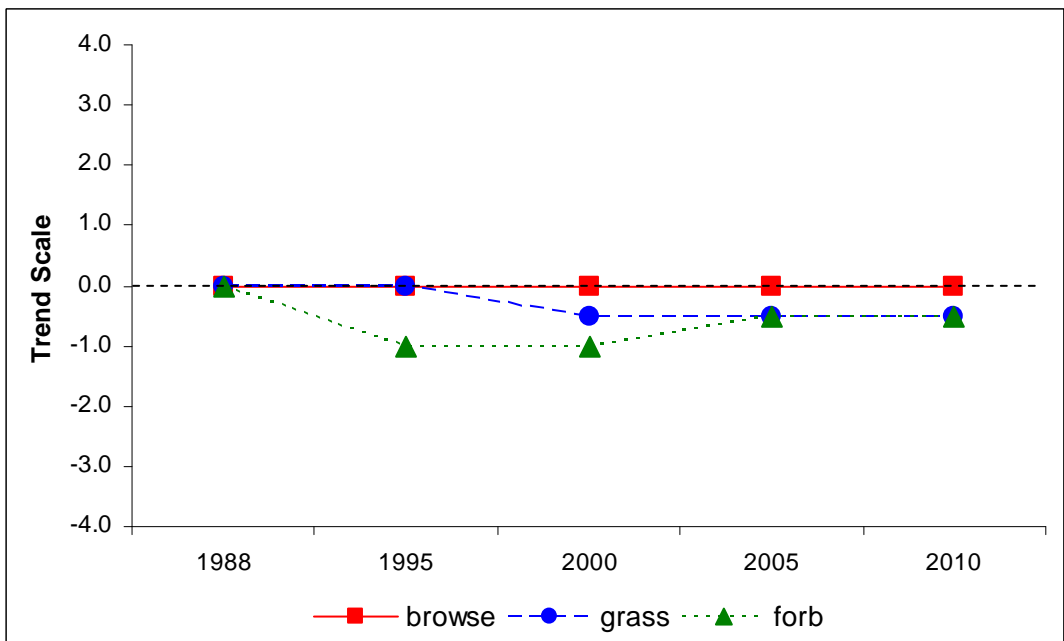
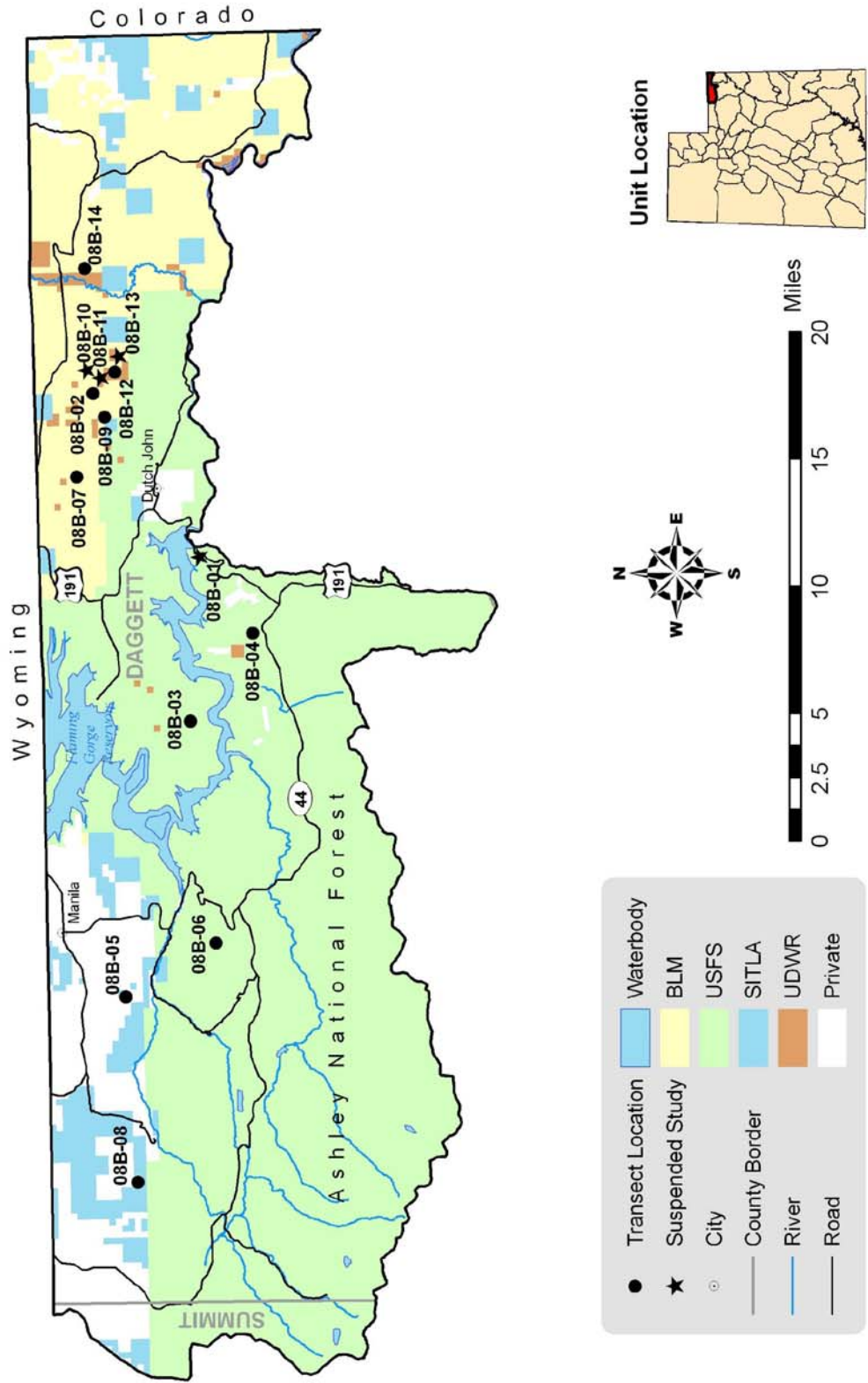


Figure 7. Cumulative median browse, grass and forb trends by year for WMU 8A, North Slope, Summit.

Management Unit 8B



WILDLIFE MANAGEMENT UNIT 8B - NORTH SLOPE, DAGGETT

Boundary Description

Daggett and Summit Counties - Boundary begins at the Utah-Wyoming state line and the Burn Fork-Birch Creek drainage divide; then east along this state line to the Utah-Wyoming-Colorado state lines (Three corners); south along the Utah-Colorado state line to the Green River; west along the Green River to Flaming Gorge Reservoir; west along the south shore of Flaming Gorge Reservoir to Cart Creek; south along Cart creek to Highway SR-191; south on SR-191 to the Uintah-Daggett County line (summit of the Uinta Mountains); west along this summit to the Burnt Fork-Sheep Creek drainage divide; north along this drainage divide to the Burnt Fork-Birch Creek drainage divide; north along this drainage divide to the Utah-Wyoming state line and beginning point.

Management Unit Description

The North Slope, Daggett Wildlife Management Unit is located along the north slope of the Uinta Mountains in Daggett County. Unit 8B is a subunit of the larger North Slope Wildlife Management Unit. The other subunit, 8A, covers Summit County. Elevation on the unit ranges from around 12,000 feet along the summit of the Uinta Mountains to 5,400 feet in the bottomlands of the Green River. Habitat varies from lowland sagebrush, to mountain sagebrush and mountain brush, to large expanses of lodgepole pine, to alpine tundra above the timberline. Manila and Dutch John are the only towns in Subunit 8B. The area supports a variety of wildlife and outdoor recreation, livestock grazing, ranches and farms, energy developments and some forest industry. Flaming Gorge Reservoir supports a wide variety of water recreation as well as energy production from the dam. Bureau of Land Management (BLM) managed lands are used primarily for cattle grazing, with oil and gas operations being the major activities in Clay Basin. There was heavy season-long grazing on Forest Service managed land in the first half of the 1900's, but cattle grazing has since been reduced and adjusted downward, in particular since construction of Flaming Gorge Reservoir. There is little cattle use permitted in the Flaming Gorge Recreation Area.

There are approximately 185,000 acres in Unit 8 (Subunits 8A and 8B) that are considered to be deer winter range and approximately 189,000 acres are considered to be elk winter range. The majority of the deer and elk winter range in Unit 8 is on U.S. Forest Service and BLM managed lands. Privately owned lands comprise about 19% of the deer winter range, most notably the bottomland in the Lucerne Valley around Manila, Brown's Park and Clay Basin. Elsewhere, privately owned land is used as rangeland for cattle or for summer homes. Deer winter range on Forest Service land is mainly part of the Flaming Gorge National Recreation Area. Following construction of the Flaming Gorge dam, approximately 14,000 acres of deer winter range was flooded, but the reservoir does not appear to be a serious barrier to migration (Warren 1973). Concurrently, most livestock grazing was eliminated within the Green River corridor. The area is now managed for recreation and electrical power generation associated with the reservoir.

Several important normal deer winter concentration areas were identified within the unit in the 1974 range inventory. They include the Dowd Mountains, Bear Mountains, Goslin Mountains, Dutch John Flat, Little Hole, Red Creek Flat, Taylor Flat, Death Valley and Digger Basin (Olson 1975). Even with very generous estimates, these areas provide only about 20% of the winter range, all of which is under federal management. The DWR owns some crucial deer winter range in Brown's Park (Taylor Flat and Red Creek) and on Goslin Mountain.

Study Site Description

Ten interagency range trend studies were sampled in the summer of 2010. Five of these studies were established in the summer of 1982 and have continued to be monitored on a regular schedule through 2010. Three of these studies [Goslin Mountain (8B-2), Bear Top Mountain (8B-3) and Greendale (8B-4)] sample mountain big sagebrush communities, one study [Bennett Ranch (8B-5)] samples a Wyoming big sagebrush

community and one study [Death Valley (8B-6)] samples a mountain brush community. Two further studies were established in 1988, with one study [Antelope Flat (8B-7)] sampling a Wyoming big sagebrush community and the other study [Phil Pico Mountain (8B-8)] sampling a true mountain mahogany community. Another two studies were established in 1995, with one study [West Goslin (8B-9)] sampling a mountain big sagebrush community and the other study [Big Meadow (8B-12)] sampling a wet meadow. The last study [Clay Basin Bench (8B-14)] was established in 2000 and samples a Wyoming big sagebrush community. There were four range trend studies [Cedar Springs (8B-1), Sagebrush Ridge (8B-10), Triangle Meadow (8B-11) and Lower Big Meadow (8B-13)] that have been suspended for various reasons and were not monitored in 2010. For further info on suspended studies, refer to past reports at <http://wildlife.utah.gov/range/>.

GOSLIN MOUNTAIN - TREND STUDY NO. 8B-2-10

Vegetation Type: Mountain Big Sagebrush-Grass

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XA430UT](#)

Land Ownership: UDWR

Elevation: 8030 ft. (2448 m)

Aspect: Southeast

Slope: 12%

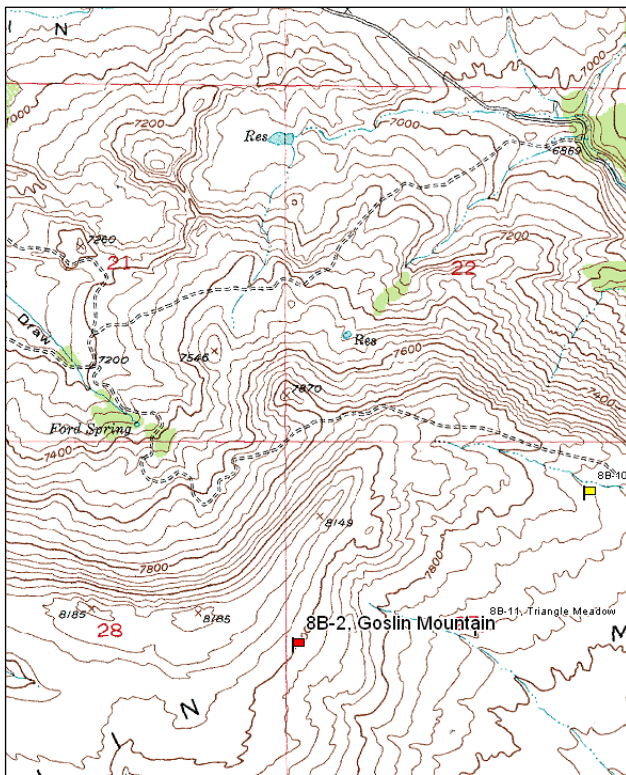
Transect bearing: 18° magnetic

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

Directions:

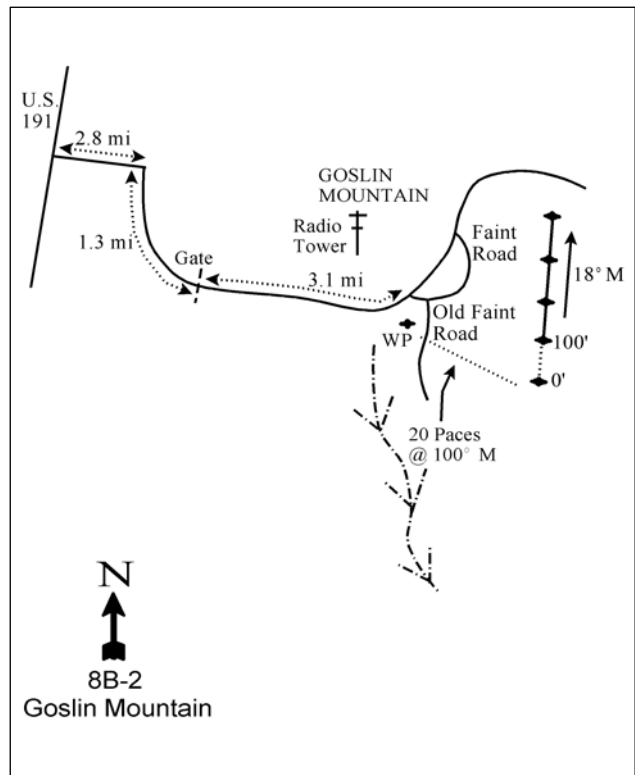
From Dutch John, proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before the Wyoming border, turn east on the Antelope Flat Road towards Goslin Mountain. Go 2.8 miles and turn right towards Goslin Mountain. Proceed 1.3 miles to a gate. Continue up the mountain 3.1 miles to a turnoff to the left which goes to a radio tower. A little further down the main road there is a road to the right with the witness post located off of it. Stop here and walk 20 paces at 100° to the 0-foot baseline stake.

Map Name: Goslin Mountain



Township: 3N Range: 23E Section: 27

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 641583 E 4536489 N

GOSLIN MOUNTAIN - TREND STUDY NO. 8B-2

Site Information

Site Description: The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community near the summit of Goslin Mountain. Much of the surrounding area was treated with a lop and scatter in the spring of 2008 as part of the Goslin Mountain Phase 2 Lop and Scatter ([WRI Project #691](#)). Several large juniper (*Juniperus osteosperma*) trees that were scattered over the site were cut down, likely as part of the treatment. Deer, elk and antelope utilize the site year-round with less use occurring during severe winters. The area is administered by the Utah Division of Wildlife Resources (UDWR), but cattle grazing is permitted in the area as part of the Goslin Mountain allotment managed by the Bureau of Land Management (BLM). The area is also considered important habitat for sage grouse. Pellet group transect data estimated light use by deer in 2001, but heavier use since 2005. Estimated elk and cattle use has been light since 2001. Grouse pellets were sampled on the site in 2005 (Table - Pellet Group Data).

Browse: The key browse species consists of a moderately dense stand of mountain big sagebrush which has provided the majority of the browse cover since 1995 (Table - Browse Trends). The sagebrush population is comprised of mostly mature plants with moderate to high amounts of decadence and poor vigor. Recruitment of young sagebrush plants has fluctuated from poor to good over the sample years. Utilization of sagebrush has been mostly light to moderate, though use was heavier in 1995 and 2010. Other important browse species consist of serviceberry (*Amelanchier utahensis*), bitterbrush (*Purshia tridentata*) and snowberry (*Symphoricarpos oreophilus*). The bitterbrush population has a prostrate growth form with an average height of less than 2 feet. Utilization estimates have been moderate to heavy, but vigor has remained good. The small number of serviceberry plants scattered throughout the site have displayed moderate to heavy hedging (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and abundant on the site. The dominant grasses consist of needle-and-thread (*Stipa comata*), Letterman needlegrass (*S. lettermani*), oniongrass (*Melica bulbosa*), thickspike wheatgrass (*Agropyron dasystachyum*), mutton bluegrass (*Poa fendleriana*) and Kentucky bluegrass (*P. pratensis*). It was reported in 1988 that the *Poa* spp. were identified to genus only because of the difficulty identifying grasses that year. Forbs are also very diverse and fairly abundant. Important species include silver lupine (*Lupinus argenteus*), low penstemon (*Penstemon humilus*) and sulfur eriogonum (*Eriogonum umbellatum*) (Table - Herbaceous Trends).

Soil: The soil texture is sandy loam which has a slightly acidic soil reaction (pH 6.2). Phosphorus may have limited availability for plant growth and development at 4.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Protective ground cover is abundant and well dispersed leaving little bare ground cover (Table - Basic Cover). However, there are some signs of past erosion in the form of soil pedestals around shrubs and the bare areas. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** The density of the primary browse species, mountain big sagebrush, increased by two-fold, but decadence increased from 3% to 52%.
- **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 mountain big sagebrush decreased to 33%, but poor vigor increased from 4% to 15% and there was no new recruitment of young sagebrush plants.
- **1995 to 2000 - stable (0):** Mountain big sagebrush density, cover, decadence and poor vigor remained similar.

- **2000 to 2005 - slightly down (-1):** The density of mountain big sagebrush decreased by 14% from 2,500 plants/acre to 2,160 plants/acre, though cover increased from 13% to 15%. Decadence of sagebrush decrease to 26%, but is still considered moderately high.
- **2005 to 2010 - slightly up (+1):** There was an 11% increase in the density of mountain big sagebrush to 2,400 plants/acre. Recruitment of young sagebrush plants increased from 6% to 15% of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 11%.
- **1995 to 2000 - up (+2):** The perennial grass sum of nested frequency increased by 21% and cover increased from 13% to 24%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses with a slight decrease in cover to 20%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 15%, though cover increased to 24%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 26%.
- **1995 to 2000 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 16%, but cover increased slightly from 3% to 5%.
- **2000 to 2005 - stable (0):** There was little change in the perennial forb sum of nested frequency or cover.
- **2005 to 2010 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 19%, but cover increased to 6%.

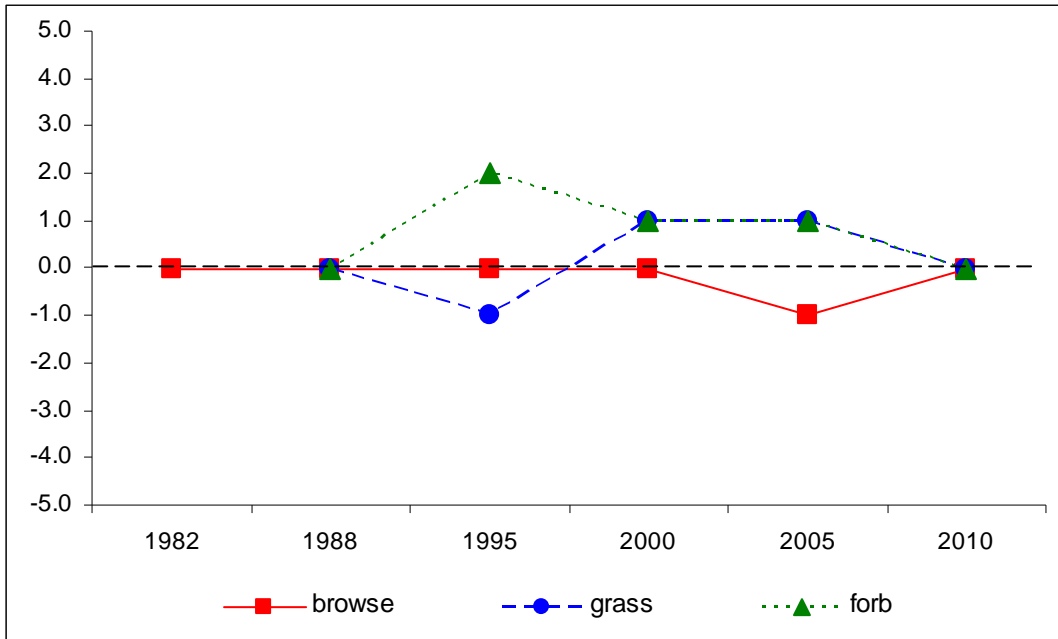
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 8B, study no: 2

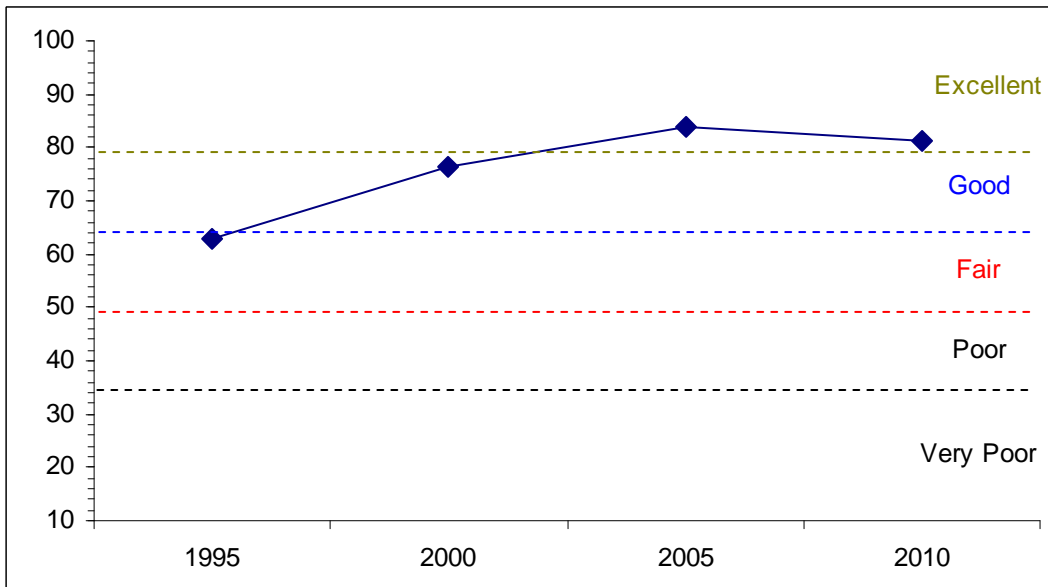
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	22.1	7.0	1.4	26.2	0.0	6.4	0.0	63.0	Fair
00	25.8	7.1	3.6	30.0	0.0	10.0	0.0	76.5	Good
05	29.9	9.9	4.5	30.0	0.0	9.4	0.0	83.7	Excellent
10	25.2	10.2	5.8	30.0	0.0	10.0	0.0	81.2	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 8B, Study no: 2



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 8B, Study no: 2



HERBACEOUS TRENDS--
Management unit 08B, Study no: 2

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	136	144	150	183	150	1.06	2.82	2.24	3.08
G	Agropyron spicatum	a-	b37	b14	b25	b20	.42	.63	.26	.60
G	Agropyron trachycaulum	a-	a-	ab6	a-	b19	-	.30	-	.15
G	Bromus carinatus	a-	a-	a6	a-	b20	-	.18	-	.47
G	Bromus tectorum (a)	-	2	-	5	-	.00	-	.01	-
G	Carex sp.	22	32	31	43	35	.88	.75	1.12	.81
G	Dactylis glomerata	-	1	-	-	-	.00	-	.00	-
G	Danthonia unispicata	14	4	3	2	3	1.01	.00	.03	.15
G	Koeleria cristata	11	-	2	-	12	-	.03	-	.39
G	Leucopoa kingii	-	3	7	7	2	.06	.44	.44	.06
G	Melica bulbosa	ab86	b102	c156	bc121	a58	2.94	3.74	1.61	1.58
G	Poa bulbosa	a-	ab3	b22	b15	b15	.03	.17	.69	.30
G	Poa fendleriana	a-	b38	b87	c128	c122	.45	2.25	3.28	3.99
G	Poa pratensis	a-	a5	b43	b53	b47	.06	1.37	1.06	2.87
G	Poa secunda	a-	b25	bc38	c56	bc32	.09	.36	1.33	.62
G	Poa sp.	b171	a-	a-	a-	a-	-	-	-	-
G	Sitanion hystrix	b63	a-	a-	a1	a-	-	-	.00	-
G	Stipa columbiana	b89	a7	b86	a22	a43	.07	2.58	1.06	1.75
G	Stipa comata	a118	b190	ab139	ab137	a112	4.46	7.60	5.60	5.39
G	Stipa lettermani	abc54	c89	a34	bc64	ab40	1.57	.68	1.50	1.50
Total for Annual Grasses		0	2	0	5	0	0.00	0	0.00	0
Total for Perennial Grasses		764	680	824	857	730	13.11	23.96	20.29	23.76
Total for Grasses		764	682	824	862	730	13.12	23.96	20.30	23.76
F	Achillea millefolium	b15	a-	a-	a4	b9	-	-	.15	.09
F	Agoseris glauca	a-	a53	b64	c89	a3	.28	1.06	.54	.03
F	Allium sp.	a21	b139	a35	a41	a13	.81	.12	.11	.05
F	Alyssum alyssoides (a)	-	-	-	-	6	-	-	-	.01
F	Androsace septentrionalis (a)	-	-	-	-	1	-	-	-	.00
F	Antennaria rosea	b14	a3	ab9	ab5	a-	.00	.07	.03	-
F	Arabis sp.	3	3	2	2	3	.00	.00	.01	.00
F	Arenaria sp.	a1	b20	b31	ab16	ab13	.20	.33	.12	.07
F	Aster chilensis	b16	b16	ab7	a-	a-	.06	.07	-	-
F	Astragalus argophyllus	a3	ab5	b15	ab6	ab7	.01	.13	.06	.04
F	Calochortus nuttallii	-	-	-	-	1	-	-	-	.00
F	Chaenactis douglasii	-	3	-	3	2	.00	-	.03	.00
F	Collinsia parviflora (a)	-	c234	a22	b92	a52	1.48	.09	.41	.26
F	Collomia linearis (a)	-	a151	b37	b37	b48	.75	.25	.14	.20
F	Comandra pallida	-	-	1	-	-	-	.00	-	-
F	Crepis acuminata	a3	ab5	ab3	ab7	b17	.04	.03	.07	.11
F	Cymopterus longipes	a-	b19	ab12	ab8	ab9	.05	.10	.09	.05
F	Delphinium nuttallianum	-	1	2	1	-	.00	.00	.00	-
F	Descurainia pinnata (a)	-	5	6	-	2	.01	.01	-	.00
F	Erigeron eatonii	a-	a7	b28	a3	ab18	.04	.11	.06	.06

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Erigeron flagellaris</i>	_b 94	_a 11	_a 5	_a 7	_a 5	.06	.06	.07	.06
F	<i>Eriogonum umbellatum</i>	_b 46	_a 3	_a 14	_a 8	_b 54	.02	.25	.30	2.85
F	<i>Gilia inconspicua</i> (a)	-	4	-	-	-	.00	-	-	-
F	<i>Heterotheca villosa</i>	-	-	8	3	-	.03	.06	.18	.00
F	<i>Lactuca serriola</i>	-	-	-	-	3	-	-	-	.00
F	<i>Lomatium</i> sp.	-	4	-	-	3	.01	-	-	.03
F	<i>Lupinus argenteus</i>	35	44	37	28	34	.51	.80	1.21	1.18
F	<i>Lychnis drummondii</i>	-	-	-	8	5	-	-	.02	.06
F	<i>Mertensia</i> sp.	_a -	_a -	_a -	_b 17	_a -	-	-	.18	-
F	<i>Microsteris gracilis</i> (a)	-	_b 31	_b 29	_b 24	_a -	.15	.07	.07	-
F	<i>Penstemon humilis</i>	_a -	_{ab} 7	_{ab} 5	_{ab} 7	_b 15	.16	.06	.07	.54
F	<i>Petrorhiza pumila</i>	-	-	1	2	3	-	.03	.15	.06
F	<i>Phlox longifolia</i>	_c 117	_b 73	_{ab} 70	_b 77	_a 39	.36	.40	.71	.17
F	<i>Polygonum douglasii</i> (a)	-	_b 71	_a 33	_a 25	_a 16	.17	.06	.07	.03
F	<i>Schoenocrambe linifolia</i>	-	-	-	3	-	-	-	.00	-
F	<i>Senecio integerrimus</i>	_a -	_{ab} 13	_a 2	_b 24	_a 10	.09	.00	.12	.05
F	<i>Senecio multilobatus</i>	-	4	-	4	3	.03	-	.03	.03
F	<i>Taraxacum officinale</i>	_{ab} 4	_b 36	_{ab} 13	_a -	_{ab} 7	.25	.22	.00	.04
F	<i>Tragopogon dubius</i>	-	3	5	2	6	.00	.06	.01	.04
F	<i>Trifolium gymnocarpon</i>	_a 8	_{bc} 57	_c 63	_{ab} 32	_{bc} 48	.15	.80	.32	.45
F	Unknown forb-perennial	_b 33	_a -	_a -	_a -	_a -	-	-	-	-
F	<i>Viola</i> sp.	_a -	_a -	_b 12	_a -	_a -	-	.24	-	-
F	<i>Zigadenus paniculatus</i>	8	2	-	1	1	.00	-	.00	.00
Total for Annual Forbs		0	496	127	178	125	2.57	0.50	0.69	0.52
Total for Perennial Forbs		421	531	444	408	331	3.21	5.09	4.71	6.13
Total for Forbs		421	1027	571	586	456	5.78	5.59	5.41	6.66

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

BROWSE TRENDS--

Management unit 08B, Study no: 2

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	<i>Amelanchier utahensis</i>	3	4	3	4	.30	1.54	1.54	1.11
B	<i>Artemisia tridentata vaseyana</i>	72	72	64	70	13.53	12.76	14.56	13.56
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	7	7	4	5	.42	.18	.41	.15
B	<i>Eriogonum heracleoides</i>	51	54	60	20	3.26	1.81	4.44	1.97
B	<i>Gutierrezia sarothrae</i>	3	0	3	1	.15	-	.03	.03
B	<i>Mahonia repens</i>	12	5	4	5	.48	.15	.30	.30
B	<i>Purshia tridentata</i>	15	20	19	21	3.13	5.00	6.25	4.42
B	<i>Ribes</i> sp.	0	0	0	1	-	-	-	-
B	<i>Symphoricarpos oreophilus</i>	10	8	8	11	.72	2.87	3.29	2.59
Total for Browse		173	170	165	138	22.01	24.33	30.83	24.16

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 2

Species	Percent Cover		
	'00	'05	'10
<i>Amelanchier utahensis</i>	-	1.68	2.06
<i>Artemisia tridentata vaseyana</i>	-	17.98	17.71
<i>Chrysothamnus viscidiflorus lanceolatus</i>	-	.13	-
<i>Eriogonum heracleoides</i>	-	4.93	1.21
<i>Gutierrezia sarothrae</i>	-	-	.06
<i>Juniperus scopulorum</i>	1.60	1.20	-
<i>Mahonia repens</i>	-	.23	.45
<i>Purshia tridentata</i>	-	5.56	7.91
<i>Symphoricarpos oreophilus</i>	-	3.01	3.66

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 2

Species	Average leader growth (in)	
	'05	'10
<i>Artemisia tridentata vaseyana</i>	1.3	1.3
<i>Purshia tridentata</i>	2.2	1.6

BASIC COVER--

Management unit 08B, Study no: 2

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.50	12.00	41.94	57.47	55.04	53.77
Rock	2.75	2.00	3.28	5.05	4.00	3.60
Pavement	0	3.00	.84	2.42	.80	.71
Litter	60.25	57.50	50.97	58.79	34.59	55.33
Cryptogams	1.00	.25	.10	.38	.07	.03
Bare Ground	27.50	25.25	16.86	12.69	17.82	16.77

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 2, Study Name: Goslin Mountain

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.4	6.2	69.3	16.2	14.6	2.6	4.6	121.6	0.5

PELLET GROUP DATA--

Management unit 08B, Study no: 2

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	-	1	5	5	-	-	-
Grouse	-	-	3	-	-	61/acre	-
Elk	3	1	4	2	3 (8)	4 (10)	10 (25)
Deer	7	4	8	12	15 (36)	56 (139)	58 (144)
Cattle	5	3	6	3	-	9 (22)	7 (16)

BROWSE CHARACTERISTICS--
Management unit 08B, Study no: 2

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>Amelanchier utahensis</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	80	0	75	25	-	50	25	0	17/37
00	80	0	100	0	-	0	0	0	30/50
05	80	0	100	0	-	0	100	0	35/56
10	100	0	80	20	-	20	80	20	30/51
<i>Artemisia tridentata vaseyana</i>									
82	2332	6	91	3	-	0	0	0	27/33
88	4865	21	27	52	733	38	1	4	27/39
95	2480	0	67	33	-	52	27	15	51/59
00	2500	7	57	36	220	12	2	18	23/36
05	2160	6	68	26	760	28	4	17	24/38
10	2400	15	64	21	20	37	23	22	25/43
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
82	199	0	100	0	-	0	0	0	9/7
88	199	0	67	33	-	0	0	0	15/7
95	200	0	100	0	-	0	0	0	12/21
00	220	0	100	0	-	0	0	0	9/13
05	120	17	83	0	-	0	0	0	10/17
10	120	17	83	0	-	17	0	0	11/16
<i>Eriogonum heracleoides</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	3000	16	83	1	-	0	.66	.66	7/18
00	2620	5	95	0	-	0	0	0	5/15
05	2660	4	91	5	-	8	0	.75	7/20
10	1520	30	70	0	-	0	0	0	5/14
<i>Gutierrezia sarothrae</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	180	0	100	-	-	0	0	0	4/7
00	0	0	0	-	-	0	0	0	-/-
05	100	0	100	-	-	0	0	0	8/12
10	80	0	100	-	-	0	0	0	6/8

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Mahonia repens									
82	599	0	100	-	-	0	0	0	5/4
88	1933	100	0	-	-	14	0	0	-/-
95	2900	34	66	-	-	0	0	0	4/6
00	560	43	57	-	-	0	0	0	4/4
05	400	40	60	-	-	0	0	0	4/6
10	1080	15	85	-	-	0	0	0	4/5
Purshia tridentata									
82	532	25	75	0	-	25	63	0	11/21
88	799	33	67	0	-	42	50	25	14/22
95	400	15	85	0	-	45	45	0	13/45
00	420	10	81	10	-	67	0	5	20/63
05	440	18	82	0	-	14	73	0	20/60
10	480	4	96	0	-	29	54	4	21/59
Ribes sp.									
82	0	0	0	-	-	0	0	0	-/-
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	31/37
10	20	0	100	-	-	100	0	0	-/-
Symphoricarpos oreophilus									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	400	35	65	-	20	0	0	0	15/41
00	160	0	100	-	-	0	0	13	24/63
05	320	6	94	-	-	0	0	0	18/41
10	340	6	94	-	-	35	24	0	19/60

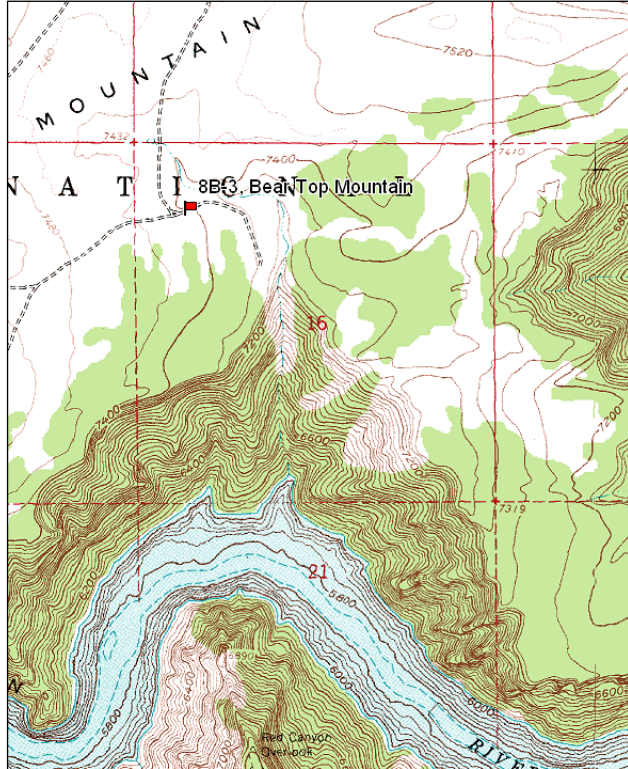
BEAR TOP MOUNTAIN - TREND STUDY NO. 8B-3-10

Vegetation Type: Mountain Big Sagebrush-Grass
Range Type: Substantial Deer Winter, Crucial Elk Year-Long (Calving habitat)
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 7430 ft. (2265 m)
Aspect: Northeast
Slope: 0%-3%
Transect bearing: 165° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

Directions:

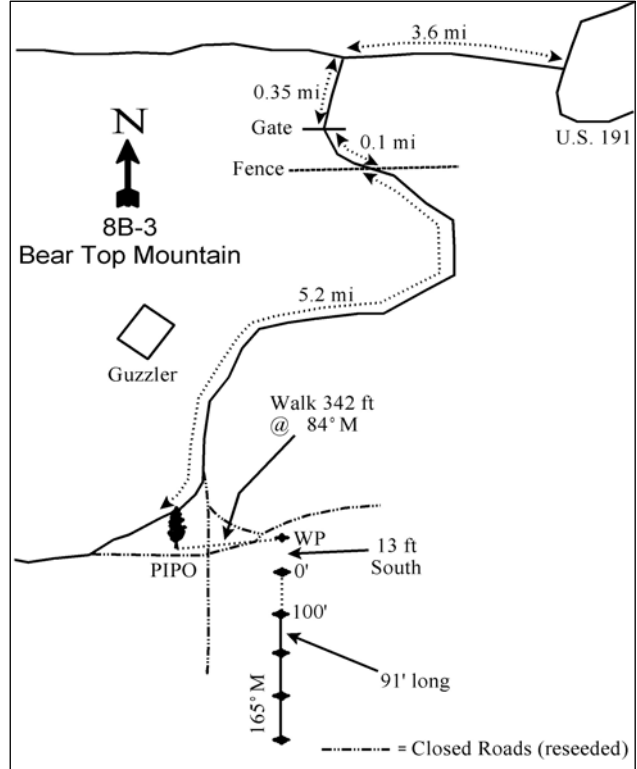
From the intersection of Highway U-260 and U.S. 191 northwest of Dutch John, proceed west towards Antelope Flat campground for 3.6 miles. Turn left, and proceed on the dirt road towards Bear Top Mountain for 0.35 miles to a locked gate. Go through the gate and continue 0.1 miles to a new fence. Continue up the mountain approximately 5.2 miles to a large Ponderosa pine (*Pinus ponderosa*). From the pine, the witness post is 342 feet at 84°M. The 0-foot stake is 13 feet south of the witness post. It is marked with a red browse tag #7095.

Map Name: Flaming Gorge



Township: 2N Range: 21E Section: 16

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 620899 E 4530310 N

BEAR TOP MOUNTAIN - TREND STUDY NO. 8B-3

Site Information

Site Description: The study is on U.S. Forest Service managed land on Bear Top Mountain, about a quarter mile from the cliffs overlooking Flaming Gorge Reservoir. Rocky Mountain bighorn sheep were transplanted in the early 1980's and utilize the area as summer range. Two nearby guzzlers provide water for wildlife since livestock have been excluded since the early 1960's. The area was burned in 1998 as part of a prescribed fire to clear the rim of Bear Top Mountain for big horn sheep habitat. However, the fire eliminated most of the shrubs. Antelope, mule deer, elk, bighorn sheep and sage grouse have been observed in close proximity to the site during past readings. Because of the difficulty in differentiating between species; deer, antelope and big horn pellets were all classified as deer. Pellet group transect data has estimated elk and deer/antelope use to be very light to moderately light since 2000. Light use by moose was sampled in 2000. Sage grouse, coyote and marmot droppings were all sampled in the pellet group transect in 2005 (Table - Pellet Group Data).

Browse: The key browse species prior to the fire was a moderately dense stand of mostly mature mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with low to moderate decadence and moderate to heavy use. The fire removed almost all of the mountain big sagebrush plants and the population is now comprised of a small, scattered stand of mixed young, mature and decadent plants. Utilization of sagebrush has remained moderate to heavy. Other browse species include a small population of heavily used antelope bitterbrush (*Purshia tridentata*), mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), gray horsebrush (*Tetradymia canescens*) and low numbers of broom snakeweed (*Gutierrezia sarothrae*) (Table - Browse Characteristics). Mountain low rabbitbrush provided as much cover as mountain big sagebrush in 2010 (Table - Browse Trends).

Herbaceous Understory: Grasses are abundant and diverse on the site, but cheatgrass (*Bromus tectorum*) was abundant on the site in 2010. Cheatgrass was most prevalent in the rocky, shallow soils dispersed throughout the site. Perennial grasses remained abundant in the deeper soils on the site, however. Perennial grass cover increased following the fire. The most common perennial grass species have included needle-and-thread (*Stipa comata*), Letterman needlegrass (*S. lettermani*), bluebunch wheatgrass (*Agropyron spicatum*), thickspike wheatgrass (*A. dasystachyum*), mutton bluegrass (*Poa fendleriana*), Sandberg bluegrass (*P. secunda*) and prairie junegrass (*Koeleria cristata*). Prior to the fire, forbs were abundant, but decreased substantially in cover since 1995. Forbs provided 36% of the vegetation cover with 27 perennial and 7 annual species sampled in 1995. Several desirable forbs including sulfur eriogonum (*Eriogonum umbellatum*) and silvery lupine (*Lupinus argenteus*) also decreased significantly in 2005 and remained rare on the site in 2010. Forbs have been fairly rare on the site since 2000 (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam with a neutral soil reaction (pH 6.8). Phosphorus may have limited availability for plant growth and development at 4.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bed rock is exposed in many places on the surface, and rock and pavement provide a good amount of protective ground cover. Bare ground cover was high in 2000, but has been low in all other sample years (Table - Basic Cover). The soil erosion condition was classified stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** The density of the primary browse species, mountain big sagebrush, increased by 45% from 6,265 plants/acre to 9,065 plants/acre. However, decadence also increased from 9% to 25% of the population. Recruitment of young plants remained excellent at 28% of the population.
- **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 mountain big sagebrush decreased to 11%, but recruitment of young plants also decreased to 12%.

- **1995 to 2000 - down (-2):** The prescribed fire removed nearly all of the shrubs from the site. Mountain big sagebrush decreased by 94% from 5,200 plants/acre to 320 plants/acre and cover decreased from 15% to 1%. Decadence of sagebrush increased to 44%, and there was no new recruitment of young plants.
- **2000 to 2005 - slightly down (-1):** The density of mountain big sagebrush decreased slightly to 240 plants/acre and cover decreased to less than 1%. Decadence of sagebrush decreased slightly, but remained high at 33%. Recruitment of young sagebrush plants comprised 33% of the small population.
- **2005 to 2010 - stable (0):** The mountain big sagebrush density increased to 440 plants/acre, but cover decreased slightly and remained less than 1%. Decadence of sagebrush decreased, but was still moderately high at 23%. Poor vigor also increased from 8% to 23% in the sagebrush population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial grasses decreased by 32%.
- **1995 to 2000 - slightly up (+1):** The perennial grass sum of nested frequency increased by 18% and cover increased from 8% to 14%.
- **2000 to 2005 - slightly up (+1):** There was only a 6% increase in the sum of nested frequency of perennial grasses, but cover increased to 36% due to a large increase in the cover of needle-and-thread.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial grasses decreased by 29% and cover decreased to 25%. Cheatgrass increased significantly in nested frequency and cover increased from less than 1% to 16%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial forbs decreased by 21%.
- **1995 to 2000 - down (-2):** There was a 42% decrease in the sum of nested frequency of perennial forbs and cover decreased from 12% to 7%. There was a significant decrease in the nested frequency of sulfur eriogonum.
- **2000 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased by 88% and cover decreased to 1%. The nested frequency of many desirable forbs decreased significantly. Perennial forbs were rare on the site.
- **2005 to 2010 - up (+2):** The sum of nested frequency of perennial forbs increased more than two-fold, but remained below 2000 levels. The cover of perennial forbs increased slightly to 3%, and perennial forbs remained fairly rare.

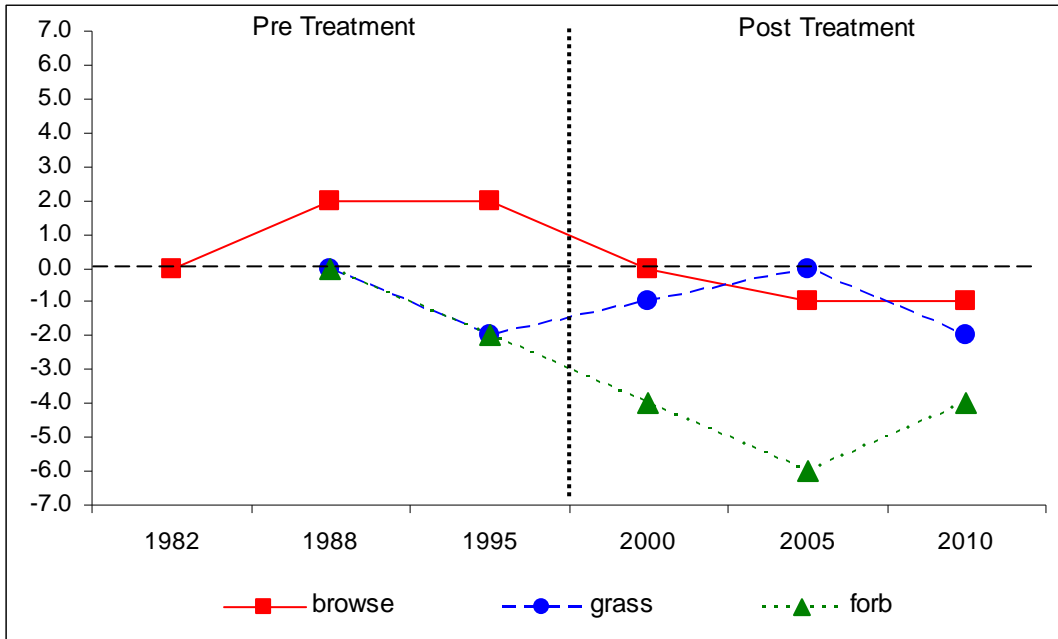
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 8B, study no: 3

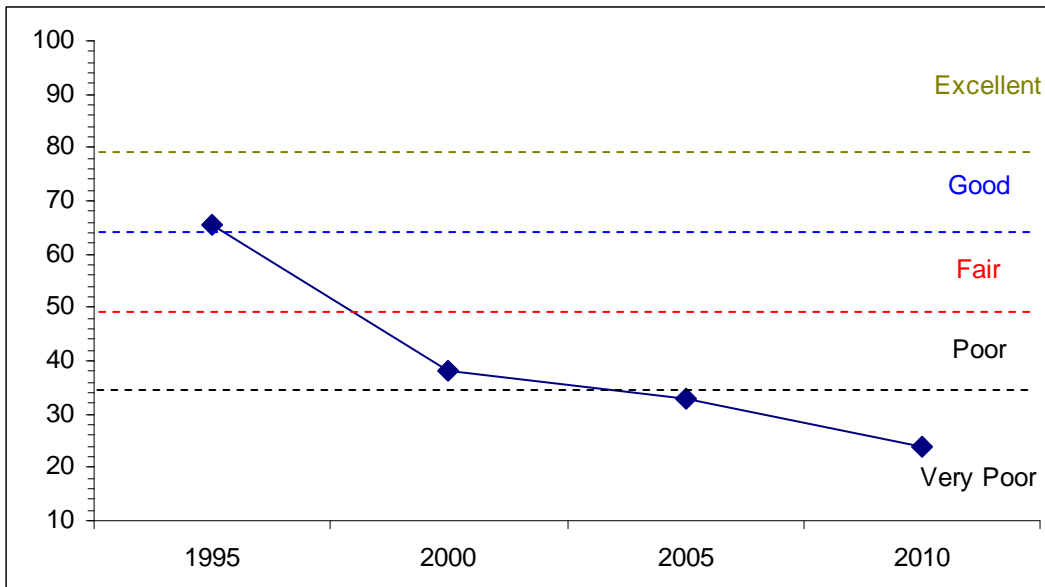
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	22.2	12.2	5.1	16.3	-0.2	10.0	0.0	65.6	Fair-Good
00	1.6	0.0	0.0	27.0	-0.5	10.0	0.0	38.1	Poor
05	1.0	0.0	0.0	30.0	-0.1	2.1	0.0	33.0	Very Poor-Poor
10	0.8	0.0	0.0	30.0	-12.3	5.1	0.0	23.7	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8B, Study no: 3



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 8B, Study no: 3



HERBACEOUS TRENDS--
Management unit 08B, Study no: 3

T y P e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a-	c118	d191	d174	b75	1.03	2.88	3.44	1.90
G	Agropyron spicatum	b208	a77	a68	a49	a69	.96	1.82	3.37	3.53
G	Bromus inermis	a-	a-	a-	ab7	b13	-	.00	.53	.65
G	Bromus tectorum (a)	-	a26	a55	a44	b226	.21	.65	.11	16.34
G	Carex sp.	b72	a17	a16	a8	a30	.15	.52	.37	1.02
G	Koeleria cristata	c119	ab13	a9	b29	ab20	.09	.04	1.47	1.21
G	Oryzopsis hymenoides	-	-	-	-	7	-	-	-	.04
G	Poa fendleriana	111	128	129	84	106	2.51	2.37	4.01	4.33
G	Poa secunda	c166	ab105	bc136	bc132	a83	1.27	1.12	4.26	3.59
G	Sitanion hystrix	ab14	bc41	bc34	c57	a2	.45	.82	1.69	.06
G	Sporobolus cryptandrus	-	7	-	-	-	.15	-	-	-
G	Stipa comata	bc129	a82	ab111	c176	ab103	1.50	3.74	16.06	6.36
G	Stipa lettermani	c39	a-	ab2	bc21	b16	-	.15	1.10	1.75
Total for Annual Grasses		0	26	55	44	226	0.20	0.65	0.10	16.34
Total for Perennial Grasses		858	588	696	737	524	8.15	13.49	36.33	24.47
Total for Grasses		858	614	751	781	750	8.36	14.14	36.44	40.81
F	Agoseris glauca	a-	b27	c63	a-	a-	.05	.48	-	-
F	Allium sp.	a-	b10	a-	a-	a-	.03	-	-	-
F	Androsace septentrionalis (a)	-	2	-	-	-	.01	-	-	-
F	Antennaria rosea	c124	b41	ab30	a4	ab21	.86	.33	.06	.89
F	Arabis sp.	11	3	2	1	5	.00	.00	.00	.01
F	Arenaria sp.	ab7	b17	a3	ab6	ab6	.23	.15	.02	.09
F	Aster sp.	a-	b23	a-	a2	ab9	.12	-	.03	.07
F	Astragalus convallarius	7	14	-	1	6	.10	-	.00	.09
F	Astragalus sp.	-	-	-	2	-	-	-	.03	-
F	Balsamorhiza sagittata	ab5	b9	b11	a-	a-	.69	.68	-	-
F	Calochortus nuttallii	-	3	-	-	-	.00	-	-	-
F	Collinsia parviflora (a)	-	a148	a100	b39	b50	2.28	.30	.13	.20
F	Comandra pallida	a-	ab13	b14	a-	a3	.25	.09	-	.03
F	Crepis acuminata	a-	b9	a-	a-	a1	.03	-	-	.00
F	Cymopterus sp.	a-	b10	a-	a-	a-	.05	-	-	-
F	Descurainia pinnata (a)	-	a-	a1	b55	a1	-	.00	.20	.00
F	Draba sp. (a)	a-	ab12	a1	b20	a-	.02	.00	.04	-
F	Erigeron flagellaris	-	2	5	-	3	.00	.06	-	.03
F	Erigeron pumilus	c83	b20	ab6	a-	a-	.19	.04	-	-
F	Eriogonum umbellatum	c79	c78	b30	a4	a7	2.25	1.48	.78	.96
F	Gayophytum ramosissimum(a)	-	a8	a7	b32	b26	.02	.01	.07	.06
F	Heterotheca villosa	bc31	c50	b20	a-	a-	.83	.22	-	-
F	Lepidium sp. (a)	-	b9	a-	a-	ab4	.02	-	-	.01
F	Linum lewisii	b38	a4	a6	a3	a2	.01	.01	.01	.03
F	Lithospermum ruderales	b18	ab4	ab8	a-	a2	.19	.04	-	.03
F	Lupinus argenteus	c176	b100	b91	a1	a2	1.97	1.92	.00	.03
F	Lychnis drummondii	a-	a-	a-	a1	b8	-	-	.03	.10

Type	Species	Nestled Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Machaeranthera canescens</i>	7	-	-	-	5	-	-	-	.03
F	<i>Mertensia fusiformis</i>	-	-	1	-	-	-	.00	-	-
F	<i>Orthocarpus tolmiei</i> (a)	-	b35	a7	a	a	.15	.04	-	-
F	<i>Penstemon humilis</i>	b11	a-	a1	a-	a-	-	.03	-	-
F	<i>Petradoria pumila</i>	b7	c31	bc17	a-	a-	1.41	.86	-	-
F	<i>Phlox longifolia</i>	b59	a3	a7	a2	a1	.01	.04	.00	.00
F	<i>Phlox multiflora</i>	c66	bc66	b30	a-	a3	2.30	.26	-	.03
F	<i>Polygonum douglasii</i> (a)	-	c60	a-	b5	c87	.13	-	.02	.86
F	<i>Sedum lanceolatum</i>	b76	b100	a24	a12	a1	.42	.10	.03	.03
F	<i>Senecio integerrimus</i>	-	-	6	-	-	-	.01	-	-
F	<i>Trifolium gymnocarpon</i>	18	16	7	6	20	.03	.01	.04	.08
F	<i>Zigadenus</i> sp.	4	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	274	116	151	168	2.65	0.37	0.47	1.13
Total for Perennial Forbs		827	653	382	45	105	12.10	6.86	1.05	2.57
Total for Forbs		827	927	498	196	273	14.75	7.24	1.52	3.71

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

BROWSE TRENDS--

Management unit 08B, Study no: 3

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	<i>Artemisia tridentata vaseyana</i>	88	9	8	11	14.65	1.29	.80	.66
B	<i>Ceanothus fendleri</i>	0	1	1	1	-	.18	-	.03
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	25	21	13	15	.75	.20	.15	.78
B	<i>Gutierrezia sarothrae</i>	3	4	9	15	-	.21	.36	.51
B	<i>Juniperus osteosperma</i>	0	0	0	1	.15	-	-	-
B	<i>Pediocactus simpsonii</i>	10	6	1	1	.01	.02	-	.03
B	<i>Purshia tridentata</i>	6	1	1	1	2.59	.01	-	-
B	<i>Tetradymia canescens</i>	4	1	4	5	.03	.00	.33	.56
Total for Browse		136	43	37	50	18.19	1.91	1.64	2.57

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 3

Species	Percent Cover	
	'05	'10
<i>Artemisia tridentata vaseyana</i>	.43	.33
<i>Chrysothamnus viscidiflorus lanceolatus</i>	.30	1.35
<i>Gutierrezia sarothrae</i>	.23	1.03
<i>Pediocactus simpsonii</i>	-	.03
<i>Purshia tridentata</i>	.06	.21
<i>Tetradymia canescens</i>	.08	.61

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 3

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	1.8	1.9

BASIC COVER--

Management unit 08B, Study no: 3

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	12.00	12.00	38.31	27.03	42.22	50.84
Rock	1.00	4.75	11.07	13.54	11.35	10.62
Pavement	0	0	.04	.57	.02	0
Litter	58.25	59.75	46.33	23.65	38.11	58.27
Cryptogams	2.25	4.50	3.25	.76	.18	1.70
Bare Ground	26.50	19.00	16.85	49.63	16.60	7.84

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 3, Study Name: Bear Top Mountain

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.4	6.8	65.4	19.7	14.9	2.2	4.5	201.6	0.9

PELLET GROUP DATA--

Management unit 08B, Study no: 3

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	3	6	26	2
Moose	-	15	-	-
Grouse	-	2	2	1
Elk	7	5	14	9
Deer/Antelope /Big Horn	16	9	6	9
Cattle	-	-	1	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
16 (39)	-	-
9/acre	9/acre	-
7 (18)	29 (71)	21 (51)
24 (60)	7 (18)	27 (66)
-	-	-

BROWSE CHARACTERISTICS--
Management unit 08B, Study no: 3

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>Amelanchier utahensis</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	13/21
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>									
82	6265	24	67	9	66	21	1	2	15/24
88	9065	28	47	25	-	42	1	2	16/18
95	5200	12	77	11	40	33	60	4	15/29
00	320	0	56	44	20	38	0	6	12/29
05	240	33	33	33	140	17	50	8	12/26
10	440	32	45	23	-	9	55	23	13/26
<i>Ceanothus fendleri</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	0	0	0	8/18
05	20	0	100	-	-	0	0	0	5/18
10	20	0	100	-	-	100	0	0	7/28
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
82	2331	46	37	17	66	0	0	17	8/12
88	3531	57	32	11	-	8	2	9	9/11
95	940	4	94	2	-	0	0	0	10/15
00	880	34	66	0	-	0	0	0	4/5
05	360	0	100	0	-	0	0	0	9/14
10	380	0	100	0	-	0	0	0	14/24
<i>Gutierrezia sarothrae</i>									
82	0	0	0	0	-	0	0	0	-/-
88	66	0	100	0	-	0	0	0	5/6
95	60	33	67	0	-	0	0	0	4/4
00	140	0	100	0	-	0	0	0	6/13
05	1080	61	37	2	-	0	0	0	7/12
10	860	28	60	12	220	0	0	12	7/13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Juniperus osteosperma									
82	0	0	0	-	-	0	0	0	-/-
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	20	100	0	-	-	0	0	0	-/-
Pediocactus simpsonii									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	220	9	91	0	-	0	0	0	2/2
00	160	25	63	13	20	0	0	13	2/16
05	20	0	100	0	-	0	0	0	1/2
10	20	0	100	0	-	0	0	0	2/3
Purshia tridentata									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	120	0	100	-	-	33	50	0	20/78
00	20	0	100	-	40	0	0	0	4/9
05	20	0	100	-	-	0	100	0	11/39
10	20	0	100	-	-	0	100	0	14/40
Tetradymia canescens									
82	199	0	33	67	-	0	0	67	17/8
88	133	0	100	0	-	100	0	0	13/18
95	120	0	83	17	-	0	0	0	10/13
00	80	0	100	0	-	0	0	0	-/-
05	80	25	75	0	-	0	0	0	8/16
10	120	0	100	0	-	83	0	0	11/18

GREENDALE - TREND STUDY NO. 8B-4-10

Vegetation Type: Mountain Big Sagebrush-Grass

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 7100 ft. (2165 m)

Aspect: North

Slope: 7%

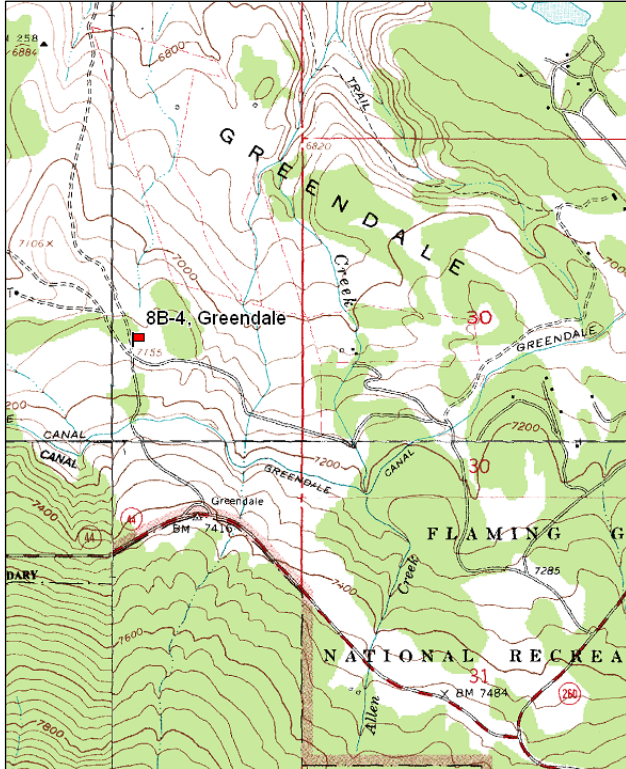
Transect bearing: 347° magnetic

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

Directions:

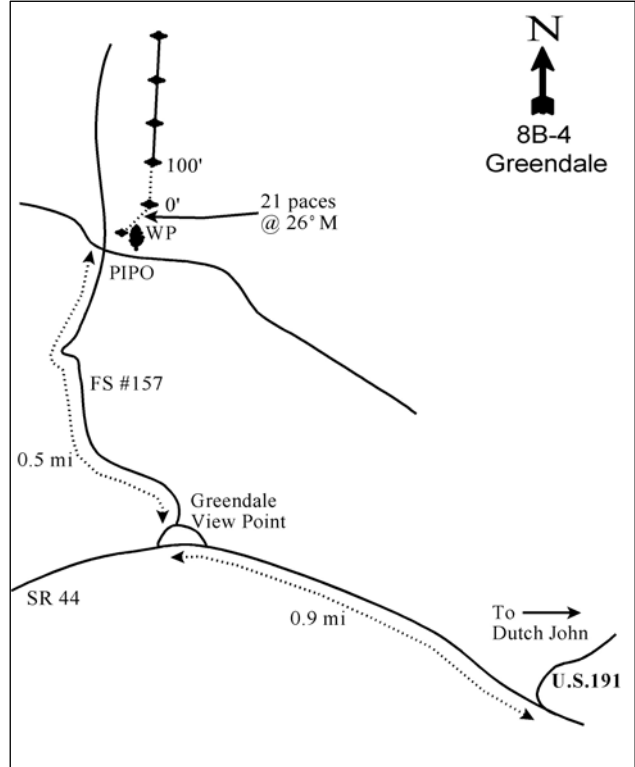
From the junction of Highways U-44 and U.S. 191, proceed toward Manila for 0.9 miles. Turn off at the Greendale view point. Take the dirt road (FS 157) to the north which goes to the Canyon Rim trail. Go 0.5 miles to an intersection. From the Ponderosa pine (*Pinus ponderosa*) northeast of the intersection, walk 21 paces at 26°M to the 0' stake.

Map Name: Dutch John



Township: 2N Range: 21E Section: 25

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 626438 E 4526365 N

GREENDALE - TREND STUDY NO. 8B-4

Site Information

Site Description: The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass park surrounded by montane forest about a mile and a half northwest of the junction of Highway 44 and Highway 191. Due to the close proximity of the highway, the area receives a large amount of recreational use by campers and hunters. The area is classified as deer and elk winter range, but depending on the weather, it actually receives year-round use by big game. Cattle graze the area as part of the U.S. Forest Service Lewis/Allen allotment. Pellet group transect data estimated moderate deer use in 2000 and 2010, with heavier use in 2005. Estimated elk use has steadily decreased from heavy use in 2000 to light use in 2010. Estimated use by cattle has been light since 2000 (Table - Pellet Group Data). This area is also used by a few moose.

Browse: The key browse species on the site are mountain big sagebrush and antelope bitterbrush (*Purshia tridentata*). Sagebrush is more numerous and provides the majority of the browse cover (Table - Browse Trends). The sagebrush population is mostly mature with a moderate amount of decadence and mostly moderate use. Recruitment of young plants has been mostly good over the course of the study. Bitterbrush consists of a moderately to heavily utilized population of mostly mature plants. Decadence of bitterbrush has fluctuated from low to moderate and recruitment of young plants has been mostly good. The low growing Fendler ceanothus (*Ceanothus fendleri*) is also abundant and increased substantially in density in 2005, but receives mostly light use. Other browse species growing on the site include mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), broom snakeweed (*Gutierrezia sarothrae*), Wood's rose (*Rosa woodsii*) and snowberry (*Symphoricarpos oreophilus*). All of these species show little or no utilization, except mountain mahogany which had heavy use (Table - Browse Characteristics). Ponderosa pine (*Pinus ponderosa*) surrounds the site and a few mature and young trees are scattered on the site. Ponderosa trees appear to be increasing slowly with an increase in density (Table - Point-Quarter Tree Data) and canopy cover (Table - Canopy Cover) since 2000.

Herbaceous Understory: Grasses are abundant and fairly diverse, but are dominated by the introduced species Kentucky bluegrass (*Poa pratensis*). Kentucky bluegrass forms a dense sod over much of the area which tends to exclude other native grass and forb species. The only other common grass species is needle-and-thread (*Stipa comata*). Forbs are also diverse and abundant on the site. The most numerous perennial forb species include arrowleaf balsamroot (*Balsamorhiza sagittata*), rose pussytoes (*Antennaria rosea*), trailing fleabane (*Erigeron flagellaris*) and rock goldenrod (*Petradoria pumila*) (Table - Herbaceous Trends).

Soil: The soil has a sandy clay loam texture and is slightly acidic (pH 6.3). Phosphorus may have limited availability for plant growth and development at 3.3 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is low with a large amount of vegetation and litter providing the majority of the protective ground cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005, but was slight in 2010 due to active gullies, flow patterns, and litter and soil movement.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** Both of the preferred browse species, mountain big sagebrush and bitterbrush, had substantial increases in density, and both of the species populations remained healthy.
- **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 mountain big sagebrush and bitterbrush decreased slightly, but so did the recruitment of young plants.
- **1995 to 2000 - stable (0):** There was a slight increase in the density of mountain big sagebrush, but cover decreased slightly. Decadence of sagebrush also increased from 6% to 29%. The density of bitterbrush increased by 11% from 1,240 plants/acre to 1,380 plants/acre, but cover increased from 4% to 6%.

- **2000 to 2005 - stable (0):** There was a slight decrease in the density of mountain big sagebrush, returning to 1995 levels, but cover increased from 13% to 17%. Decadence of sagebrush remained moderate at 26% and recruitment of young plants increased slightly from 11% to 15% of the population. The density of bitterbrush increased by 14% to 1,580 plants/acre, but cover remained similar. Decadence of bitterbrush increased from 10% to 25% and poor vigor increased from 3% to 10%.
- **2005 to 2010 - stable (0):** There was a 25% decrease in the density of mountain big sagebrush from 4,520 plants/acre to 3,400 plants/acre, and cover decreased to 13%. However, the density of bitterbrush continued to increase by 18% to 1,860 plants/acre and decadence decreased to 9% of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial grasses increased by 35%.
- **1995 to 2000 - down (-2):** The perennial grass sum of nested frequency decreased by 21%, but cover increased from 13% to 25%. There was a significant increase in the nested frequency of Kentucky bluegrass with a subsequent increase in cover from 10% to 21%.
- **2000 to 2005 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 14%, although cover decreased to 17%. There was a significant increase in the nested frequency of bottlebrush squirreltail (*Sitanion hystrix*) and needle-and-thread. The nested frequency of Kentucky bluegrass decreased significantly with a subsequent decrease in cover.
- **2005 to 2010 - slightly down (-1):** There was a 14% decrease in the nested frequency of perennial grasses, though cover once again increased to 25%. The Kentucky bluegrass nested frequency increased significantly with a large increase in cover.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The perennial forb sum of nested frequency increased by 28%.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 24%, returning to 1988 levels, but cover remained similar.
- **2000 to 2005 - slightly up (+1):** The perennial forb sum of nested frequency increased by 12% and cover increased from 10% to 13%.
- **2005 to 2010 - slightly down (-1):** There was an 18% decrease in the sum of nested frequency of perennial forbs and cover decreased to 9%.

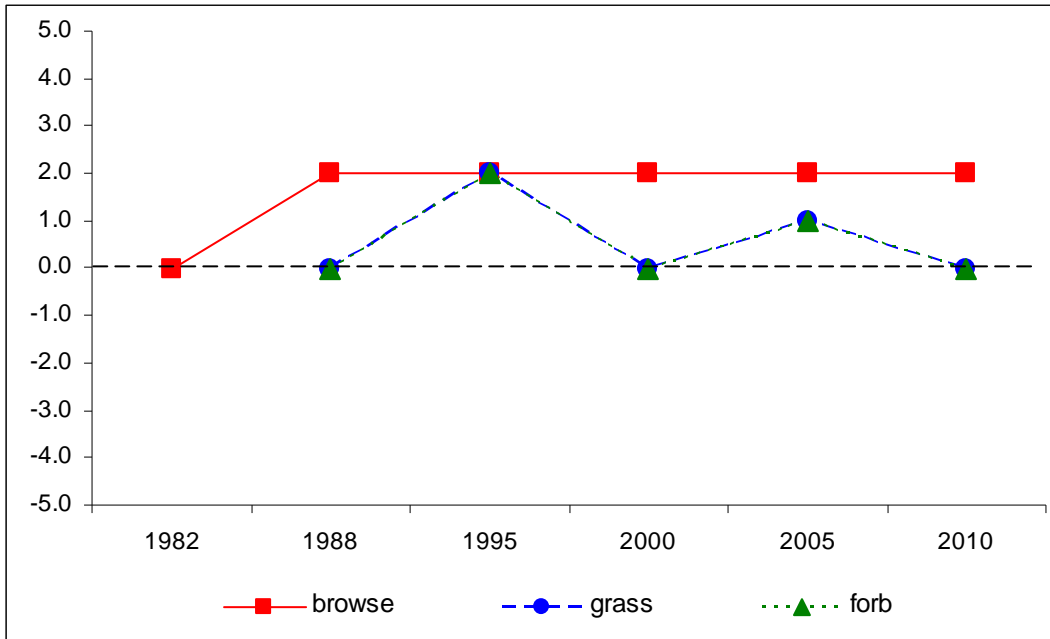
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 8B, study no: 4

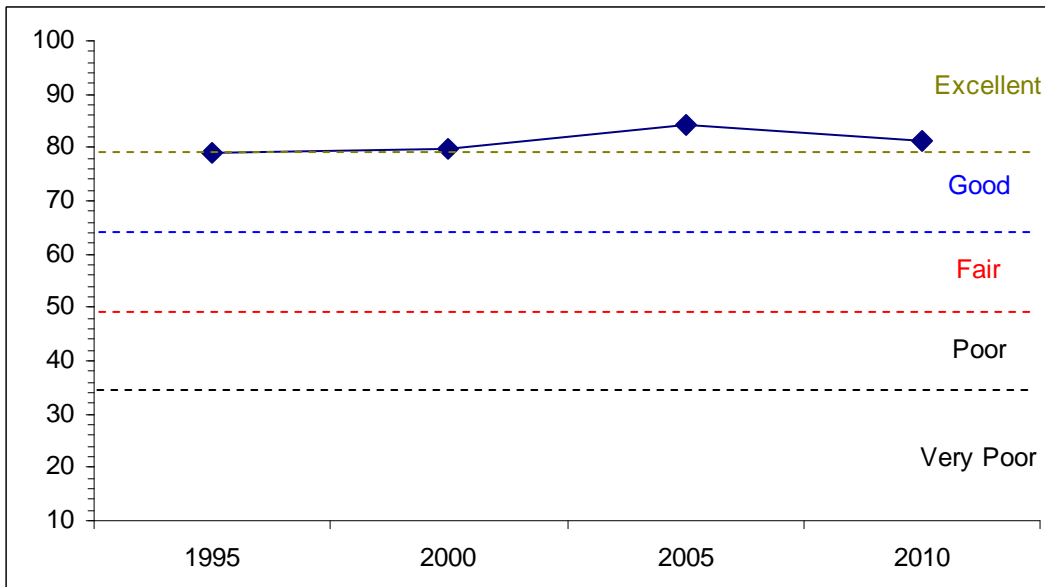
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	23.7	13.6	5.6	26.4	-0.1	10.0	0.0	79.1	Good-Excellent
00	26.4	8.2	5.1	30.0	0.0	10.0	0.0	79.7	Good-Excellent
05	30.0	7.6	6.7	30.0	0.0	10.0	0.0	84.3	Excellent
10	26.4	8.6	6.7	30.0	-0.4	10.0	0.0	81.3	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8B, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 8B, Study no: 4



HERBACEOUS TRENDS--
Management unit 08B, Study no: 4

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	a37	b110	a19	a22	a28	.88	.12	.08	.18
G	<i>Agropyron spicatum</i>	-	4	3	-	-	.03	.00	-	.00
G	<i>Agropyron trachycaulum</i>	-	-	4	-	-	-	.03	-	-
G	<i>Bromus tectorum</i> (a)	-	a5	a-	a3	b33	.15	-	.03	.52
G	<i>Carex</i> sp.	20	17	18	23	13	.08	.16	.65	.42
G	<i>Dactylis glomerata</i>	a-	b25	a4	ab11	ab8	.07	.18	.22	.21
G	<i>Danthonia unispicata</i>	-	-	1	-	-	-	.00	-	-
G	<i>Koeleria cristata</i>	ab18	ab18	a3	b28	b24	.11	.03	1.07	.67
G	<i>Poa fendleriana</i>	a-	b28	b11	c66	bc37	.25	.08	.65	.30
G	<i>Poa pratensis</i>	c303	c287	d352	a203	b259	10.21	21.30	6.65	18.53
G	<i>Poa secunda</i>	ab8	b33	a11	ab23	a9	.26	.04	.15	.01
G	<i>Sitanion hystrix</i>	c54	bc40	a3	bc41	b26	.28	.00	.51	.73
G	<i>Stipa comata</i>	a36	b82	b82	c154	b94	.97	3.17	6.43	4.27
G	<i>Stipa lettermani</i>	1	-	-	11	-	-	-	.05	-
Total for Annual Grasses		0	5	0	3	33	0.15	0	0.03	0.52
Total for Perennial Grasses		477	644	511	582	498	13.18	25.17	16.48	25.37
Total for Grasses		477	649	511	585	531	13.33	25.17	16.52	25.90
F	<i>Achillea millefolium</i>	-	1	11	9	9	.00	.09	.18	.09
F	<i>Agoseris glauca</i>	a-	b27	a-	b41	a-	.09	-	.23	-
F	<i>Allium</i> sp.	a-	c46	a-	b15	ab2	.18	-	.04	.01
F	<i>Antennaria rosea</i>	a6	b37	b35	b38	b47	1.11	.92	1.43	1.08
F	<i>Arabis</i> sp.	a-	ab5	a2	b13	ab5	.01	.00	.03	.01
F	<i>Artemisia ludoviciana</i>	-	-	4	-	3	-	.18	-	.03
F	<i>Aster chilensis</i>	a4	b24	c17	c26	b15	.26	.32	.93	.29
F	<i>Astragalus</i> sp.	-	-	2	-	-	-	.00	-	-
F	<i>Balsamorhiza sagittata</i>	a8	bc57	c59	c62	b36	3.67	3.95	5.40	3.46
F	<i>Calochortus nuttallii</i>	-	7	-	3	-	.01	-	.00	-
F	<i>Castilleja</i> sp.	-	1	-	-	-	.00	-	-	-
F	<i>Collinsia parviflora</i> (a)	-	d255	a3	c67	b21	2.95	.01	.21	.06
F	<i>Collomia linearis</i> (a)	-	c195	a3	ab18	b30	1.56	.00	.05	.07
F	<i>Comandra pallida</i>	54	72	66	67	84	.39	.65	.66	.62
F	<i>Crepis acuminata</i>	-	-	-	2	-	-	-	.03	-
F	<i>Cymopterus longipes</i>	ab8	ab20	ab19	b20	a4	.66	.07	.05	.03
F	<i>Erigeron divergens</i>	b28	a-	a-	a-	a-	-	-	-	-
F	<i>Erigeron eatonii</i>	a12	ab11	b28	a8	a8	.02	.45	.04	.21
F	<i>Erigeron flagellaris</i>	a-	a3	b36	b38	b39	.03	.93	1.16	.84
F	<i>Eriogonum alatum</i>	b45	a6	a4	a6	a-	.07	.01	.31	-
F	<i>Eriogonum umbellatum</i>	6	6	4	6	5	.03	.15	.21	.06
F	<i>Gayophytum ramosissimum</i> (a)	-	2	-	1	1	.00	-	.00	.00
F	<i>Heterotheca villosa</i>	c110	b39	ab17	a4	ab	.29	.46	.48	.45
F	<i>Holosteum umbellatum</i> (a)	-	-	1	2	-	-	.03	.00	-
F	<i>Ipomopsis aggregata</i>	a-	a-	ab7	ab2	b13	.00	.01	.03	.10
F	<i>Lepidium</i> sp. (a)	-	ab5	a-	b15	ab9	.01	-	.05	.02

T y p e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Linum lewisii</i>	40	35	35	39	30	.10	.24	.21	.15
F	<i>Lithospermum ruderales</i>	a ⁻	a ²	b ¹²	ab ⁹	ab ⁷	.03	.10	.37	.18
F	<i>Lupinus argenteus</i>	1	-	-	-	-	-	-	-	-
F	<i>Lychnis drummondii</i>	-	-	-	5	-	-	-	.01	-
F	<i>Microsteris gracilis</i> (a)	-	a ⁻	a ⁻	b ¹⁵	a ¹	-	-	.04	.00
F	<i>Oenothera pallida</i>	b ²⁶	a ⁶	a ⁻	a ⁵	a ⁻	.01	-	.03	-
F	<i>Penstemon humilis</i>	a ²	b ¹⁸	ab ⁹	a ⁻	a ¹	.14	.04	-	.15
F	<i>Penstemon</i> sp.	-	-	-	1	4	-	-	.03	.01
F	<i>Petradoria pumila</i>	b ⁴⁰	ab ²⁷	ab ²³	a ¹⁷	ab ¹⁹	.92	1.00	1.19	.58
F	<i>Phlox hoodii</i>	a ⁻	b ⁸	ab ³	a ⁻	a ⁻	.51	.00	-	-
F	<i>Phlox longifolia</i>	-	7	6	-	-	.01	.04	-	-
F	<i>Phlox</i> sp.	a ⁻	b ²¹	a ⁻	a ⁻	a ⁻	.03	-	-	-
F	<i>Polygonum douglasii</i> (a)	-	c ⁵¹	a ¹⁴	bc ³⁶	ab ²⁹	.19	.03	.11	.15
F	<i>Sedum lanceolatum</i>	b ²³	ab ¹³	a ⁻	a ⁷	a ³	.02	-	.04	.00
F	<i>Solidago sparsiflora</i>	b ¹⁷	b ²⁷	b ¹⁰	a ⁻	b ¹²	.51	.24	-	.45
F	<i>Taraxacum officinale</i>	a ⁻	b ¹¹	ab ⁶	a ⁻	a ⁻	.05	.01	-	-
F	<i>Tragopogon dubius</i>	5	8	5	6	1	.02	.04	.03	.00
F	<i>Trifolium gymnocarpon</i>	a ⁻	b ¹⁰	ab ⁶	c ²²	bc ¹⁶	.03	.02	.13	.13
F	<i>Zigadenus paniculatus</i>	-	3	-	6	-	.00	-	.06	-
Total for Annual Forbs		0	508	21	154	91	4.72	0.08	0.48	0.31
Total for Perennial Forbs		435	558	426	477	390	9.28	10.01	13.39	8.99
Total for Forbs		435	1066	447	631	481	14.00	10.09	13.88	9.31

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

BROWSE TRENDS--

Management unit 08B, Study no: 4

T y p e	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	<i>Amelanchier utahensis</i>	0	1	1	1	-	.38	.85	.63
B	<i>Artemisia tridentata vaseyana</i>	84	90	86	82	14.17	13.44	16.73	13.18
B	<i>Ceanothus fendleri</i>	23	32	38	36	6.81	3.92	3.00	2.52
B	<i>Cercocarpus montanus</i>	0	0	0	1	-	-	-	-
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	26	21	23	20	.71	.33	.72	.42
B	<i>Gutierrezia sarothrae</i>	3	1	3	6	.03	.15	.15	.15
B	<i>Mahonia repens</i>	10	13	13	11	.45	.16	.22	.42
B	<i>Pinus ponderosa</i>	0	2	3	1	-	1.23	2.11	2.39
B	<i>Purshia tridentata</i>	52	46	49	52	3.98	6.00	5.82	6.00
B	<i>Rosa woodsii</i>	2	0	0	0	-	-	-	-
B	<i>Symphoricarpos oreophilus</i>	4	2	3	5	.79	.21	.21	.45
Total for Browse		204	208	219	215	26.97	25.85	29.83	26.19

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 4

Species	Percent Cover		
	'00	'05	'10
Amelanchier utahensis	-	.68	.81
Artemisia tridentata vaseyana	-	19.70	21.00
Ceanothus fendleri	-	4.50	5.48
Chrysothamnus viscidiflorus lanceolatus	-	.91	.31
Gutierrezia sarothrae	-	.01	.16
Mahonia repens	-	.26	.45
Pinus ponderosa	2.40	2.83	4.51
Purshia tridentata	-	7.59	10.53
Symphoricarpos oreophilus	-	1.04	1.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 4

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	2.3	2.2
Purshia tridentata	2.8	3.8

POINT-QUARTER TREE DATA--

Management unit 08B, Study no: 4

Species	Trees per Acre				Average diameter (in)			
	'95	'00	'05	'10	'95	'00	'05	'10
Pinus ponderosa	24	21	35	40	9.6	3.4	5.9	5.6

BASIC COVER--

Management unit 08B, Study no: 4

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	9.25	10.75	46.69	59.22	53.50	57.98
Rock	2.25	4.00	2.57	1.79	1.85	1.24
Pavement	0	7.00	1.43	1.28	1.60	2.26
Litter	51.25	53.25	55.45	65.27	36.88	60.79
Cryptogams	1.25	0	.57	.75	.12	.24
Bare Ground	36.00	25.00	16.99	11.93	21.40	12.93

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 4, Study Name: Greendale

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
19.9	6.3	61.4	21.7	16.9	2.5	3.3	227.2	0.6

PELLET GROUP DATA--

Management unit 08B, Study no: 4

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	-	11	20	9
Elk	2	6	8	-
Deer	8	35	56	42
Cattle	1	3	2	1

Days use per acre (ha)		
'00	'05	'10
-	-	-
62 (152)	25 (61)	13 (31)
28 (69)	96 (236)	42 (104)
10 (25)	4 (9)	5 (13)

BROWSE CHARACTERISTICS--

Management unit 08B, Study no: 4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier utahensis									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	29/45
00	20	0	100	-	-	0	0	0	26/35
05	20	0	100	-	-	0	100	0	32/41
10	20	0	100	-	-	100	0	0	33/44
Artemisia tridentata vaseyana									
82	1732	0	81	19	133	12	0	0	24/31
88	4397	32	55	14	866	38	5	0	26/26
95	4440	12	82	6	20	60	12	1	19/30
00	4800	11	60	29	-	35	2	6	19/27
05	4520	15	59	26	1080	34	21	9	23/34
10	3440	7	66	27	160	47	23	28	24/34
Ceanothus fendleri									
82	66	100	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	780	0	100	0	-	0	0	0	9/49
00	900	9	91	0	-	0	0	0	8/37
05	4680	8	92	0	-	31	14	0	5/12
10	3120	7	93	0	-	13	0	0	8/16
Chrysothamnus viscidiflorus lanceolatus									
82	399	0	100	0	-	0	0	0	10/9
88	466	0	100	0	-	0	0	0	12/10
95	840	5	95	0	-	2	0	0	14/16
00	620	3	94	3	-	0	0	0	10/12
05	620	16	81	3	-	0	0	0	12/15
10	580	0	100	0	-	7	0	0	13/16

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Gutierrezia sarothrae										
82	0	0	0	-	-	0	0	0	-/-	
88	66	0	100	-	-	0	0	0	6/10	
95	80	0	100	-	-	0	0	0	7/7	
00	40	0	100	-	-	0	0	0	-/-	
05	120	0	100	-	-	0	0	0	8/9	
10	320	31	69	-	-	0	0	0	9/12	
Mahonia repens										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	4880	0	100	-	-	0	0	0	3/4	
00	1740	82	18	-	-	0	0	0	2/2	
05	2900	12	88	-	-	0	0	0	3/4	
10	4160	24	76	-	-	0	0	0	3/4	
Pinus ponderosa										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	33	67	-	-	0	0	0	-/-	
05	60	0	100	-	20	0	0	0	-/-	
10	20	100	0	-	20	0	0	0	-/-	
Purshia tridentata										
82	1399	5	95	0	-	86	14	0	22/26	
88	2198	21	67	12	-	42	27	12	19/25	
95	1240	8	92	0	40	81	8	0	14/33	
00	1380	9	81	10	20	51	1	3	17/35	
05	1580	11	63	25	40	15	81	10	15/34	
10	1860	29	62	9	40	57	9	6	18/38	
Rosa woodsii										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	180	89	11	-	20	0	0	0	7/8	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	13/13	
10	0	0	0	-	-	0	0	0	15/14	
Symphoricarpos oreophilus										
82	66	0	100	-	-	0	0	0	9/17	
88	66	0	100	-	-	0	0	0	10/19	
95	100	0	100	-	-	0	0	0	17/53	
00	40	50	50	-	-	0	0	0	20/66	
05	80	0	100	-	-	0	0	0	20/50	
10	100	20	80	-	-	0	0	0	24/53	

BENNETT RANCH - TREND STUDY NO. 8B-5-10

Vegetation Type: Mountain Big Sagebrush-Grass

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: SANDY (10-14W), R034XY250WY

Land Ownership: Private

Elevation: 603463 ft. (4534401 m)

Aspect: North

Slope: 8%

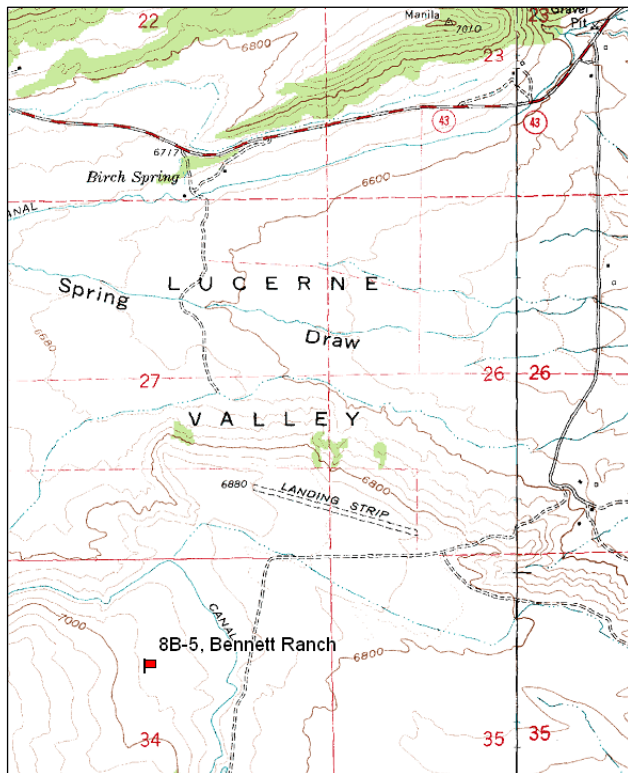
Transect bearing: 200° magnetic

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

Directions:

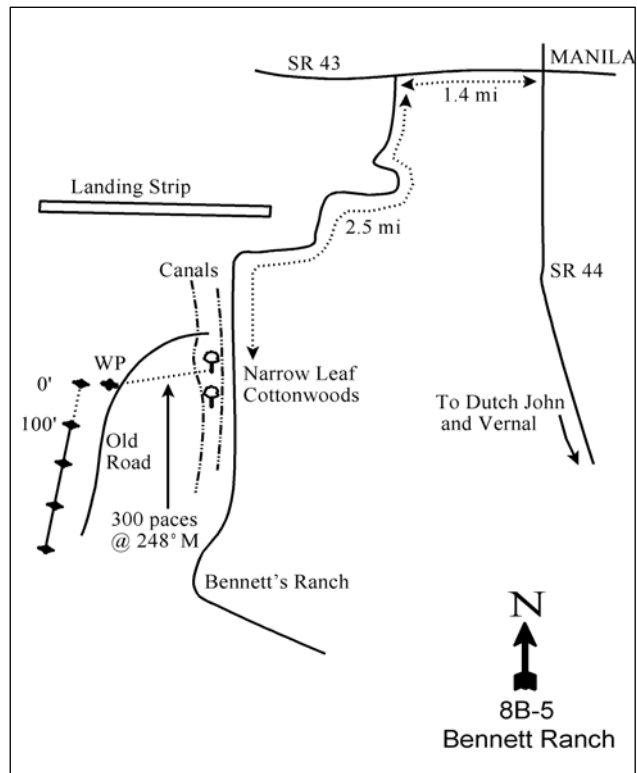
From the intersection of Highway U-43 and Main Street in Manila, proceed west on U-43 for 1.4 miles to a dirt road (Bennion Lane) on the left. Turn south and go 2.5 miles to a narrowleaf cottonwood (*Populus angustifolia*) tree on the right (west) side of the road. From the cottonwood tree, the 0-foot baseline stake is 300 paces away at a bearing of 234°M. Several canals have to be crossed from the road to the study transect.

Map Name: Jessen Butte



Township: 3N Range: 19E Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 603463 E 4534401 N

BENNETT RANCH - TREND STUDY NO. 8B-5

Site Information

Site Description: The trend study is located on Bennett Ranch property, which is privately owned. The study samples a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community, located at the foot of Jensen Butte, and above the irrigated hay fields and pastures near Manila. Water is seasonally available from an irrigation ditch about 400 yards from the site. The area is used by cattle and wintering deer and elk. Pellet group transect data estimated light use by deer and elk in 2000, with more moderate use by both species since 2005. Estimated use by cattle has been light since 2000 (Table - Pellet Group Data).

Browse: The key browse species include Wyoming big sagebrush and black sagebrush (*Artemisia nova*), which together provide nearly all of the browse cover (Table - Browse Trends). The Wyoming big sagebrush population is comprised of a fairly dense stand of relatively small, mature plants with moderately high decadence, and moderate to heavy use. Much of the population has displayed poor vigor over the course of the study, and recruitment of young plants has been mostly poor. The density of Wyoming big sagebrush has steadily decreased since 1995. The black sagebrush population is also comprised of mostly small, mature plants, but decadence and vigor are considerably better than in Wyoming big sagebrush. Recruitment of young black sagebrush plants has fluctuated over the sample years, but has been generally good. Utilization of black sagebrush has been mostly light. Other preferred browse encountered on the site included small numbers of winterfat (*Ceratoides lanata*), white rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) and slenderbush eriogonum (*Eriogonum microthecum*) (Table - Browse Characteristics). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are found in low densities scattered over the site (Table - Point-Quarter Tree Data).

Herbaceous Understory: Grasses are quite diverse and abundant for a Wyoming big sagebrush site. Native perennial grasses dominate the site including thickspike wheatgrass (*Agropyron dasystachyum*), needle-and-thread (*Stipa comata*), mutton bluegrass (*Poa fendleriana*) and prairie junegrass (*Koeleria cristata*). Forbs are diverse, but are not overly abundant. Most of the perennial forb cover is provided by two species, Hood's phlox (*Phlox hoodii*) and scarlet globemallow (*Sphaeralcea coccinea*) (Table - Herbaceous Trends). Utilization of the grasses has been heavy in the past, but there was no apparent use observed since 2000.

Soil: Soils are an alluvial deposited sandy clay loam with a neutral soil reaction (pH 7.1) (Table - Soil Analysis Data). Ground cover is typical for a Wyoming big sagebrush site with a moderately high amount of bare ground (Table - Basic Cover). Some erosion has been occurring on the site but it is not serious due to the shallow slope. The soil erosion condition was classified as stable in 2005, but was slight in 2010 due primarily to rills and flow patterns which were transporting a large portion of litter and soil on the site.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** There was a substantial increase in the density of both Wyoming big sagebrush and black sagebrush. However, decadence of both species also increased markedly.
- **1988 to 1995 - slightly up (+1):** 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 34% to 7%, and poor vigor decreased from 17% to 4%. The decadence of black sagebrush also decreased from 22% to 1%.
- **1995 to 2000 - slightly down (-1):** The density of Wyoming big sagebrush decreased by 13% from 6,080 plants/acre to 5,260 plants/acre, though cover changed little. The proportion of decadent plants increased to 39% and poor vigor increased to 21% of the population. Recruitment of young Wyoming big sagebrush plants decreased from 10% to 2%. Black sagebrush, however, increased by 47% in density from 2,760 plants/acre to 4,060 plants/acre, though cover decreased slightly. Decadence and

poor vigor remained low in black sagebrush, but recruitment of young plants decreased from 19% to 6%.

- **2000 to 2005 - stable (0):** The density of Wyoming big sagebrush decreased slightly, but the density of black sagebrush increased slightly. Decadence and poor vigor remained high in the Wyoming big sagebrush population, and recruitment remained low.
- **2005 to 2010 - slightly down (-1):** Wyoming big sagebrush density decreased by 13% from 4,960 plants/acre to 4,300 plants/acre, and cover decreased from 16% to 12%. Decadence decreased from 40% to 29%, but is still considered moderately high. Poor vigor increased from 32% to 40%. The black sagebrush population remained similar.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 15%.
- **1995 to 2000 - slightly down (-1):** There was a 10% decrease in the sum of nested frequency of perennial grasses, though cover remained similar.
- **2000 to 2005 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 11%, returning to 1995 levels, but cover decreased from 9% to 6%. There was a slight change in composition with a significant decrease in the nested frequency of thickspike wheatgrass and a significant increase in the nested frequency of needle-and -thread.
- **2005 to 2010 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 14%, though cover increased to 9%.

Forb:

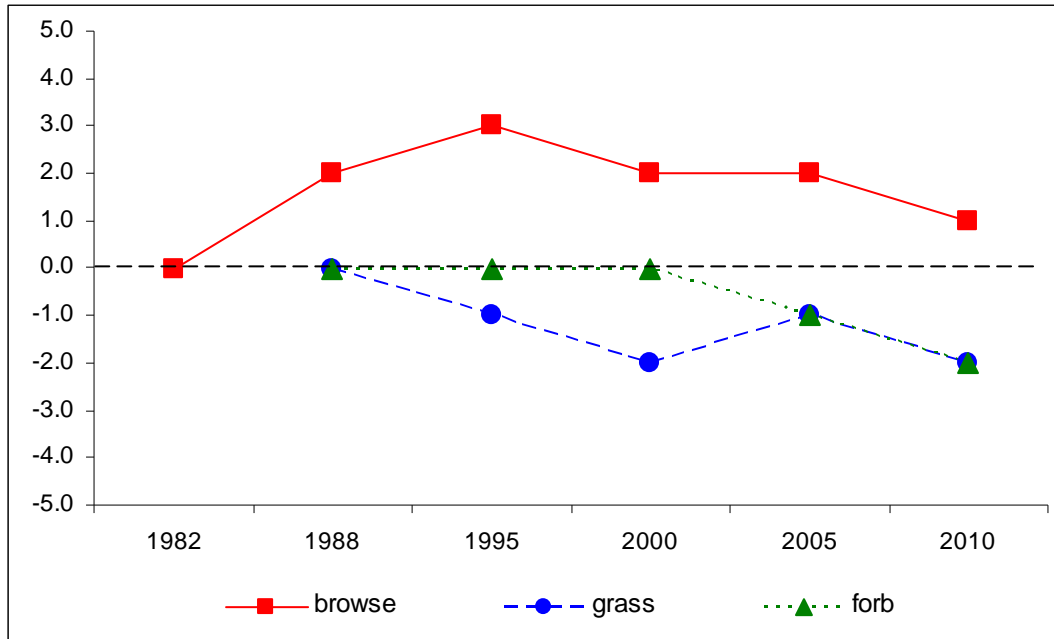
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial forbs.
- **1995 to 2000 - stable (0):** The perennial forb sum of nested frequency and cover remained similar.
- **2000 to 2005 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 12%, and cover decreased from 5% to 4%.
- **2005 to 2010 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 18%, though cover remained similar.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 8B, study no: 5

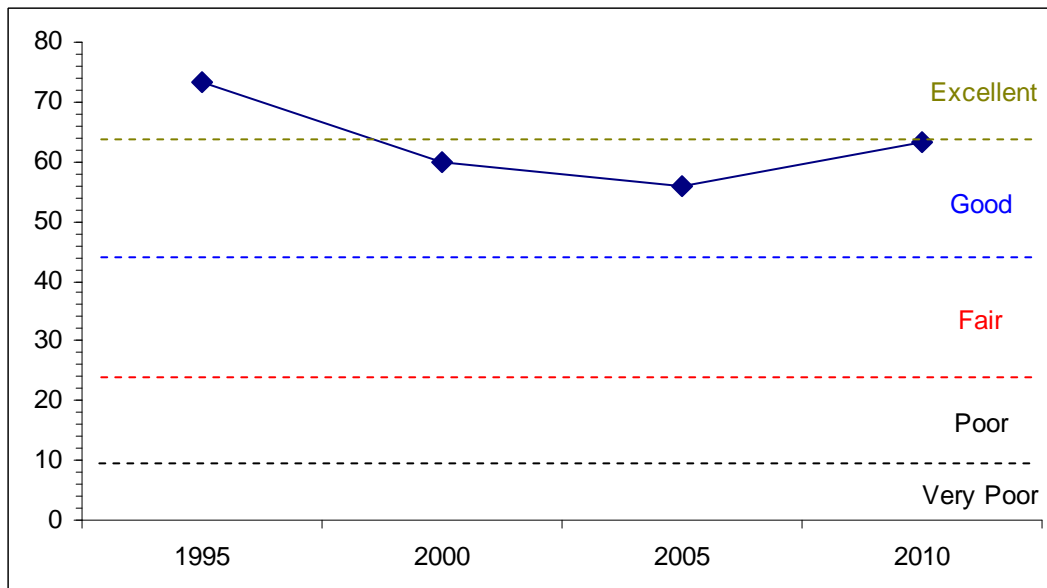
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	28.0	13.4	6.1	16.5	0.0	9.1	0.0	73.2	Excellent
00	26.0	5.4	1.5	17.1	0.0	10.0	0.0	60.0	Good
05	28.2	6.0	1.8	11.8	0.0	8.2	0.0	56.0	Good
10	25.3	8.9	2.9	18.4	0.0	7.6	0.0	63.1	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8B, Study no: 5



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 8B, Study no: 5



HERBACEOUS TRENDS--
Management unit 08B, Study no: 5

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron cristatum</i>	1	-	-	-	-	-	-	-	-
G	<i>Agropyron dasystachyum</i>	ab209	bc220	c247	ab201	a156	2.75	3.98	1.40	1.79

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron intermedium	-	-	3	5	-	-	.03	.09	-
G	Hilaria jamesii	a ⁻	a ⁻	a ³	a ⁻	b ¹⁸	-	.00	-	.19
G	Koeleria cristata	bc ⁴⁷	ab ¹⁹	a ⁷	bc ⁴²	c ⁴⁶	.11	.07	.55	1.17
G	Oryzopsis hymenoides	24	35	14	31	19	.43	.19	.26	.38
G	Poa fendleriana	b ¹⁷⁷	a ⁴⁷	a ⁸¹	a ⁴⁶	a ⁶³	.88	1.50	.45	1.58
G	Poa secunda	68	71	61	92	71	.74	.46	1.13	1.26
G	Sitanion hystrix	a ⁴⁰	b ⁸¹	a ¹⁷	a ²⁰	a ¹⁵	1.36	.38	.14	.16
G	Stipa comata	ab ¹¹¹	ab ¹⁰⁴	a ⁸⁷	b ¹⁴²	ab ¹⁰⁸	1.99	1.93	1.87	2.65
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		677	577	520	579	496	8.27	8.57	5.92	9.21
Total for Grasses		677	577	520	579	496	8.27	8.57	5.92	9.21
F	Agoseris glauca	a ⁻	a ⁻	b ¹²	a ⁻	ab ²	-	.02	-	.01
F	Arabis sp.	ab ⁴	b ¹⁶	a ⁻	ab ⁹	a ¹	.03	-	.02	.00
F	Astragalus sp.	3	-	1	-	4	-	.00	-	.01
F	Calochortus nuttallii	ab ⁷	ab ⁶	a ⁻	b ⁸	a ⁻	.01	-	.02	-
F	Castilleja sp.	-	-	4	-	-	-	.04	-	-
F	Chaenactis douglasii	a ⁻	a ¹	b ¹⁷	ab ⁵	a ²	.00	.09	.04	.01
F	Chenopodium leptophyllum(a)	-	b ⁴⁷	a ⁻	a ⁻	a ³	.10	-	-	.00
F	Cirsium sp.	-	-	3	-	-	-	.00	-	-
F	Crepis acuminata	b ¹⁶	ab ¹²	a ¹	ab ¹⁰	a ⁵	.04	.00	.07	.02
F	Cryptantha sp.	a ⁻	a ⁻	a ⁻	b ¹²	a ⁴	-	-	.29	.03
F	Descurainia pinnata (a)	b ¹³	c ³²	ab ²	ab ³	a ¹	.16	.00	.01	.00
F	Erigeron pumilus	-	4	3	4	6	.02	.01	.04	.15
F	Hackelia patens	-	-	-	3	-	-	-	.15	-
F	Haplopappus acaulis	-	-	3	6	1	-	.03	.18	.00
F	Hymenoxys richardsonii	b ¹⁷	a ¹	ab ⁷	ab ⁸	ab ⁷	.03	.09	.15	.21
F	Lesquerella alpina	-	4	2	-	1	.03	.00	-	.00
F	Leucelene ericoides	ab ²³	a ⁵	b ³¹	a ¹⁵	a ¹³	.04	.38	.06	.15
F	Linum lewisii	ab ³⁷	b ⁶²	a ²⁶	ab ⁴⁴	a ²²	.21	.13	.28	.24
F	Machaeranthera canescens	1	3	8	4	2	.18	.09	.06	.03
F	Penstemon humilis	7	-	1	-	-	-	.03	-	-
F	Phlox hoodii	c ¹⁴⁶	b ⁹⁴	bc ¹²⁴	ab ⁹¹	a ⁷⁷	2.59	2.97	1.78	1.80
F	Phlox longifolia	-	-	-	-	4	-	-	-	.00
F	Physaria acutifolia	-	-	1	-	-	-	.00	-	-
F	Senecio multilobatus	-	-	4	-	-	-	.03	.00	.00
F	Sphaeralcea coccinea	a ⁸⁰	b ¹¹⁹	ab ⁹⁸	ab ⁸⁵	ab ⁹⁹	1.36	1.22	.90	1.11
F	Townsendia incana	7	-	-	-	-	-	-	-	-
F	Unknown forb-perennial	8	-	-	-	-	-	-	-	-
Total for Annual Forbs		13	79	2	3	4	0.26	0.00	0.01	0.00
Total for Perennial Forbs		356	327	346	304	250	4.57	5.19	4.08	3.82
Total for Forbs		369	406	348	307	254	4.84	5.19	4.09	3.83

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

BROWSE TRENDS--

Management unit 08B, Study no: 5

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia nova	46	51	55	60	5.64	4.62	6.93	7.84
B	Artemisia tridentata wyomingensis	97	94	92	94	16.11	16.09	15.63	12.41
B	Ceratoides lanata	8	7	5	3	.60	.04	.00	-
B	Chrysothamnus nauseosus hololeucus	1	0	0	3	.15	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	9	19	10	6	.33	.39	.56	.19
B	Eriogonum microthecum	3	4	3	2	.03	.01	-	-
B	Gutierrezia sarothrae	25	61	70	13	.04	1.34	2.72	.16
B	Juniperus osteosperma	-	-	-	-	.93	-	-	-
B	Opuntia sp.	30	41	41	40	1.58	1.11	1.14	1.22
B	Pediocactus simpsonii	0	0	1	1	-	-	-	-
Total for Browse		219	277	277	222	25.44	23.62	27.01	21.83

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 5

Species	Percent Cover	
	'05	'10
Artemisia nova	10.71	8.89
Artemisia tridentata wyomingensis	16.35	19.68
Chrysothamnus nauseosus hololeucus	-	.05
Chrysothamnus viscidiflorus viscidiflorus	.26	.38
Eriogonum microthecum	-	.05
Gutierrezia sarothrae	1.29	.08
Opuntia sp.	.50	.43

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 5

Species	Average leader growth (in)	
	'05	'10
Artemisia nova	0.7	0.7
Artemisia tridentata wyomingensis	0.9	0.9

POINT-QUARTER TREE DATA--

Management unit 08B, Study no: 5

Species	Trees per Acre				Average diameter (in)			
	'95	'00	'05	'10	'95	'00	'05	'10
Juniperus osteosperma	14	24	-	39	4.1	3.1	-	4.1
Pinus edulis	-	7	-	19	-	1.8	-	.8

BASIC COVER--

Management unit 08B, Study no: 5

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	3.00	6.75	32.09	41.79	32.27	36.56
Rock	5.50	9.00	9.55	5.67	6.74	5.73
Pavement	11.50	14.25	5.40	8.54	7.50	6.09
Litter	45.25	41.25	39.65	36.47	29.86	33.48
Cryptogams	.75	5.25	3.51	6.07	3.90	3.37
Bare Ground	34.00	23.50	21.24	29.50	35.99	35.61

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 5, Study Name: Bennett Ranch

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
8.8	7.1	61.4	16.0	22.6	2.1	6.0	92.8	0.9

PELLET GROUP DATA--

Management unit 08B, Study no: 5

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Sheep	-	-	1	-	-	-	-
Rabbit	3	2	12	2	-	-	-
Elk	10	9	21	12	14 (35)	32 (78)	34 (83)
Deer	32	7	18	21	9 (23)	22 (55)	39 (96)
Cattle	10	3	3	1	6 (14)	11 (27)	-

BROWSE CHARACTERISTICS--

Management unit 08B, Study no: 5

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Artemisia frigida									
82	0	0	0	-	-	0	0	0	-/-
88	532	12	88	-	-	13	13	0	5/6
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	-/-
Artemisia nova									
82	1932	7	93	0	-	7	0	0	6/12
88	5464	20	59	22	799	44	12	5	7/14
95	2760	19	80	1	-	27	4	.72	7/20
00	4060	6	86	8	40	11	4	3	6/15
05	4520	5	88	7	-	0	0	5	8/23
10	4500	10	83	7	20	4	7	7	7/19

		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>Artemisia tridentata wyomingensis</i>										
82	3932	2	90	8	-	5	88	29	11/17	
88	7131	13	53	34	666	43	31	17	13/16	
95	6080	10	83	7	40	56	25	4	14/27	
00	5260	2	59	39	-	44	27	21	12/25	
05	4960	3	56	40	40	37	49	32	16/27	
10	4300	3	68	29	40	41	13	40	15/31	
<i>Ceratoides lanata</i>										
82	266	0	100	0	-	0	0	0	4/6	
88	466	0	100	0	-	43	57	0	4/5	
95	220	9	91	0	-	64	9	0	5/8	
00	160	50	50	0	-	50	0	0	4/6	
05	120	0	83	17	-	0	100	17	2/5	
10	80	50	50	0	-	100	0	0	5/7	
<i>Chrysothamnus nauseosus hololeucus</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	17/13	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	19/19	
10	60	0	100	-	-	0	0	0	17/23	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	240	0	100	0	-	17	0	0	9/14	
00	500	8	80	12	-	4	0	8	9/15	
05	340	12	76	12	-	71	0	12	9/14	
10	220	0	91	9	-	27	0	9	10/14	
<i>Eriogonum microthecum</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	140	0	100	-	-	0	0	0	4/7	
00	80	25	75	-	-	0	0	0	4/7	
05	80	0	100	-	-	0	0	0	3/3	
10	40	0	100	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
82	3133	0	100	0	-	0	0	0	5/5	
88	7865	45	54	1	66	0	0	.84	5/4	
95	680	0	100	0	-	0	0	0	12/14	
00	3300	2	96	1	20	0	0	.60	5/7	
05	4460	1	97	2	60	0	0	1	7/8	
10	400	10	90	0	-	0	0	0	8/8	

		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>Opuntia</i> sp.										
82	999	0	100	0	-	0	0	0	4/6	
88	2132	31	63	6	66	0	0	13	3/5	
95	860	2	98	0	-	9	0	0	4/15	
00	1320	6	92	2	20	0	0	0	4/11	
05	1320	5	80	15	-	2	0	3	4/10	
10	1020	4	82	14	20	0	0	18	4/12	
<i>Pediocactus simpsonii</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	2/3	
10	20	0	100	-	-	0	0	0	2/3	
<i>Pinus edulis</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	20	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	

DEATH VALLEY - TREND STUDY NO. 8B-6-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 7860 ft. (2396 m)

Aspect: West

Slope: 4%

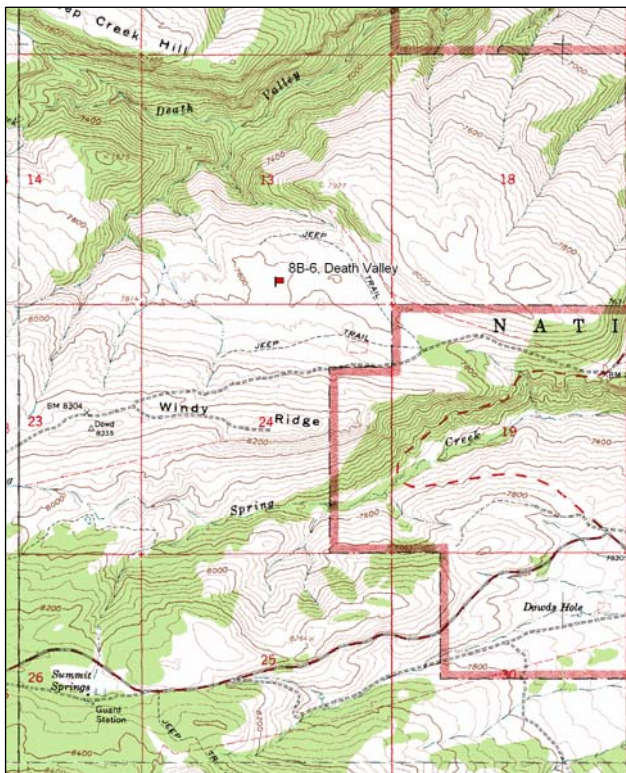
Transect bearing: 0'-100' at 15° magnetic and 100'-400' at 289° magnetic

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

Directions:

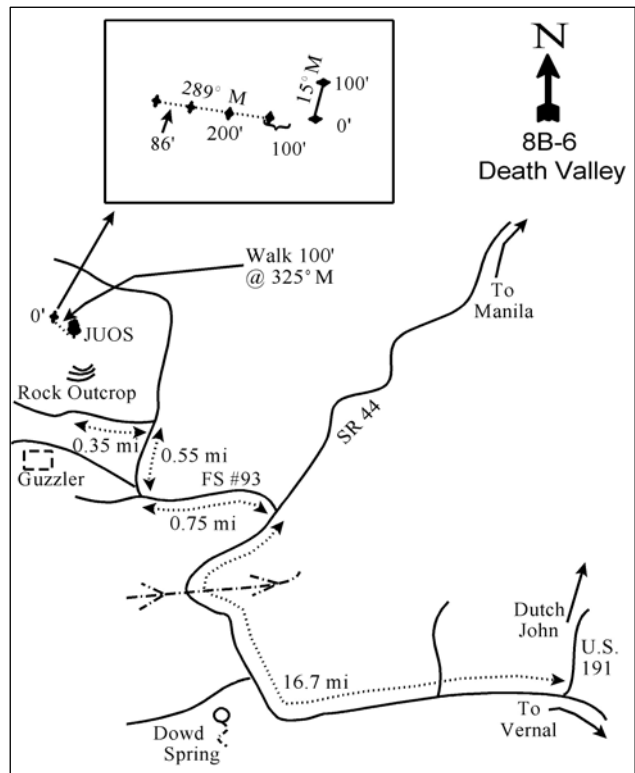
From the Dutch John turnoff on Highway U-44, proceed 16.7 miles north towards Manila. As you reach the summit before dropping down into Sheep Creek, there will be a dirt road (FS #93) to the left. Turn left on FS #93 and drive west for 0.75 miles until you pass a grove of ponderosa pine (*Pinus ponderosa*) trees. Turn to the right. The road forks again almost immediately, keep to the right and proceed 0.55 miles to another faint fork. Turn left and drive west 0.35 miles to the top of a small knoll. To the north, two rock outcroppings mark the highest point of the knoll. From the juniper (*Juniperus osteosperma*) on top, the 0-foot baseline stake is 100 feet away at a bearing of 325° M.

Map Name: Manila



Township: 2N Range: 19E Section: 13

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 606882 E 4528709 N

DEATH VALLEY - TREND STUDY NO. 8B-6

Site Information

Site Description: This study is located in Death Valley, a broad bench that drops off very rapidly towards Death Valley Creek to the north. The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and mixed mountain brush community that is used by deer and elk in the winter. Grazing in the area is managed as part of the U.S. Forest Service Sheep Creek Mountain allotment. Pellet group transect data has estimated moderate use by elk since 2000. Estimated use by deer was also moderate in 2000 and 2010, but was light in 2005. Use by cattle has been light since 2000 and a small number of moose pellets have also been encountered over the sample years (Table - Pellet Group Data).

Browse: The most important feature of this site is the browse composition. The key species are true mountain mahogany (*Cercocarpus montanus*) and mountain big sagebrush, which provide the majority of the browse cover for the site (Table - Browse Trends). The mahogany population is mostly mature plants that display moderate to heavy use. The average height of mature mahogany plants is just over three feet tall, with most of the plants still available to browsing. Decadence of mahogany was fairly high in 2000, but has been low in all other sample years. Recruitment of young mahogany plants has fluctuated over the course of the study, but has been generally good. Mountain big sagebrush is mostly mature with a moderate amount of decadence, and moderate to heavy use. Recruitment of young sagebrush plants was good at the outset of the study, but has been poor since 1995. Other important browse species include a few serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*) and antelope bitterbrush (*Purshia tridentata*) plants. Some fringed sagebrush (*Artemisia frigida*), stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), Oregon grape (*Mahonia repens*), snowberry (*Symphoricarpos oreophilus*) and gray horsebrush (*Tetradymia canescens*) were also sampled in low numbers (Table - Browse Characteristics).

Herbaceous Understory: Grasses on the site are abundant and fairly diverse. Grasses are dominated by alpine fescue (*Festuca ovina*) with other prevalent grasses including Sandberg bluegrass (*Poa secunda*) and thickspike wheatgrass (*Agropyron dasystachyum*). Forbs are very diverse, but only a few species produce any notable cover including sulfur eriogonum (*Eriogonum umbellatum*) and wild onion (*Allium sp.*) (Table - Herbaceous Trends).

Soil: The soils are sandy and shallow with some rock outcrops in the area. The soil texture is a loamy sand with a neutral reaction (pH 6.9). Phosphorus may have limited availability for plant growth and development at 2.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is low with abundant, well dispersed vegetation and litter cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** True mountain mahogany decreased in density, but mountain big sagebrush increased in density. Decadence remained moderate in mountain big sagebrush, but recruitment of young plants in both species was excellent.
- **1988 to 1995 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Recruitment of young plants decreased to 8% in both the true mountain mahogany and mountain big sagebrush populations. Decadence decreased, but remained moderate at 18% in sagebrush.
- **1995 to 2000 - down (-2):** The density of true mountain mahogany decreased by 37% from 1,680 plant/acre to 1,060 plants/acre, and cover decreased from 16% to 12%. Decadence of mahogany increased from 2% to 23% and there was no new recruitment of young plants. Mountain big sagebrush density and cover remained similar, but decadence increased to 37%.

- **2000 to 2005 - stable (0):** There was a slight increase in the density of true mountain mahogany by 13% from 1060 plants/acre to 1,200 plants/acre, but the density of mountain big sagebrush decreased slightly from 2,220 plants/acre to 1,720 plants/acre. Decadence of mahogany decreased to 12% and recruitment of young plants increased to 17%. Decadence remained high in mountain big sagebrush, and recruitment of young plants was low.
- **2005 to 2010 - slightly down (-1):** The density of both true mountain mahogany and mountain big sagebrush decreased slightly. Decadence of mountain big sagebrush decreased slightly from 29% to 23%, but poor vigor increased from 19% to 28%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 10%.
- **1995 to 2000 - up (+2):** The perennial grass sum of nested frequency increased by 19% and cover increased from 6% to 19%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover decreased slightly to 17%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover decreased to 14%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 12%.
- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial forbs with a slight increase in cover from 5% to 6%.
- **2000 to 2005 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 19% and cover decreased to 4%.
- **2005 to 2010 - slightly up (+1):** There was a 16% increase in the sum of nested frequency of perennial forbs and cover increased to 6%.

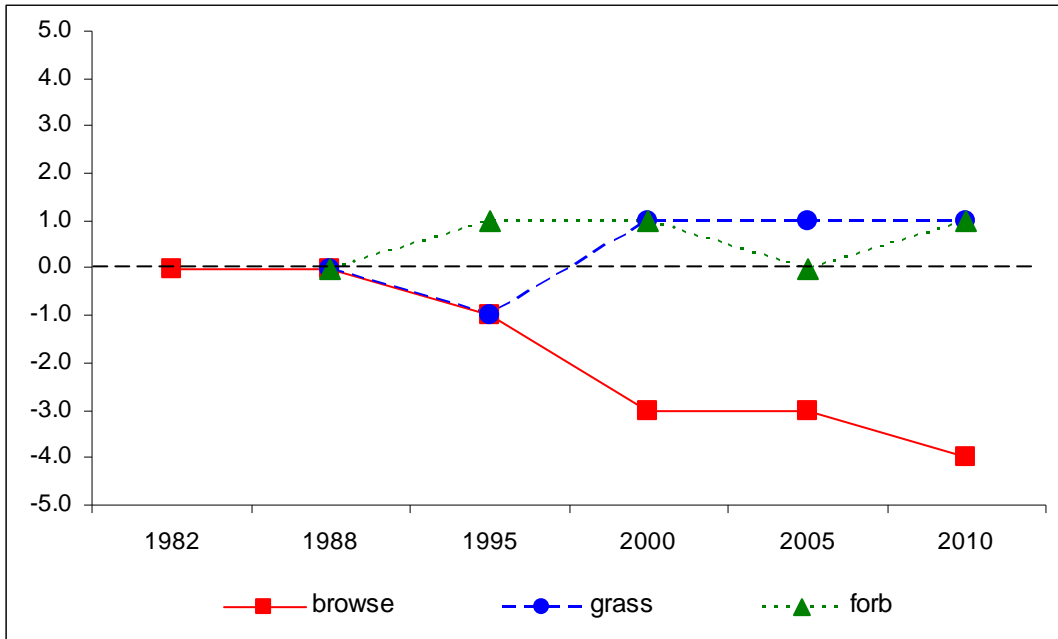
DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

Management unit 8B, study no: 6

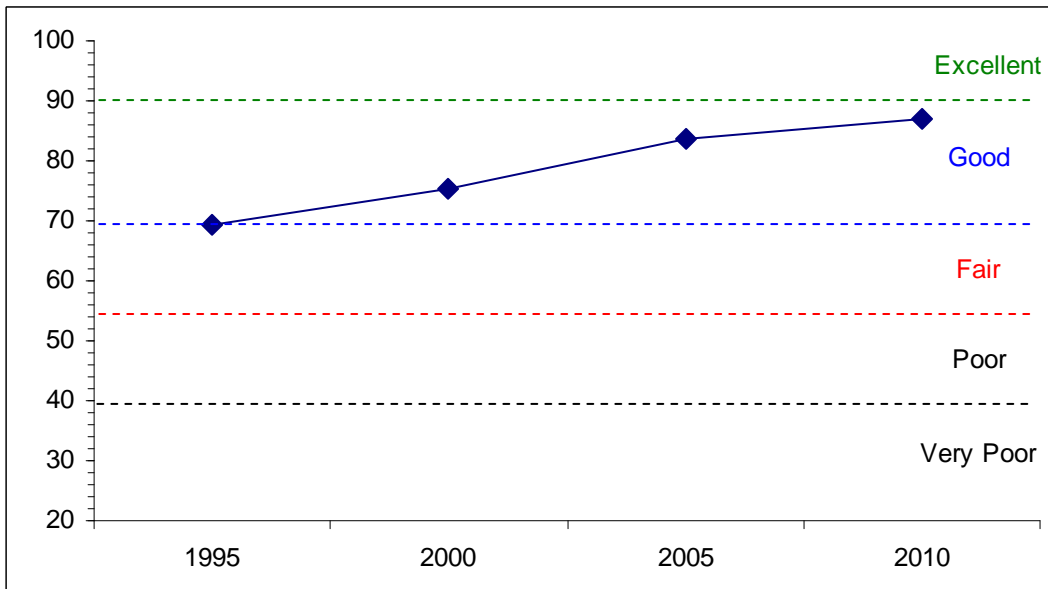
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.3	3.6	12.6	0.0	9.8	0.0	69.4	Fair-Good
00	27.6	6.8	0.9	30.0	0.0	10.0	0.0	75.3	Good
05	30.0	9.5	5.4	30.0	0.0	8.9	0.0	83.7	Good
10	29.2	11.4	8.0	28.3	0.0	10.0	0.0	87.0	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 8B, Study no: 6



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 8B, Study no: 6



HERBACEOUS TRENDS--
Management unit 08B, Study no: 6

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	ab153	a114	b162	ab128	ab150	.79	2.04	.93	2.09
G	<i>Bouteloua gracilis</i>	-	-	3	3	3	-	.15	.15	.15
G	<i>Bromus tectorum</i> (a)	-	-	-	1	3	-	-	.00	.03
G	<i>Carex</i> sp.	b42	ab31	ab23	a15	ab27	.45	.26	.11	.63
G	<i>Festuca ovina</i>	a62	b118	c226	c232	c231	2.84	10.77	12.55	8.42
G	<i>Koeleria cristata</i>	28	26	13	17	19	.12	.10	.42	.22
G	<i>Oryzopsis hymenoides</i>	-	5	-	4	4	.21	-	.07	.06
G	<i>Poa fendleriana</i>	-	-	-	-	3	-	-	-	.38
G	<i>Poa secunda</i>	b221	a132	a120	a114	a108	1.36	5.42	.83	1.36
G	<i>Sitanion hystrix</i>	-	-	6	-	-	-	.06	-	-
G	<i>Stipa comata</i>	ab28	bc57	a23	c64	ab38	.52	.39	1.40	.83
Total for Annual Grasses		0	0	0	1	3	0	0	0.00	0.03
Total for Perennial Grasses		534	483	576	577	583	6.31	19.22	16.47	14.17
Total for Grasses		534	483	576	578	586	6.31	19.22	16.47	14.20
F	<i>Agoseris glauca</i>	-	-	2	1	1	-	.00	.00	.00
F	<i>Allium</i> sp.	70	78	64	55	81	.36	.57	.73	1.00
F	<i>Androsace septentrionalis</i> (a)	-	1	-	6	2	.00	-	.04	.00
F	<i>Antennaria rosea</i>	15	3	6	5	9	.03	.06	.03	.12
F	<i>Arabis</i> sp.	b35	a6	a3	a13	a5	.01	.01	.04	.01
F	<i>Aster</i> sp.	c72	a-	ab10	b9	ab2	-	.09	.25	.06
F	<i>Balsamorhiza sagittata</i>	3	-	-	-	-	-	-	-	-
F	<i>Calochortus nuttallii</i>	a-	b13	a-	ab7	a3	.03	-	.02	.00
F	<i>Chenopodium fremontii</i> (a)	-	8	-	-	4	.04	-	-	.00
F	<i>Collinsia parviflora</i> (a)	-	b143	a20	b113	a43	.91	.05	.37	.13
F	<i>Collomia linearis</i> (a)	-	c74	a-	b16	b19	.43	-	.05	.04
F	<i>Comandra pallida</i>	a19	ab30	b55	ab26	ab33	.19	.45	.22	.41
F	<i>Crepis acuminata</i>	-	-	-	-	4	-	-	-	.06
F	<i>Cryptantha</i> sp.	22	13	30	31	35	.33	.55	.31	.71
F	<i>Delphinium nuttallianum</i>	-	4	-	-	-	.01	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	ab12	a-	b22	ab8	.04	-	.05	.07
F	<i>Draba</i> sp. (a)	-	bc87	c104	ab64	a35	.59	1.08	.35	.12
F	<i>Erigeron eatonii</i>	b43	b43	a5	a1	a-	.92	.09	.03	-
F	<i>Erigeron speciosus</i>	a-	b13	c56	b17	b8	.22	1.09	.34	.28
F	<i>Eriogonum racemosum</i>	a-	a-	a-	a5	b21	-	-	.03	.38
F	<i>Eriogonum umbellatum</i>	a24	ab47	b57	ab43	b59	1.33	1.27	.91	1.04
F	<i>Heterotheca villosa</i>	17	14	26	11	10	.23	.78	.40	.54
F	<i>Hymenoxys acaulis</i>	19	37	21	28	25	.23	.29	.13	.32
F	<i>Ipomopsis aggregata</i>	-	-	11	2	2	-	.05	.00	.03
F	<i>Lepidium</i> sp. (a)	-	a2	a-	ab16	b58	.01	-	.14	.51
F	<i>Lithospermum ruderales</i>	-	-	2	1	1	.00	.03	.18	.18
F	<i>Lupinus argenteus</i>	-	2	1	1	5	.00	.01	.00	.04
F	<i>Lychnis drummondii</i>	-	-	-	-	2	-	-	-	.01
F	<i>Machaeranthera canescens</i>	6	-	6	2	10	.00	.02	.00	.09

T y p e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Mertensia sp.	a ⁻	a ⁻	a ⁻	a ⁻	b ⁹	-	-	-	.10
F	Microsteris gracilis (a)	-	c ⁹⁶	a ⁵	b ⁴⁷	a ³	.53	.01	.13	.00
F	Phacelia sericea	a ⁶	b ³⁴	a ¹	a ⁻	a ³	.08	.03	-	.03
F	Polygonum douglasii (a)	-	bc ⁴⁵	a ⁸	c ⁵⁴	ab ¹⁹	.10	.01	.16	.04
F	Sedum lanceolatum	a ⁵⁰	b ¹⁰³	ab ⁸⁵	ab ⁹⁵	ab ⁸⁶	.79	.68	.70	.50
F	Senecio integerrimus	-	-	-	5	1	-	-	.02	.00
F	Senecio multilobatus	1	6	3	2	-	.04	.01	.03	-
F	Taraxacum officinale	-	3	-	-	-	.01	-	-	-
F	Townsendia incana	1	-	-	-	-	-	-	-	-
F	Tragopogon dubius	-	-	-	-	3	-	-	-	.00
F	Unknown forb-perennial	-	3	-	-	-	.03	-	-	-
F	Zigadenus paniculatus	-	-	3	1	2	-	.03	.00	.01
Total for Annual Forbs		0	468	137	338	191	2.67	1.16	1.31	0.93
Total for Perennial Forbs		403	452	447	361	420	4.90	6.14	4.43	5.97
Total for Forbs		403	920	584	699	611	7.58	7.31	5.75	6.91

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

BROWSE TRENDS--

Management unit 08B, Study no: 6

T y p e	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	4	1	1	3	.91	.21	.03	.78
B	Artemisia frigida	0	2	7	9	-	-	.19	.54
B	Artemisia nova	3	0	0	2	-	-	-	.03
B	Artemisia tridentata vaseyana	63	61	54	54	5.65	6.80	8.67	6.21
B	Cercocarpus montanus	61	43	44	42	16.22	12.24	13.01	12.59
B	Chrysothamnus viscidiflorus viscidiflorus	44	48	53	54	1.65	1.72	2.16	2.49
B	Gutierrezia sarothrae	0	2	4	4	-	-	-	-
B	Juniperus osteosperma	0	1	1	1	-	-	-	-
B	Mahonia repens	9	9	10	10	.69	.19	.25	.75
B	Opuntia sp.	22	23	31	24	.57	.24	.58	.51
B	Pediocactus simpsonii	3	8	3	1	-	.33	-	.15
B	Purshia tridentata	4	3	3	2	1.38	.30	.18	.53
B	Symphoricarpos oreophilus	2	0	0	0	.21	-	-	-
B	Tetradymia canescens	6	10	9	10	.30	.18	.60	.45
Total for Browse		221	211	220	216	27.61	22.24	25.68	25.04

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 6

Species	Percent Cover	
	'05	'10
<i>Amelanchier utahensis</i>	1.51	2.01
<i>Artemisia frigida</i>	.03	.35
<i>Artemisia tridentata vaseyana</i>	8.19	8.78
<i>Cercocarpus montanus</i>	13.64	16.20
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	2.43	4.83
<i>Gutierrezia sarothrae</i>	-	.20
<i>Juniperus osteosperma</i>	-	.16
<i>Mahonia repens</i>	.18	.63
<i>Opuntia sp.</i>	.56	1.14
<i>Purshia tridentata</i>	.60	1.11
<i>Tetradymia canescens</i>	.60	.68

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 6

Species	Average leader growth (in)	
	'05	'10
<i>Amelanchier utahensis</i>	3.7	3.6
<i>Artemisia tridentata vaseyana</i>	1.8	1.6
<i>Cercocarpus montanus</i>	3.0	4.5
<i>Purshia tridentata</i>	3.1	3.8

BASIC COVER--

Management unit 08B, Study no: 6

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	7.00	12.00	35.36	48.55	43.59	46.37
Rock	4.00	5.25	2.33	3.81	3.57	3.27
Pavement	0	.25	.47	.39	.11	.47
Litter	59.25	58.75	60.37	53.99	49.13	53.56
Cryptogams	1.00	9.50	2.96	5.01	2.58	4.56
Bare Ground	28.75	14.25	18.35	20.98	22.71	20.79

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 6, Study Name: Death Valley

Effective rooting depth (in)	pH	loamy sand			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.0	6.9	85.4	5.7	8.9	1.5	2.5	76.8	0.7

PELLET GROUP DATA--

Management unit 08B, Study no: 6

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	12	26	72	21
Moose	-	1	-	-
Elk	17	19	21	25
Deer	37	14	18	21
Cattle	-	-	2	1

Days use per acre (ha)		
'00	'05	'10
-	-	-
0.5 (1)	1 (1)	-
48 (117)	44 (108)	40 (99)
58 (144)	13 (33)	40 (98)
-	4 (9)	2 (4)

BROWSE CHARACTERISTICS--

Management unit 08B, Study no: 6

		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>Amelanchier utahensis</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	80	0	100	-	-	75	0	0	64/69	
00	20	0	100	-	-	0	0	0	49/58	
05	20	0	100	-	-	0	0	0	52/59	
10	60	0	100	-	-	67	0	0	48/56	
<i>Artemisia frigida</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	332	20	80	-	-	0	0	0	4/5	
95	0	0	0	-	-	0	0	0	4/7	
00	40	0	100	-	-	0	0	0	4/4	
05	240	17	83	-	40	33	8	0	13/12	
10	200	0	100	-	-	20	0	0	12/12	
<i>Artemisia nova</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	60	0	67	33	-	33	67	0	11/20	
00	0	0	0	0	-	0	0	0	-/-	
05	0	0	0	0	-	0	0	0	11/24	
10	40	0	50	50	-	0	100	50	7/9	
<i>Artemisia tridentata vaseyana</i>										
82	1598	21	50	29	66	54	0	4	14/25	
88	3465	31	42	27	199	44	8	0	11/15	
95	2140	8	74	18	-	22	38	6	14/26	
00	2220	5	58	37	-	44	5	19	16/28	
05	1720	1	70	29	340	36	28	19	20/31	
10	1500	8	69	23	40	51	16	28	18/33	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Cercocarpus montanus										
82	933	0	100	0	-	29	0	0	34/8	
88	532	37	63	0	-	50	13	0	36/44	
95	1680	8	89	2	60	58	35	1	34/51	
00	1060	0	77	23	20	58	21	11	38/62	
05	1200	17	72	12	140	12	63	3	38/54	
10	1060	21	72	8	80	85	11	13	40/58	
Chrysothamnus viscidiflorus viscidiflorus										
82	1332	30	70	0	-	0	0	0	7/8	
88	1865	18	75	7	-	0	0	11	10/11	
95	1520	3	97	0	-	1	0	0	10/15	
00	2040	5	88	7	-	.98	.98	17	9/11	
05	2340	7	91	2	-	7	4	.85	11/14	
10	1800	2	98	0	-	1	0	0	12/17	
Gutierrezia sarothrae										
82	0	0	0	0	-	0	0	0	-/-	
88	599	0	78	22	-	0	0	0	7/7	
95	0	0	0	0	-	0	0	0	5/4	
00	40	0	50	50	-	0	0	100	-/-	
05	80	0	100	0	-	0	0	0	6/8	
10	120	17	83	0	-	0	0	0	7/12	
Juniperus osteosperma										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	100	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	20	100	0	-	20	0	0	0	-/-	
Mahonia repens										
82	2132	37	63	0	266	0	0	0	7/2	
88	2065	81	19	0	-	0	0	0	2/2	
95	1360	0	100	0	20	0	0	0	3/6	
00	1200	15	85	0	-	0	0	0	3/6	
05	1440	1	92	7	-	0	0	7	2/3	
10	2820	13	87	0	-	0	0	0	4/5	
Opuntia sp.										
82	532	12	88	0	-	0	0	0	2/7	
88	666	50	50	0	-	0	0	0	3/9	
95	1180	2	97	2	20	0	0	2	3/9	
00	1260	24	73	3	-	2	0	2	2/7	
05	1000	10	90	0	-	0	0	0	3/11	
10	1000	2	98	0	-	0	0	0	3/11	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Pediocactus simpsonii									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	60	0	100	0	-	0	0	0	2/5
00	180	0	89	11	20	0	0	22	5/9
05	60	0	100	0	-	33	0	0	2/4
10	20	0	100	0	-	0	0	0	3/4
Purshia tridentata									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	140	0	100	-	-	57	0	0	19/50
00	60	0	100	-	-	33	0	0	16/41
05	80	25	75	-	-	25	50	0	20/54
10	60	33	67	-	-	67	33	33	22/58
Rosa woodsii									
82	0	0	0	-	-	0	0	0	-/-
88	333	100	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	-/-
Symphoricarpos oreophilus									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	50	50	-	-	0	0	0	15/25
00	0	0	0	-	-	0	0	0	21/71
05	0	0	0	-	-	0	0	0	17/33
10	0	0	0	-	-	0	0	0	22/59
Tetradymia canescens									
82	932	29	71	0	-	0	0	0	8/13
88	1532	43	22	35	-	13	0	0	9/10
95	320	13	88	0	-	13	0	0	10/15
00	260	15	69	15	-	0	0	62	9/14
05	240	8	92	0	-	25	8	0	7/16
10	260	23	77	0	-	77	0	0	10/17

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%

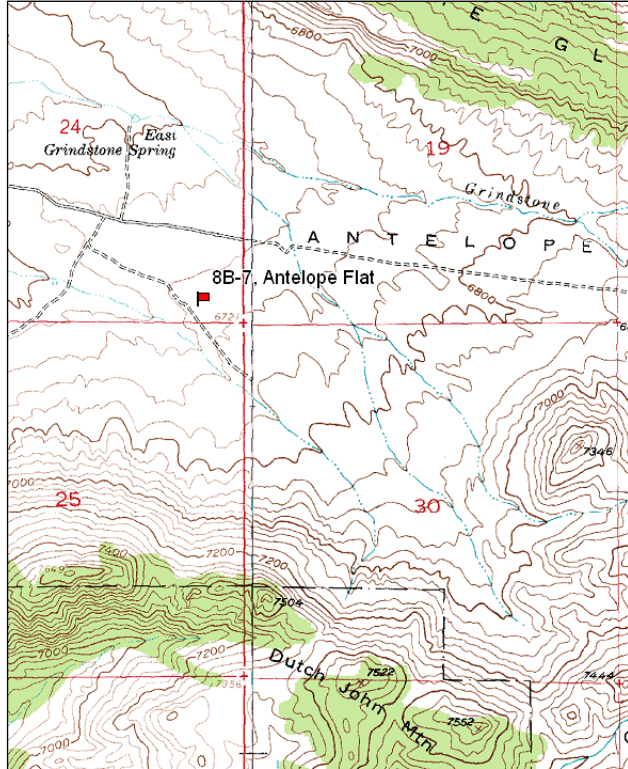
Transect bearing: 165° magnetic

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

Directions:

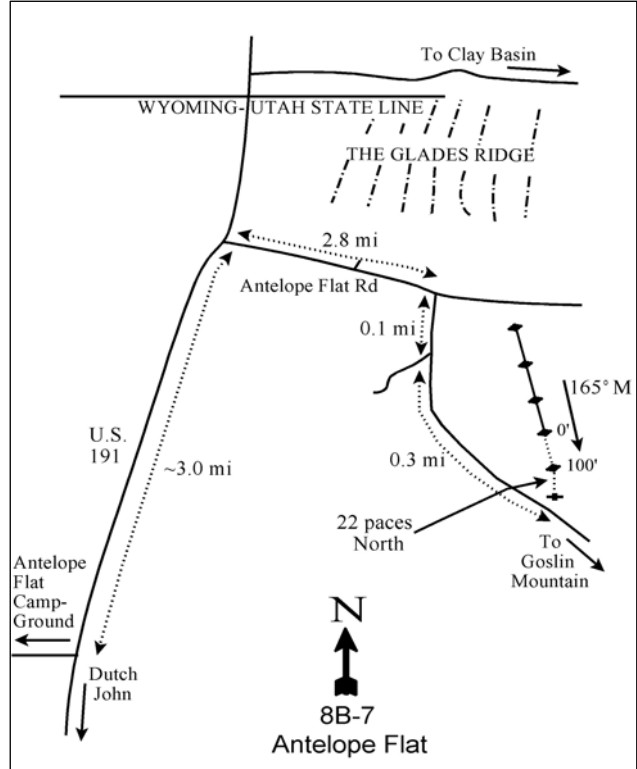
From Dutch John, proceed north toward Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road towards Goslin Mountain. Go 2.8 miles and turn right towards Goslin Mountain. Go 0.1 miles to a fork. Bear left on the main fork 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



Township: 3N Range: 22E Section: 24

Diagrammatic Sketch:



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:

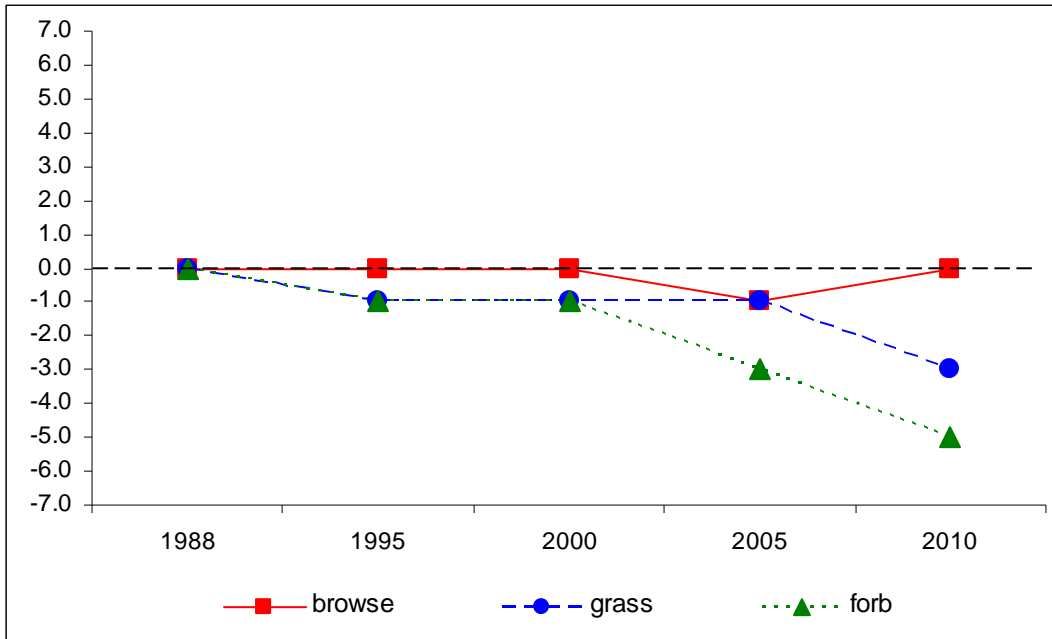
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 14%.
- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover increased slightly from 3% to 5%.
- **2000 to 2005 - down (-2):** The perennial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

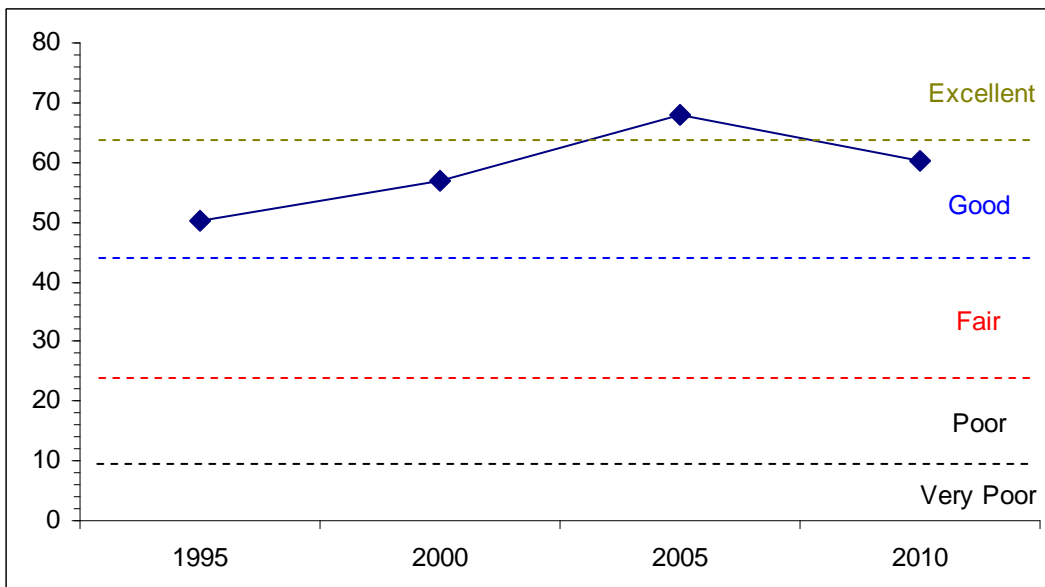
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	20.2	8.4	5.0	11.3	-0.4	5.6	0.0	50.1	Good
00	24.4	1.2	4.1	19.3	-2.1	10.0	0.0	56.9	Good
05	28.1	7.2	4.0	23.9	-0.6	5.4	0.0	67.9	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	b18	c110	b22	b36	a-	.61	.32	.61	-
G	Bromus tectorum (a)	-	a66	b120	b147	c272	.50	2.74	.84	10.04
G	Carex sp.	9	-	3	-	-	-	.03	-	-
G	Koeleria cristata	c55	a-	b36	a7	a1	-	.62	.21	.00
G	Oryzopsis hymenoides	13	20	12	14	7	.20	.25	.29	.04
G	Poa fendleriana	a5	a32	c113	b74	a8	.43	2.86	2.31	.07
G	Poa secunda	ab184	a159	ab173	a165	b217	3.00	1.90	4.47	5.52
G	Sitanion hystrix	c67	ab34	ab35	bc41	a10	.30	1.06	.73	.08
G	Stipa comata	c87	b31	a5	ab24	b33	.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-	b22	a1	a6	a-	.05	.01	.02	-
F	Allium sp.	ab4	b11	a-	a-	ab1	.04	-	-	.00
F	Antennaria rosea	c62	a1	b28	a2	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)	-	c57	b24	c72	a1	.25	.14	.25	.00
F	Cordylanthus ramosus (a)	-	d187	c57	b16	a-	6.05	.27	.26	-
F	Crepis acuminata	-	3	-	-	-	.00	-	-	-
F	Cymopterus longipes	a15	a15	b39	b38	a9	.03	.32	.13	.02
F	Descurainia pinnata (a)	-	3	-	-	-	.00	-	-	-
F	Erigeron eatonii	a7	a19	b47	a11	a8	a.08	.51	.05	.06
F	Eriogonum umbellatum	a-	a-	a3	a1	b12	-	.03	.03	.23
F	Gayophytum ramosissimum(a)	-	b17	a-	a2	a2	.03	-	.01	.00
F	Gilia inconspicua (a)	-	10	1	2	-	.02	.00	.00	-
F	Lepidium sp. (a)	-	a3	a-	a-	b22	.00	-	-	.09
F	Machaeranthera canescens	-	5	-	-	-	.03	-	-	-
F	Microsteris gracilis (a)	-	c118	b40	c105	a4	.42	.08	.38	.00
F	Penstemon humilis	b60	b54	a24	a18	a2	.45	.11	.25	.06
F	Phlox hoodii	c139	b95	b90	a41	a44	1.23	2.40	.63	.99
F	Phlox longifolia	d153	c97	c82	b41	a3	.22	.31	.15	.00
F	Polygonum douglasii (a)	-	b45	a7	a-	a-	.09	.01	-	-
F	Ranunculus testiculatus (a)	-	a-	a3	b36	a-	-	.00	.10	-
F	Schoenrambe linifolia	a-	b12	ab5	ab1	a-	.02	.04	.00	-
F	Sphaeralcea coccinea	40	26	26	27	28	.18	.31	.39	.28
F	Trifolium gymnocarpon	a-	c55	d74	d76	b18	.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)	
<i>Artemisia tridentata wyomingensis</i>										
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	
<i>Ceratoides lanata</i>										
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	-/-	
<i>Chrysothamnus nauseosus</i>										
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	-/-	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
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)	
<i>Eriogonum microthecum</i>										
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	
<i>Gutierrezia sarothrae</i>										
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	
<i>Leptodactylon pungens</i>										
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	
<i>Opuntia sp.</i>										
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	

PHIL PICO MOUNTAIN - TREND STUDY NO. 8B-8-10

Vegetation Type: True Mountain Mahogany

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Upland Stony Loam \(Mountain Big Sagebrush\), R047XB336UT](#)

Land Ownership: SITLA

Elevation: 8896 ft. (2712 m)

Aspect: Southwest

Slope: 65%

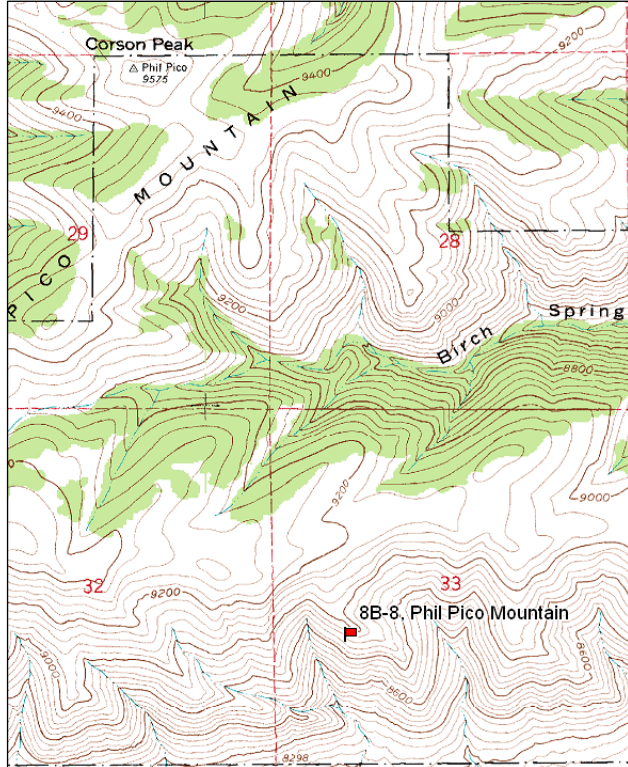
Transect bearing: 215° magnetic

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

Directions:

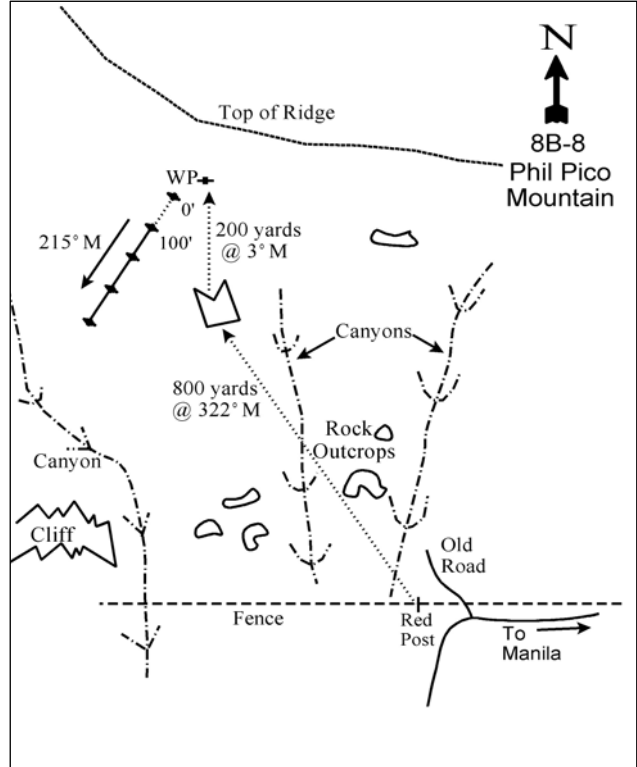
From the Wyoming-Utah state line, drive south on U-43 for 1.9 miles to a road (Rt. 166) on the right (south). Turn right and follow Rt. 166 for 3.6 miles to an intersection. Turn to the right and go 1.6 miles to another fork. Bear right before crossing the creek and go 0.9 miles on a fairly rough road to the Forest Service boundary fence. Continue 0.8 miles west along the fence. Stop where the road turns left away from the fence by a red post in the fence. The study is located on the slope below the ridge to the northwest. From the red witness post along the fence, hike about 1/4 mile at 322° M up across the slope to a large square rock outcrop. Continue hiking about 200 yards directly north to the study site. The 0-foot baseline stake is tagged with browse tag #9080.

Map Name: Hoop Lake



Township: 3N Range: 18E Section: 33

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 591757 E 4533640 N

PHIL PICO MOUNTAIN - TREND STUDY NO. 8B-8

Site Information

Site Description: The study is located on the south side of Phil Pico Mountain which is steep, rocky and covered mostly with mountain brush. There are scattered clumps of aspen (*Populus tremuloides*) and conifer in the protected drainages. An open sagebrush (*Artemisia spp.*) and grass communities are found on the upper slopes and ridge tops. The site is located just below a narrow windswept ridge. These slopes are used mostly by wintering elk and, to a lesser extent, deer. Cattle grazing in the area is managed by the Utah State Institutional Trust Lands Administration (SITLA), but cattle tend to utilize mainly the valley bottoms and more gentle slopes. Pellet group transect data has estimated moderate use by elk and light use by deer since 2000. Estimated use by cattle has been very light since 2000 (Table - Pellet Group Data).

Browse: True mountain mahogany (*Cercocarpus montanus*) provides the majority of the browse cover and the bulk of the available forage (Table - Browse Trends). The mahogany is a fairly dense population of heavily used mature plants with low decadence and good recruitment of young plants. Most of the mahogany plants are relatively small less than 3 feet in height and remain mostly available to wildlife for browsing. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) occurs across the slope, which offers additional nutritional winter forage on the site. This small population of sagebrush has had moderate use over the course of the study. Decadence of sagebrush was moderate at the outset of the study in 1988, but has steadily decreased to low levels in 2010. Recruitment of young sagebrush plants has also decreased over the sample years and was poor in 2010. Other browse species include small populations of serviceberry (*Amelanchier utahensis*), fringed sagebrush (*Artemisia frigida*), winterfat (*Ceratoides lanata*), mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*) and slenderbush eriogonum (*Eriogonum microthecum*) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant and diverse on the site, with the most common species being bluebunch wheatgrass (*Agropyron spicatum*). Other common grasses include Indian ricegrass (*Oryzopsis hymenoides*) and sedge (*Carex sp.*). Cheatgrass (*Bromus tectorum*) was prevalent in 1995, but has not been common in any other sample year. Forbs are diverse but have provided only about 3% to 4% cover since 1995. Forbs are represented by a variety of species which include cryptantha (*Cryptantha sp.*), hoary aster (*Machaeranthera canescens*) and Hoods phlox (*Phlox hoodii*) (Table - Herbaceous Trends).

Soil: Sandstone and limestone rock are very common on the surface, making the slope loose and talus-like in places. Outcrops of old conglomerate rock are scattered across the hillside. The soil texture is sandy loam with a neutral reaction (pH 7.0). Phosphorus may have limited availability for plant growth and development 5.2 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Considering the harshness of the site on the dry, steep, rocky slope, there has been a surprisingly high amount of vegetation cover and very little bare ground cover (Table - Basic Cover). With the steep, talus slope, some erosion is expected and there is definite down slope soil movement, especially along game trails. Soil is also pedestaled on the uphill side of shrubs and bunch grasses, but soil erosion does not appear to be serious. The soil erosion condition was classified as slight in 2005 and 2010 because of small pedestals surrounding shrubs and perennial grasses, moderate soil movement, minor litter and surface rock movement, common 3 to 6 inch deep rills, and minor flow patterns between perennial species.

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 the primary browse species, true mountain mahogany, decreased from 18% to 3%, but recruitment of young plants also decreased from 37% to 18%.

- **1995 to 2000 - stable (0):** There was little change in the true mountain mahogany population, though decadence increased to 15% and cover increased slightly from 18% to 20%.
- **2000 to 2005 - slightly up (+1):** The density of true mountain mahogany increased by 18% from 3,120 plants/acre to 3,680 plants/acre, though cover remained similar. Decadence of mahogany decreased to 7%.
- **2005 to 2010 - stable (0):** The true mountain mahogany population remained similar.

Grass:

- **1988 to 1995 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 14%.
- **1995 to 2000 - slightly up (+1):** There was little change in the sum of nested frequency of perennial grass, but cover increased from 14% to 27%. Cheatgrass also decreased significantly in nested frequency and cover decreased from 3% to less than 1%.
- **2000 to 2005 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 12% and cover decreased to 17%.
- **2005 to 2010 - stable (0):** The sum of nested frequency and cover of perennial grasses remained similar.

Forb:

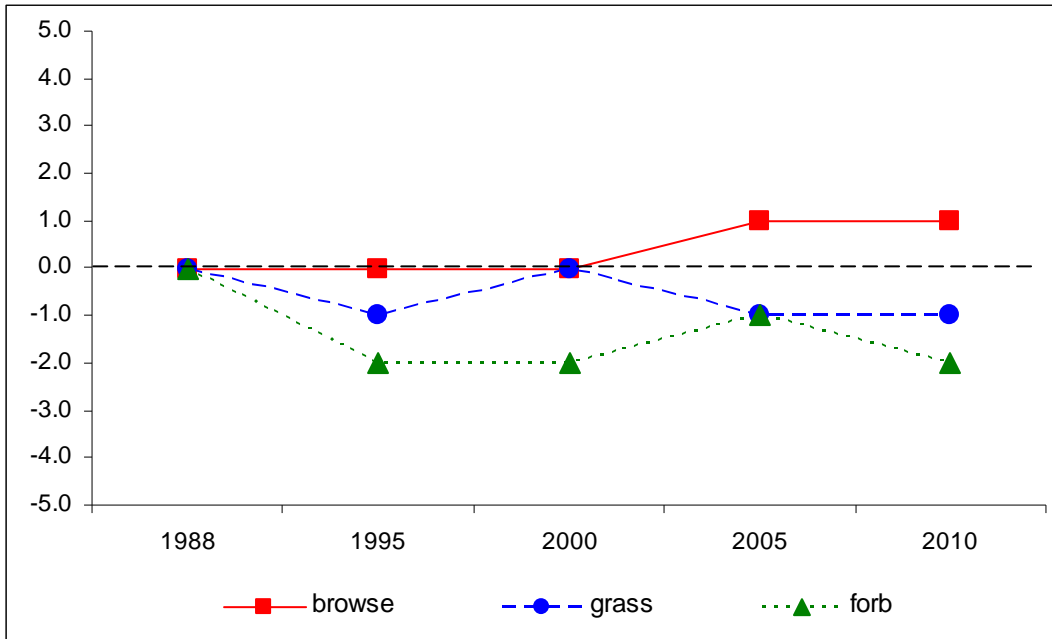
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial forbs decreased by 42%.
- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial forbs and cover remained similar.
- **2000 to 2005 - slightly up (+1):** The perennial forb sum of nested frequency increased by 13% and cover remained similar.
- **2005 to 2010 - slightly down (-1):** There was a 10% decrease in the sum of nested frequency of perennial forbs, though cover remained similar.

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

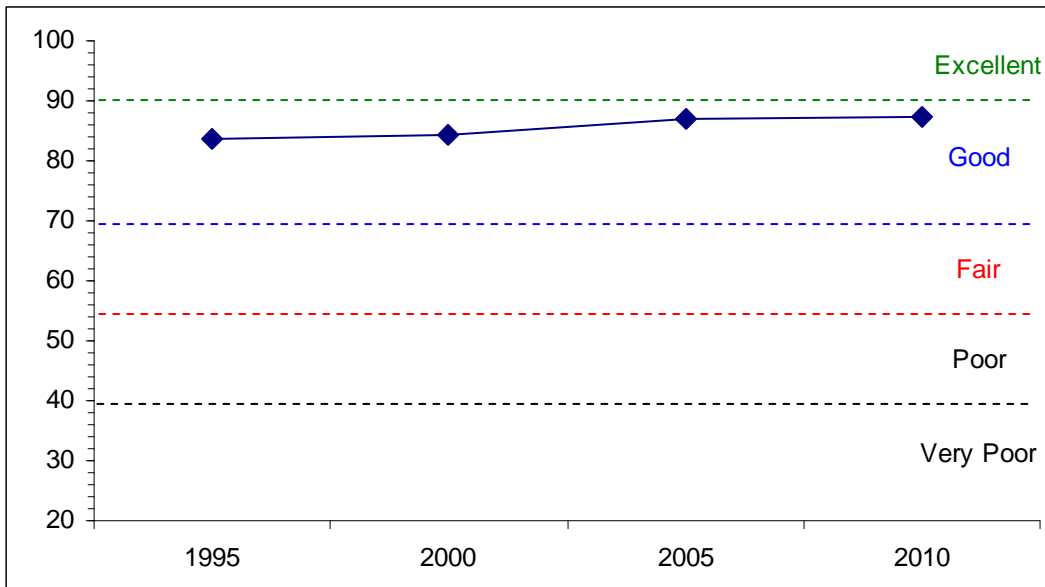
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.8	8.0	27.9	-1.9	5.8	0.0	83.6	Good
00	30.0	10.8	6.1	30.0	-0.1	7.8	0.0	84.5	Good
05	30.0	13.1	7.2	30.0	0.0	6.9	0.0	87.1	Good
10	30.0	14.6	5.5	30.0	-0.1	7.2	0.0	87.2	Good

Trend Summary

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



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 8B, Study no: 8



HERBACEOUS TRENDS--
Management unit 08B, Study no: 8

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron spicatum	297	287	309	291	282	10.99	19.74	13.44	12.29
G	Bromus tectorum (a)	-	c152	b53	a22	ab30	2.53	.18	.05	.10
G	Carex sp.	b36	ab33	a9	ab12	b47	.50	.39	.34	2.25
G	Koeleria cristata	ab16	ab7	a4	ab17	b18	.08	.03	.36	.32
G	Leucopoa kingii	-	2	4	-	3	.03	.03	-	.00
G	Oryzopsis hymenoides	b115	ab85	ab104	a62	a64	2.16	6.56	2.73	2.27
G	Poa fendleriana	-	-	2	1	-	-	.03	.00	-
G	Poa secunda	ab45	a23	a19	a14	a5	.18	.18	.09	.03
Total for Annual Grasses		0	152	53	22	30	2.53	0.18	0.05	0.10
Total for Perennial Grasses		509	437	451	397	420	13.95	26.98	16.98	17.21
Total for Grasses		509	589	504	419	450	16.49	27.16	17.03	17.31
F	Allium sp.	-	-	-	2	-	-	-	.00	-
F	Arabis sp.	a-	ab7	ab6	b14	a-	.02	.01	.03	-
F	Aster chilensis	b25	a-	a2	a-	a1	-	.00	-	.00
F	Astragalus convallarius	-	7	8	3	10	.21	.21	.20	.07
F	Astragalus sp.	8	4	3	2	2	.06	.15	.03	.06
F	Balsamorhiza hookeri	1	-	-	-	2	-	-	-	.03
F	Camelina microcarpa (a)	a-	a-	b27	b38	a-	-	.10	.13	-
F	Castilleja linariaefolia	b26	a-	a3	a-	a6	-	.04	-	.06
F	Chaenactis douglasii	28	24	19	23	12	.10	.14	.17	.02
F	Chenopodium fremontii (a)	-	-	-	3	-	-	-	.00	-
F	Chenopodium leptophyllum(a)	-	b19	a3	a3	a6	.05	.01	.00	.01
F	Cirsium sp.	12	2	4	10	11	.06	.03	.33	.40
F	Collinsia parviflora (a)	-	a3	a2	b15	a-	.00	.00	.07	-
F	Comandra pallida	6	-	-	3	-	-	-	.00	-
F	Cruciferae	2	-	-	-	-	-	-	-	-
F	Cryptantha sp.	b81	a35	a57	b89	ab61	.48	1.06	1.24	.87
F	Cymopterus sp.	-	-	-	-	1	-	-	-	.00
F	Delphinium nuttallianum	c65	c52	a6	b19	a-	.48	.09	.18	-
F	Descurainia pinnata (a)	a-	c67	ab5	a3	b18	.39	.01	.00	.09
F	Erigeron sp.	-	1	3	-	-	.00	.01	-	-
F	Hymenoxys acaulis	-	2	-	-	7	.03	-	-	.06
F	Ipomopsis aggregata	-	3	-	4	-	.01	-	.04	-
F	Lappula occidentalis (a)	-	b8	a-	ab7	a-	.03	-	.01	-
F	Lepidium sp. (a)	-	3	-	-	3	.03	-	-	.01
F	Lesquerella sp.	b65	b66	a31	a15	a17	.47	.22	.11	.08
F	Leuceleone ericoides	10	-	-	1	4	-	-	.00	.03
F	Linum lewisii	ab6	ab5	ab2	a-	b8	.03	.03	.01	.10
F	Lithospermum sp.	1	-	1	1	3	-	.00	.00	.03
F	Lomatium sp.	-	-	3	-	3	-	.03	-	.00
F	Lychnis drummondii	-	2	-	10	1	.00	-	.07	.03
F	Machaeranthera canescens	b48	a15	a20	a10	a35	.07	.49	.11	.39
F	Microsteris gracilis (a)	-	1	-	-	-	.03	-	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Oenothera sp.	-	-	9	-	-	-	.07	-	-
F	Oxytropis sericea	b12	ab2	b14	a-	b9	.19	.26	-	.24
F	Penstemon caespitosus	a-	a-	a-	b13	ab5	-	-	.07	.04
F	Penstemon humilis	b66	a35	a21	a25	a25	.37	.43	.21	.27
F	Petradoria pumila	-	-	-	-	5	-	-	-	.03
F	Phlox hoodii	a-	b24	b41	b38	b35	.22	.43	.42	.59
F	Phlox longifolia	b46	a-	a5	a2	a-	-	.01	.03	-
F	Physaria acutifolia	a-	a-	ab8	b17	ab6	-	.07	.08	.02
F	Senecio multilobatus	-	9	8	5	3	.04	.05	.03	.06
F	Taraxacum officinale	-	-	-	4	8	-	-	.01	.04
Total for Annual Forbs		0	101	37	69	27	0.53	0.12	0.23	0.10
Total for Perennial Forbs		508	295	274	310	280	2.89	3.88	3.43	3.59
Total for Forbs		508	396	311	379	307	3.43	4.01	3.66	3.70

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

BROWSE TRENDS--

Management unit 08B, Study no: 8

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	2	2	2	2	.01	.03	-	.15
B	Artemisia frigida	63	62	77	83	.91	1.03	2.89	4.76
B	Artemisia tridentata vaseyana	36	36	33	31	1.51	2.73	1.41	1.72
B	Ceratoides lanata	2	0	1	1	-	-	.15	-
B	Cercocarpus montanus	82	84	81	86	18.02	19.50	18.43	19.78
B	Chrysothamnus viscidiflorus lanceolatus	14	14	14	14	.07	.48	.51	.81
B	Eriogonum microthecum	55	40	46	56	1.59	1.51	.86	1.70
B	Symphoricarpos oreophilus	5	6	5	3	.00	.30	.56	.03
B	Tetradymia canescens	1	1	3	6	.06	-	.15	.53
Total for Browse		260	245	262	282	22.21	25.60	24.98	29.50

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 8

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	-	.40
Artemisia frigida	3.83	7.08
Artemisia tridentata vaseyana	3.20	3.04
Cercocarpus montanus	22.25	28.70
Chrysothamnus viscidiflorus lanceolatus	.63	.88
Eriogonum microthecum	1.26	2.71
Symphoricarpos oreophilus	.71	.06
Tetradymia canescens	.18	.20

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 8

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	1.8	1.8
Cercocarpus montanus	3.4	3.5

BASIC COVER--

Management unit 08B, Study no: 8

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	11.00	39.45	57.22	43.37	54.54
Rock	19.25	23.53	19.75	18.84	14.18
Pavement	23.25	11.68	30.17	23.23	19.20
Litter	38.00	40.21	36.86	22.23	25.56
Cryptogams	.25	.02	.11	.04	0
Bare Ground	8.25	2.26	4.55	12.37	7.93

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 8, Study Name: Phil Pico Mountain

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.3	7.0	69.0	20.1	10.9	3.7	5.2	86.4	1.4

PELLET GROUP DATA--

Management unit 08B, Study no: 8

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	8	-	9	-
Elk	51	26	37	12
Deer	25	7	15	10
Cattle	-	-	-	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
40 (99)	48 (119)	25 (63)
7 (17)	19 (46)	15 (36)
-	2 (5)	-

BROWSE CHARACTERISTICS--
Management unit 08B, Study no: 8

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>Amelanchier utahensis</i>									
88	0	0	0	-	-	0	0	0	-/-
95	120	83	17	-	80	0	17	0	16/9
00	340	94	6	-	-	6	0	0	16/12
05	240	92	8	-	-	100	0	0	30/41
10	100	80	20	-	-	0	0	0	15/20
<i>Artemisia frigida</i>									
88	14932	44	56	0	399	3	2	.44	5/4
95	3900	11	89	0	160	0	0	0	9/7
00	3440	8	91	1	-	.58	0	.58	5/7
05	5540	12	88	0	960	4	.72	0	10/11
10	7460	10	90	0	840	38	0	2	5/11
<i>Artemisia tridentata vaseyana</i>									
88	1998	17	60	23	133	20	13	0	11/16
95	1000	10	68	22	20	46	10	12	11/24
00	1100	13	69	18	-	20	5	13	12/22
05	840	7	76	17	120	24	14	17	15/25
10	860	5	86	9	-	35	35	7	12/25
<i>Ceratoides lanata</i>									
88	0	0	0	-	-	0	0	0	-/-
95	40	0	100	-	-	0	0	0	11/13
00	0	0	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	100	0	7/9
10	40	0	100	-	-	0	0	0	6/9
<i>Cercocarpus montanus</i>									
88	4132	37	45	18	199	16	73	5	27/24
95	3120	18	79	3	160	34	54	6	29/39
00	3120	13	72	15	-	36	40	6	29/40
05	3680	16	78	7	60	9	84	4	29/38
10	3760	12	87	1	20	23	40	.53	33/42
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
88	333	0	100	-	-	0	0	40	9/7
95	400	0	100	-	-	0	0	0	10/14
00	440	0	100	-	-	0	9	0	10/16
05	400	0	100	-	-	10	0	0	10/18
10	400	0	100	-	-	0	0	0	12/16

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>Eriogonum microthecum</i>									
88	5598	19	79	2	-	11	5	0	5/6
95	2540	2	98	0	40	0	0	0	6/12
00	2060	1	97	2	-	0	0	.97	5/8
05	2100	1	99	0	100	7	.95	0	5/10
10	2180	2	98	0	-	0	0	.91	6/12
<i>Gutierrezia sarothrae</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	6/8
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Pediocactus simpsonii</i>									
88	132	50	50	-	-	0	0	0	3/4
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	4/9
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
88	399	83	17	-	-	0	0	0	9/15
95	240	42	58	-	40	0	0	0	9/32
00	300	27	73	-	-	0	0	0	7/19
05	160	0	100	-	20	0	38	0	12/55
10	80	0	100	-	-	0	0	0	10/19
<i>Tetradymia canescens</i>									
88	266	0	100	-	-	0	0	0	6/7
95	20	0	100	-	-	0	0	0	8/12
00	40	0	100	-	-	0	0	0	9/12
05	80	0	100	-	-	0	0	0	7/9
10	160	13	88	-	-	13	0	0	8/14

WEST GOSLIN - TREND STUDY NO. 8B-9-10

Vegetation Type: Mountain Big Sagebrush-Grass

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XA430UT](#)

Land Ownership: BLM

Elevation: 7986 ft. (2435 m)

Aspect: Southeast

Slope: 2%-4%

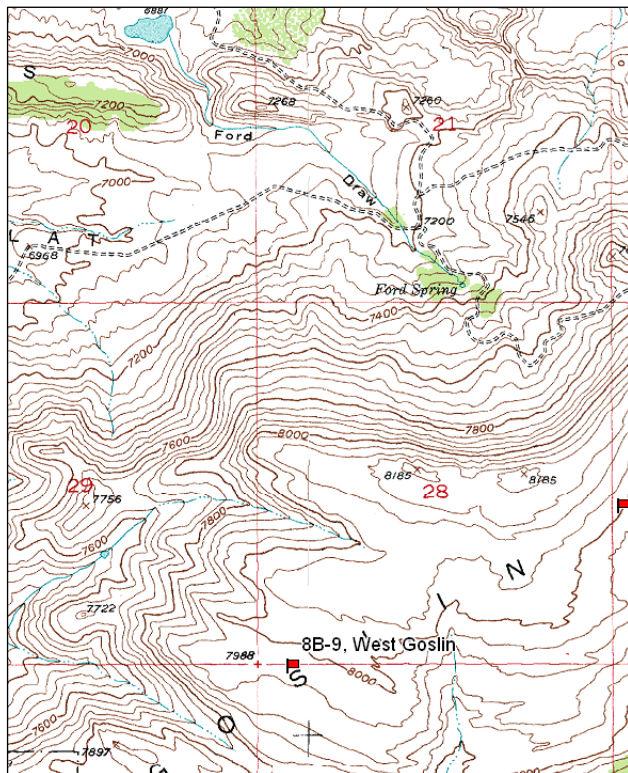
Transect bearing: 264° magnetic

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

Directions:

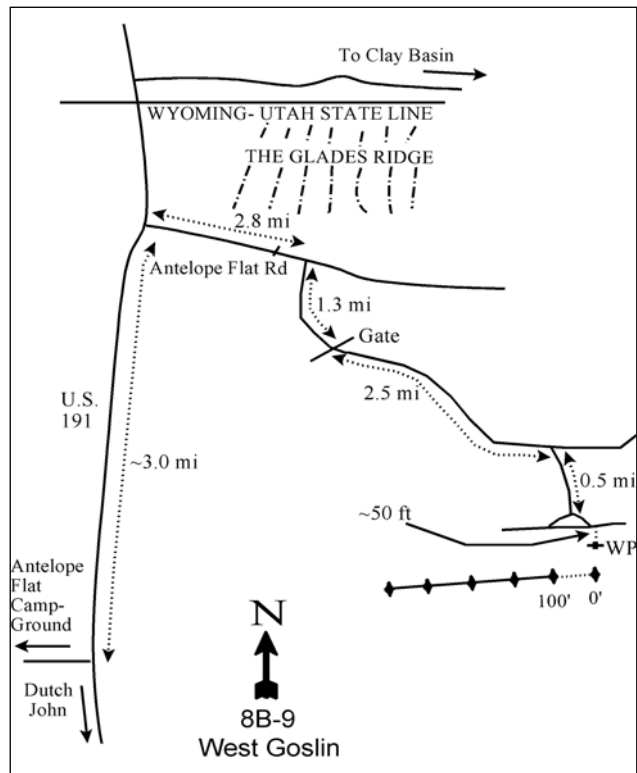
From Dutch John, proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road toward Goslin Mountain. Go 2.8 miles and turn right toward Goslin Mountain. Turn right and drive 1.3 miles to a gate. Go through the gate and continue 2.5 miles to a fork. Go right 0.5 miles to a intersection . The witness post is located on the east side of the Y shaped intersection about 50' south of the road. Full size posts are used to mark the site. The 0-foot post is marked with a browse tag # 34.

Map Name: Goslin Mountain



Township: 3N Range: 23E Section: 28

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 640111 E 4535748 N

WEST GOSLIN - TREND STUDY NO. 8B-9

Site Information

Site Description: The study is located within a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community on a ridge top on the west side of Goslin Mountain. The site was burned in 2002 as part of the Mustang fire which burned the west face of Goslin Mountain, but did not extend to the east side of the mountain where the Goslin Mountain (8B-2) site is located. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Goslin Mountain allotment. Deer, elk and antelope use the area, and elk and antelope have been seen using the site during multiple readings. Due to difficulties in differentiating between species, deer and antelope pellets were all classified as deer. Pellet group transect data estimated moderate use by elk in 2000, heavy use in 2005 and light use in 2010. Estimated deer/antelope use was light in 2000 and 2010, with more moderate use in 2005. Estimated use by cattle has been light since 2000. Grouse pellets were also sampled on the site since 2005 (Table - Pellet Group Data).

Browse: The key browse species on the site historically consisted of a fairly dense stand of mountain big sagebrush, but sagebrush density decreased substantially following the wildfire in 2002. Prior to the burn, the sagebrush consisted of a population of large, mature plants with moderate decadence and light use. Following the burn, the population has rebounded quickly in density, but is now comprised of much smaller plants. Utilization of sagebrush has increased and was mostly moderate in 2010. Recruitment of young sagebrush plants was high in 2005, immediately following the fire, but has been poor in all other sample years. Other browse sampled on the site includes Wyeth eriogonum (*Eriogonum heracleoides*), snowberry (*Symphoricarpos oreophilus*) and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). Low rabbitbrush has increased substantially in density since the fire. A few small serviceberry (*Amelanchier utahensis*) and true mountain mahogany (*Cercocarpus montanus*) are also scattered over the site (Table - Browse Characteristics).

Herbaceous Understory: Due to the high elevation of this site (8,000 feet) and the apparent spring use by big game, the herbaceous understory is the key component on this site. Grasses on the site are diverse and abundant. Prior to the fire, letterman needlegrass (*Stipa lettermani*), mutton bluegrass (*Poa fendleriana*) and onion grass (*Melica bulbosa*) were the most abundant grasses, but since the fire many species have become more prevalent including thickspike wheatgrass (*Agropyron dasystachyum*), alpine fescue (*Festuca ovina*) and needle-and-thread (*Stipa comata*). Cheatgrass (*Bromus tectorum*) was sampled for the first time in 2010 at moderate frequency and cover. Forbs are also diverse and fairly abundant. Silvery lupine (*Lupinus argenteus*) is the dominant forb providing a large portion of the perennial forb cover. Other common forbs include: sulfur eriogonum (*Eriogonum umbellatum*), longleaf phlox (*Phlox longifolia*) and hollyleaf clover (*Trifolium gymnocarpon*). Preferred forbs include arrowleaf balsamroot (*Balsamorhiza sagittata*), yellow Indian paintbrush (*Castilleja flava*), low penstemon (*Penstemon humilus*), lambstongue groundsel (*Senecio integerrimus*) and spindleroot bluebell (*Mertensia fusiformis*). Annual forbs increased substantially in 2005, following the fire, but have been less prevalent in other sample years (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam with a slightly acidic reaction (pH 6.1). Phosphorus may have limited availability for plant growth and development at 4.7 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Due to the abundant vegetation and litter cover, there was little bare ground exposed previous to 2005. Vegetation and litter cover was very well dispersed (as indicated by the very high nested frequency values) further protecting the soil from erosion. There are also a few large boulders on the soil surface. Bare ground cover increased substantially in 2005, but returned to pre-fire levels in 2010 (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1995 to 2000 - stable (0):** There was little change in the mountain big sagebrush population.

- **2000 to 2005 - down (-2):** The wildfire in 2002 removed many of the shrubs from the site. Density of mountain big sagebrush decreased by 48% from 3,600 plants/acre to 1,880 plants/acre, and cover decreased from 24% to 1%. Recruitment of young sagebrush plants was high at 69% of the population, indicating the sagebrush population may rebound quickly.
- **2005 to 2010 - up (+2):** Though still well below pre-fire levels, the density of mountain big sagebrush increased by 34% and cover increased to 8%. Most of the mature plants are considerably smaller than prior to the fire. Recruitment of young sagebrush plants was again poor decreasing to 4%.

Grass:

- **1995 to 2000 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 11%, though cover increased from 13% to 17%.
- **2000 to 2005 - down (-2):** The sum of nested frequency of perennial grasses decreased by 31% despite cover increasing slightly to 18%.
- **2005 to 2010 - up (+2):** There was a 62% increase in the sum of nested frequency of perennial grasses and cover increased to 35%. Unfortunately, cheatgrass was sampled for the first time on the site at moderate frequency and cover.

Forb:

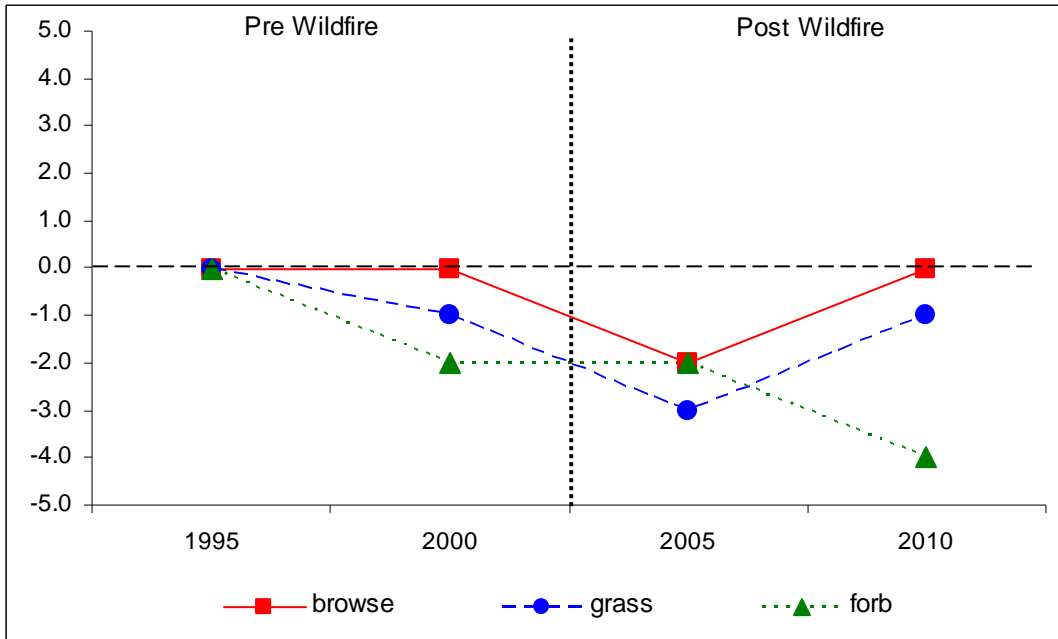
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 46%, though cover decreased only slightly from 14% to 13%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency or cover of perennial forbs, but several important forbs including sulfur eriogonum and silvery lupine decreased significantly in nested frequency. Annual forbs also increased substantially in nested frequency and cover.
- **2005 to 2010 - down (-2):** The perennial forb sum of nested frequency decreased by 36% and cover decreased to 6%. Annual forbs also decreased markedly in frequency and cover.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 8B, study no: 9

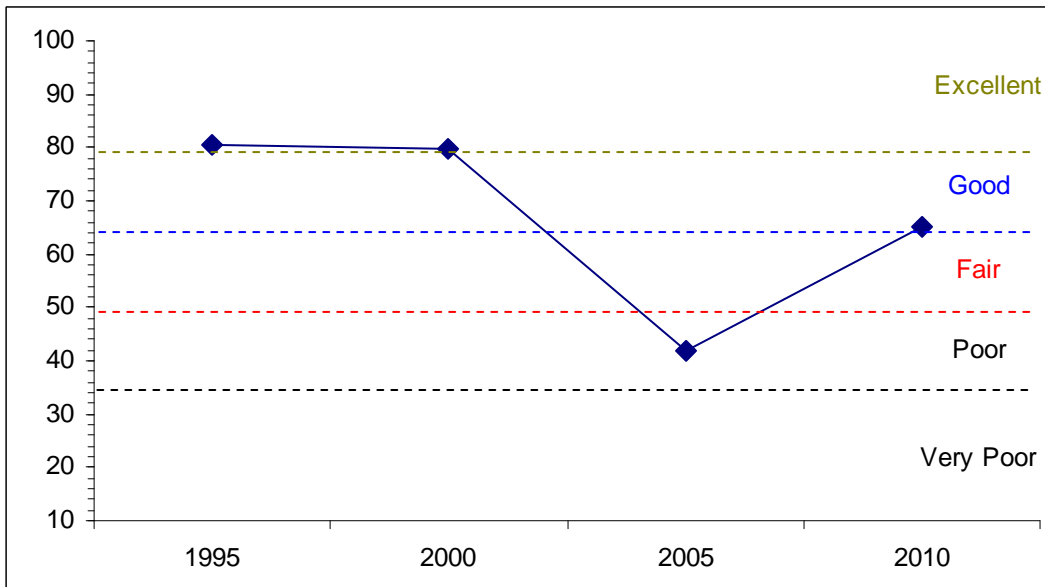
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	10.8	3.6	26.1	0.0	10.0	0.0	80.5	Good-Excellent
00	29.9	6.4	3.5	30.0	0.0	10.0	0.0	79.8	Good-Excellent
05	1.8	0.0	0.0	30.0	0.0	10.0	0.0	41.8	Poor
10	9.9	15.0	2.1	30.0	-2.0	10.0	0.0	65.0	Fair-Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 8B, Study no: 9



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 8B, Study no: 9



HERBACEOUS TRENDS--
Management unit 08B, Study no: 9

Type	Species	Nested Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a180	a116	b232	c308	.80	.96	7.42	9.48
G	Agropyron spicatum	a-	a-	b16	a4	-	-	.50	.38
G	Bromus tectorum (a)	a-	a-	a-	b96	-	-	-	2.67
G	Carex sp.	39	33	19	40	.56	.99	.34	1.41
G	Dactylis glomerata	b49	a-	a-	a-	.31	-	-	-
G	Festuca ovina	b26	b17	a-	c88	.35	.28	-	3.46
G	Koeleria cristata	-	-	3	4	-	-	.00	.30
G	Melica bulbosa	c213	b80	a6	a18	4.51	1.95	.04	.11
G	Poa fendleriana	a43	b188	a58	b185	.86	3.37	2.43	6.53
G	Poa pratensis	a13	b50	ab35	ab29	.06	1.43	1.74	2.42
G	Poa secunda	b15	a-	ab13	b30	.13	-	.15	.35
G	Sitanion hystrix	28	34	11	22	.16	.61	.30	.49
G	Stipa columbiana	96	72	51	55	1.70	1.35	2.54	2.95
G	Stipa comata	a16	b66	ab50	b83	.13	1.90	1.51	5.48
G	Stipa lettermani	b174	b141	a57	a25	3.47	4.26	1.06	1.17
Total for Annual Grasses		0	0	0	96	0	0	0	2.67
Total for Perennial Grasses		892	797	551	891	13.07	17.13	18.09	34.56
Total for Grasses		892	797	551	987	13.07	17.13	18.09	37.23
F	Agoseris glauca	c151	a9	b59	b47	.90	.19	.46	.41
F	Allium sp.	c86	ab13	b29	a7	.42	.02	.10	.04
F	Antennaria rosea	4	-	-	-	.03	-	-	-
F	Arabis drummondi	9	6	-	5	.02	.01	-	.00
F	Arenaria sp.	ab16	b16	a1	a3	.51	.11	.00	.00
F	Astragalus convallarius	4	8	11	10	.18	.24	.33	.19
F	Astragalus sp.	8	4	-	-	.01	.15	-	-
F	Balsamorhiza sagittata	4	3	-	-	.01	.04	-	-
F	Castilleja flava	4	8	-	-	.03	.04	-	-
F	Chenopodium leptophyllum(a)	-	-	2	-	-	-	.00	-
F	Collinsia parviflora (a)	c154	a5	b78	bc110	.99	.01	.36	.44
F	Collomia linearis (a)	c169	a3	b73	b62	1.07	.00	.22	.19
F	Crepis acuminata	b36	a8	a4	a3	.34	.07	.18	.03
F	Cryptantha sp.	-	-	-	4	-	-	-	.02
F	Cymopterus longipes	11	16	7	-	.07	.06	.04	-
F	Delphinium nuttallianum	18	-	6	-	.04	-	.02	-
F	Descurainia pinnata (a)	-	-	12	-	-	-	.19	-
F	Draba sp. (a)	2	-	-	-	.03	-	-	-
F	Erigeron eatonii	11	5	-	3	.02	.04	-	.03
F	Eriogonum umbellatum	c52	c59	a-	b13	1.31	1.56	-	.20
F	Gayophytum ramosissimum(a)	a-	a-	b120	a-	-	-	1.88	-
F	Heterotheca villosa	a3	ab9	ab13	b22	.00	.21	.62	.95
F	Hymenoxys sp.	2	-	-	-	.03	-	-	-
F	Lappula occidentalis (a)	a-	a-	b44	a2	-	-	.99	.00
F	Lepidium sp. (a)	a-	a-	b44	a4	-	-	.76	.01

Type	Species	Nested Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
F	Lomatium triternatum	9	-	3	-	.01	-	.04	-
F	Lupinus argenteus	_b 197	_b 184	_a 115	_a 111	6.85	6.93	7.41	2.81
F	Mertensia fusiformis	3	-	2	-	.00	-	.03	-
F	Microsteris gracilis (a)	-	-	10	1	-	-	.07	.00
F	Penstemon humilis	9	-	8	-	.04	-	.06	-
F	Phlox hoodii	_b 27	_b 36	_a 7	_a 2	.56	1.34	.33	.03
F	Phlox longifolia	_b 129	_a 47	_c 163	_a 48	1.36	.41	2.54	.64
F	Polygonum douglasii (a)	_b 69	_a 27	_d 294	_c 137	.19	.26	4.40	.68
F	Ranunculus testiculatus (a)	-	-	10	-	-	-	.01	-
F	Salsola iberica (a)	-	-	1	-	-	-	.00	-
F	Schoenocrambe linifolia	-	-	7	-	-	-	.01	-
F	Sedum lanceolatum	9	11	-	-	.06	.09	-	-
F	Senecio integerrimus	_b 16	_b 13	_{ab} 5	_a -	.09	.06	.04	-
F	Sphaeralcea coccinea	-	-	3	3	-	-	.03	.38
F	Taraxacum officinale	_b 58	_a 3	_a 9	_a 3	.21	.03	.20	.00
F	Trifolium gymnocarpon	75	59	69	54	.73	.96	.62	.49
F	Unknown forb-annual (a)	3	-	-	-	.00	-	-	-
F	Zigadenus paniculatus	-	-	2	-	-	-	.00	-
Total for Annual Forbs		397	35	688	316	2.29	0.28	8.94	1.33
Total for Perennial Forbs		951	517	523	338	13.90	12.60	13.11	6.26
Total for Forbs		1348	552	1211	654	16.19	12.88	22.05	7.60

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

BROWSE TRENDS--

Management unit 08B, Study no: 9

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	7	4	3	5	.21	.18	.03	.03
B	Artemisia nova	4	0	1	0	.00	-	-	-
B	Artemisia tridentata vaseyana	82	87	46	65	24.90	23.68	1.22	7.84
B	Chrysothamnus viscidiflorus viscidiflorus	7	8	6	43	.53	.21	.53	2.20
B	Eriogonum heracleoides	67	65	26	44	7.47	7.94	1.88	2.34
B	Gutierrezia sarothrae	2	0	0	3	.15	-	-	.00
B	Mahonia repens	0	0	0	2	-	-	-	-
B	Purshia tridentata	1	1	1	1	-	.03	.15	.03
B	Symphoricarpos oreophilus	9	10	7	9	.96	1.19	1.81	1.60
Total for Browse		179	175	90	172	34.23	33.23	5.63	14.06

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 9

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	.33	.40
Artemisia tridentata vaseyana	1.73	11.16
Chrysothamnus viscidiflorus viscidiflorus	.40	2.09
Eriogonum heracleoides	2.31	2.78
Purshia tridentata	.06	-
Symphoricarpos oreophilus	1.08	1.13

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 08B, Study no: 9

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	-	1.9

BASIC COVER--

Management unit 08B, Study no: 9

Cover Type	Average Cover %			
	'95	'00	'05	'10
Vegetation	55.49	61.42	44.98	62.28
Rock	1.75	1.41	2.09	1.63
Pavement	.12	1.22	2.40	1.00
Litter	61.50	70.24	21.14	57.08
Cryptogams	.07	.00	.01	0
Bare Ground	8.76	6.59	36.85	6.59

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 9, Study Name: West Goslin

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.4	6.1	64.0	21.4	14.6	3.0	4.7	134.4	0.6

PELLET GROUP DATA--

Management unit 08B, Study no: 9

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	-	3	20	4	-	-	-
Grouse	-	-	1	-	-	52/acre	-
Elk	7	7	9	4	30 (74)	80 (197)	14 (35)
Deer/Antelope	3	4	8	21	7 (17)	34 (84)	8 (20)
Cattle	-	5	3	5	4 (11)	15 (36)	20 (48)

BROWSE CHARACTERISTICS--
Management unit 08B, Study no: 9

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>Amelanchier utahensis</i>									
95	260	23	69	8	-	23	8	0	27/41
00	80	0	100	0	-	25	50	0	27/33
05	80	50	50	0	-	0	75	0	11/17
10	120	67	33	0	-	17	33	17	11/21
<i>Artemisia nova</i>									
95	80	0	75	25	-	50	50	25	6/9
00	0	0	0	0	-	0	0	0	-/-
05	20	100	0	0	-	0	0	0	-/-
10	0	0	0	0	-	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>									
95	3380	7	80	14	20	25	2	4	30/43
00	3600	7	64	29	200	7	1	9	28/43
05	1880	69	31	0	40	3	3	1	7/11
10	2520	4	96	0	-	46	17	0	16/26
<i>Cercocarpus montanus</i>									
95	0	0	0	-	-	0	0	0	68/84
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	15/23
10	0	0	0	-	-	0	0	0	19/24
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
95	200	10	90	0	-	0	0	0	8/12
00	260	23	69	8	-	0	0	0	9/14
05	240	8	92	0	20	0	0	0	12/20
10	2020	14	86	0	-	0	0	2	8/12
<i>Eriogonum heracleoides</i>									
95	5440	1	99	-	-	0	0	0	11/14
00	6360	18	82	-	-	0	0	0	4/10
05	1260	0	100	-	-	0	0	0	7/14
10	1740	2	98	-	-	13	0	0	5/18
<i>Gutierrezia sarothrae</i>									
95	40	0	100	-	-	0	0	0	6/7
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	80	0	100	-	-	0	0	0	10/9
<i>Mahonia repens</i>									
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	3/9
10	80	0	100	-	-	0	0	0	3/10

		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>Purshia tridentata</i>										
95	20	0	100	-	-	0	100	0	15/42	
00	60	0	100	-	-	0	0	0	16/28	
05	20	0	100	-	-	0	100	0	7/24	
10	20	0	100	-	-	0	100	0	10/48	
<i>Symphoricarpos oreophilus</i>										
95	340	0	100	-	-	41	0	0	24/47	
00	320	6	94	-	-	0	0	0	25/53	
05	220	9	91	-	-	0	0	0	14/45	
10	400	5	95	-	-	5	0	0	16/42	
<i>Tetradymia canescens</i>										
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	10/25	
10	0	0	0	-	-	0	0	0	12/28	

BIG MEADOW - TREND STUDY NO. 8B-12-10

Vegetation Type: Wet Meadow

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: LOWLAND (10-14W), R034XY228WY

Land Ownership: UDWR

Elevation: 7450 ft. (2271 m)

Aspect: Southeast

Slope: 2%-3%

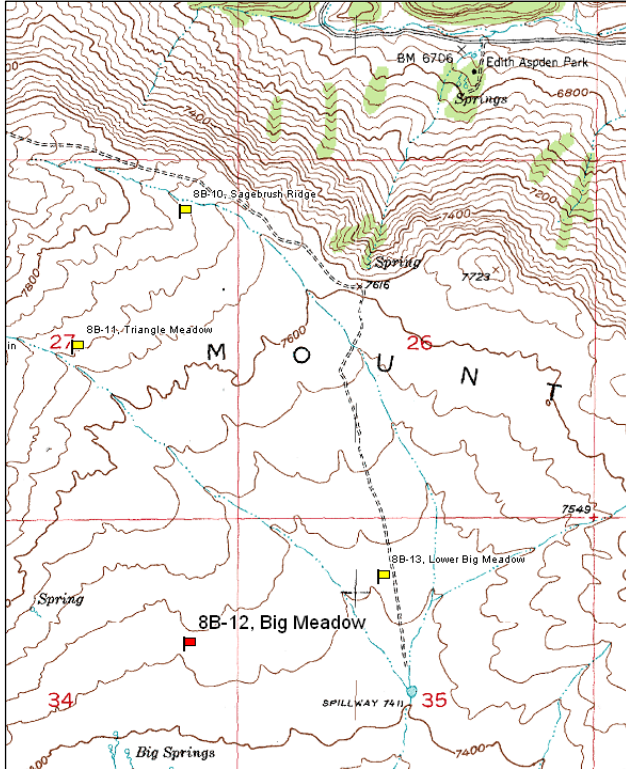
Transect bearing: 322° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft)

Directions:

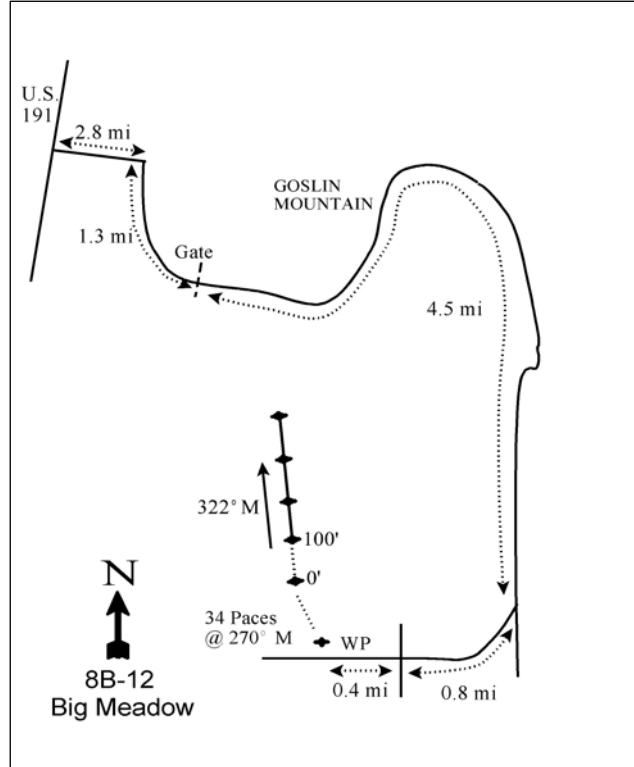
From Dutch John, proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road toward Goslin Mountain. Go 2.8 miles and turn right toward Goslin Mountain. Bear left and drive 1.3 miles to a gate. Continue 4.5 miles to a fork. Bear right and proceed 0.8 miles to a four-way intersection. Continue straight west and drive 0.4 miles to a witness post. The witness post is located 50 feet off the north side of the road. From the witness post walk 34 paces at 270°M. to the 0-foot baseline stake.

Map Name: Goslin Mountain



Township: 3N Range: 23E Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 642944 E 4535095 N

BIG MEADOW - TREND STUDY NO. 8B-12

Site Information

Site Description: The study is located in a wet meadow in the Goslin Mountain area, just north of Big Springs. The study was established to monitor concentrated use by wildlife and livestock on the small meadows in the area. Water is found on the surface of the meadow until sometime in June or July depending on weather conditions. The surrounding area was treated by a lop and scatter to remove encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) in the fall of 2006 as part of the Goslin Mountain P/J encroachment Removal ([WRI Project #297](#)). The area is administered by the Utah Division of Wildlife Resources (UDWR), but grazing is managed by the Bureau of Land Management as part of the Goslin Mountain allotment. Pellet group transect data has indicated light use by deer since 2000. Estimated cattle use was light in 2000, but was very heavy in 2010 with cattle using the site at the time of the reading (Table - Pellet Group Data).

Browse: There is no browse on this site.

Herbaceous Understory: Grasses are diverse and abundant, providing most of the vegetation cover on the site. Baltic rush (*Juncus balticus*) and Kentucky bluegrass (*Poa pratensis*) dominate the grass component. Other common species include several sedges (*Carex spp.*) and tufted hair-grass (*Deschampsia caespitosa*). Forbs are also diverse and abundant, though not nearly as abundant as grasses. Common forbs include yarrow (*Achillea millefolium*), Pacific aster (*Aster chilensis*), thistle (*Cirsium sp.*), two species of cinquefoil (*Potentilla spp.*), balsam groundsel (*Senecio pauperculus*), dandelion (*Taraxacum officinale*) and hook violet (*Viola adunca*). Forbs have steadily decreased on the site since 1995 (Table - Herbaceous Trends).

Soil: The soil is a clay loam with a mildly alkaline soil reaction (pH 7.4). Phosphorous may have limited availability for plant growth and development at 5.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is minimal with high amounts of vegetation and litter cover (Table - Basic Cover). Due to the wet nature of the meadow, deep hoof action by cattle has caused the surface to be uneven in places. The soil erosion condition was classified as stable in 2010.

Trend Assessments

Browse:

- There is no browse on the site.

Grass:

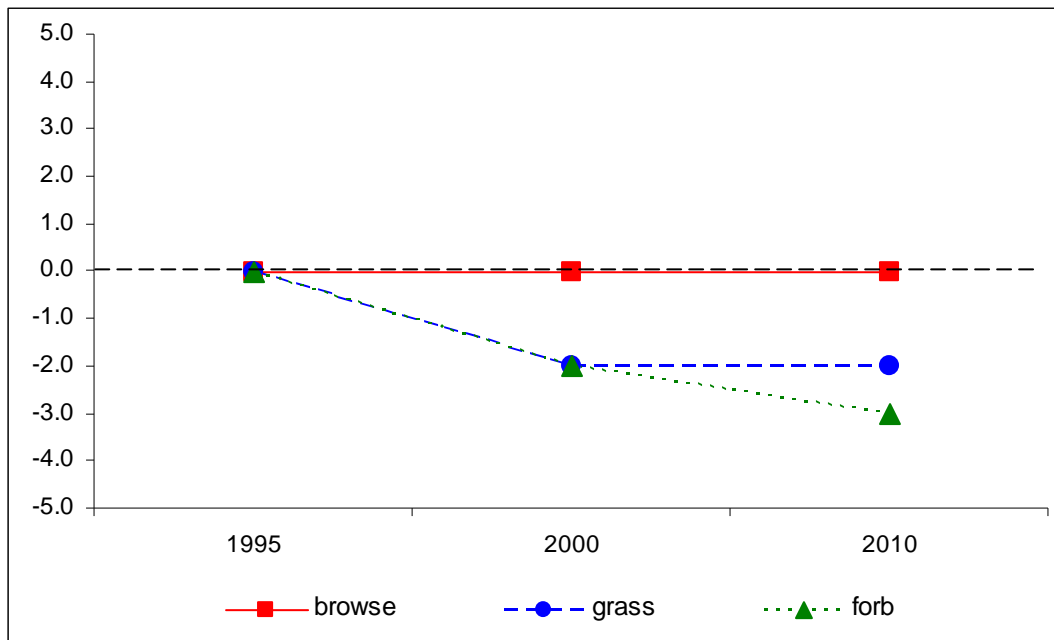
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 22%, though cover increased from 41% to 60%. There was a significant increase in the nested frequency of Baltic rush and Nebraska sedge (*Carex nebraskensis*) with subsequent increases in cover.
- **2000 to 2010 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial grasses, but cover increased to 69%.

Forb:

- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 56% and cover decreased from 28% to 14%.
- **2000 to 2010 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 11% and cover decreased to 11%.

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8B, Study no: 12



HERBACEOUS TRENDS--

Management unit 08B, Study no: 12

Type	Species	Nested Frequency			Average Cover %		
		'95	'00	'10	'95	'00	'10
G	Agropyron trachycaulum	b89	a29	a7	.74	.15	.10
G	Carex nebraskensis	b233	c303	a135	2.76	14.13	8.42
G	Carex sp.	b146	a39	a59	2.86	1.39	1.22
G	Deschampsia caespitosa	88	47	63	1.85	.76	1.42
G	Elymus junceus	-	-	3	-	-	.15
G	Hordeum brachyantherum	a9	b31	a-	.01	.31	-
G	Juncus balticus	a410	b444	a403	16.51	34.60	34.15
G	Muhlenbergia richardsonis	b16	ab1	a-	.07	.00	-
G	Phleum pratense	-	2	-	-	.03	-
G	Poa pratensis	c440	a223	b354	16.20	8.55	23.11
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		1431	1119	1024	41.02	59.94	68.58
Total for Grasses		1431	1119	1024	41.02	59.94	68.58
F	Achillea millefolium	b48	a8	ab27	1.43	.10	1.42
F	Agoseris glauca	10	3	7	.05	.00	.10
F	Antennaria rosea	b26	a3	a15	.91	.03	1.06
F	Arabis sp.	3	-	-	.00	-	-
F	Aster chilensis	c146	a35	b81	3.13	.91	2.16
F	Aster sp.	b36	a-	b35	.59	-	.60
F	Astragalus agrestis	b37	a-	b30	.08	-	.81

Type	Species	Nested Frequency			Average Cover %		
		'95	'00	'10	'95	'00	'10
F	Cirsium sp.	c95	a-	b10	1.53	-	.54
F	Collinsia parviflora (a)	-	-	8	-	-	.30
F	Equisetum laevigatum	72	90	70	.33	1.66	.47
F	Erigeron sp.	3	5	12	.00	.00	.07
F	Gentiana sp.	a-	a-	b20	-	-	.33
F	Lepidium sp. (a)	-	-	1	-	-	.00
F	Myosotis alpestris	a13	b52	a5	.04	.77	.01
F	Potentilla anersina	b200	b199	a23	3.85	5.14	.21
F	Potentilla gracilis	b69	a25	b70	1.56	.44	1.26
F	Ranunculus testiculatus (a)	11	-	-	.18	-	-
F	Senecio multilobatus	a-	a-	b29	-	-	.45
F	Senecio pauperculus	b97	a-	a-	2.75	-	-
F	Sisyrinchium idahoensis	b104	a-	a-	1.24	-	-
F	Stellaria longipes	5	-	10	.01	.00	.33
F	Taraxacum officinale	c316	a30	b67	8.56	.78	1.10
F	Townsendia incana	-	-	3	-	-	.03
F	Tragopogon dubius	-	-	4	-	-	.03
F	Viola adunca	b124	c171	a3	2.32	3.75	.03
Total for Annual Forbs		11	0	9	0.18	0	0.30
Total for Perennial Forbs		1404	621	521	28.44	13.61	11.07
Total for Forbs		1415	621	530	28.63	13.61	11.38

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

BASIC COVER--

Management unit 08B, Study no: 12

Cover Type	Average Cover %		
	'95	'00	'10
Vegetation	69.33	70.35	67.77
Litter	76.84	86.00	77.80
Cryptogams	5.28	4.85	0
Bare Ground	0	.18	.48

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 12, Study Name: Big Meadow

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
35.4	7.4	34.0	33.7	32.3	6.1	5.5	256.0	1.2

PELLET GROUP DATA--

Management unit 08B, Study no: 12

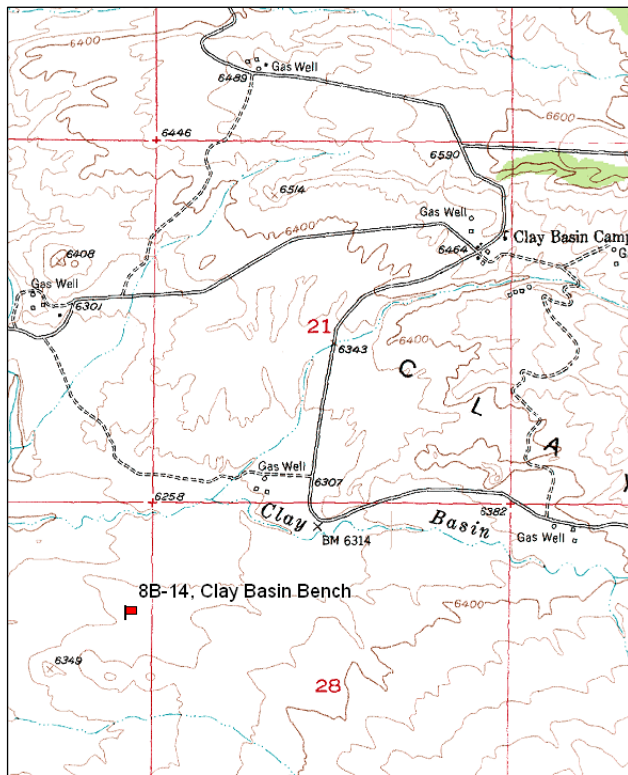
Type	Quadrat Frequency			Days use per acre (ha)	
	'95	'00	'10	'00	'10
Rabbit	-	-	5	-	-
Elk	-	1	3	-	-
Deer	-	1	2	-	21 (51)
Cattle	21	2	40	11 (27)	164 (405)

CLAY BASIN BENCH - TREND STUDY NO. 8B-14-10

Vegetation Type: Wyoming Big Sagebrush
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: SANDY (10-14W), R034XY250WY
Land Ownership: BLM
Elevation: 6295 ft. (1919 m)
Aspect: West
Slope: 3%
Transect bearing: 107° magnetic
Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

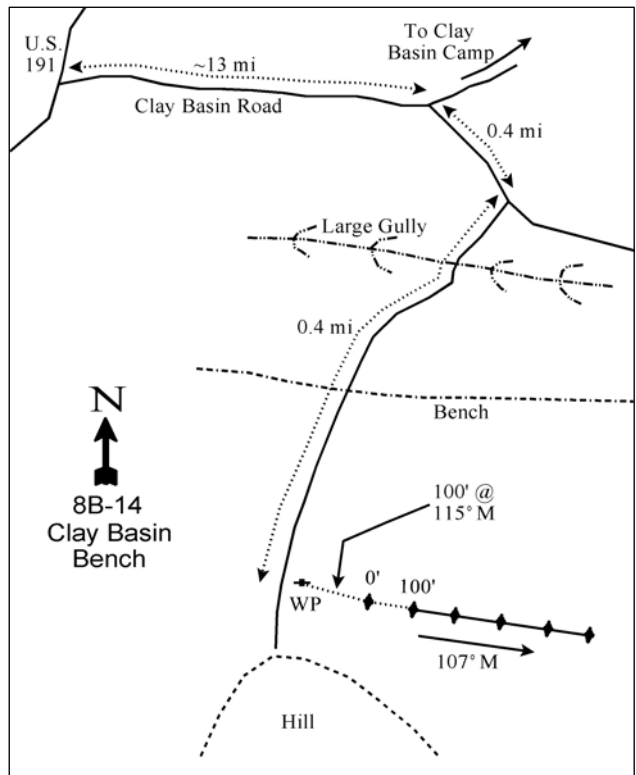
Directions:
 From Dutch John, proceed north towards Antelope Flat on Highway U.S. 191. Continue over the stateline into Wyoming and turn right just after Minnies Gap onto the Clay Basin road. Drive approximately 13 miles toward Clay Basin to the turn off to Clay Basin Camp. Turn right again and proceed 0.4 miles to another intersection. Turn right and go 0.4 miles going through the large gully and onto the bench. The witness post is on the left side of the road. From witness post go 100 feet (17 paces) at 115°M.

Map Name: Clay Basin



Township: 3N Range: 24E Section: 29

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 649495 E 4537023 N

CLAY BASIN BENCH - TREND STUDY NO. 8B-14

Site Information

Site Description: The study is located on a bench about one mile to the south of Clay Basin Camp. There is a large amount of energy development in the surrounding area with many roads and pipelines. An underground pipeline was laid next to the road that is adjacent to the transect between 2005 and 2010. The trenching affected the first belt of the transect. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Clay Basin allotment. Deer and elk have used the area primarily as winter range with antelope also using the area. Due to difficulties in differentiating between species, deer and antelope pellets were all classified as deer. Pellet group transect data estimated heavy deer/antelope use in 2000 and 2010, with more moderate use in 2005. Estimated elk and cattle use has been light since 2000 (Table - Pellet Group Data).

Browse: At the outset of the study in 2000, the site supported an old, dense stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), but there was a large die-off of sagebrush between 2000 and 2005, reducing the population to a low density. The surviving population consists of mostly decadent plants that receive moderate to heavy use. Recruitment of young sagebrush plants was poor in 2000 and 2005, but was good in 2010. Additional browse forage is provided by small numbers of winterfat (*Ceratoides lanata*), stickleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and slenderbush eriogonum (*Eriogonum microthecum*). All of these species have received moderate to heavy use over the course of the study (Table - Browse Characteristics).

Herbaceous Understory: Grasses were not abundant at the outset of the study in 2000, but increased substantially in 2005, with a large increase in the nested frequency and cover of Sandberg bluegrass (*Poa secunda*) and needle-and-thread (*Stipa comata*). Other common perennial grass species include western wheatgrass (*Agropyron smithii*) and Indian ricegrass (*Oryzopsis hymenoides*). Cheatgrass (*Bromus tectorum*) increased substantially in 2010, but much of the increase was in the disturbed soil from the pipeline trenching that affected the first belt of the transect. Forbs are not diverse or abundant on the site with the low growing species Hoods phlox (*Phlox hoodii*) providing almost all of the perennial forb cover (Table - Herbaceous Trends).

Soil: The soil has a sandy loam texture with a neutral soil reaction (pH 7.3) (Table - Soil Analysis Data). Bare ground cover was moderately high in 2000 and 2005, but decreased in 2010 with increases in the herbaceous vegetation cover. Cryptogam cover was very high in 2000, but decreased substantially in 2005 (Table - Basic Cover). There are some small gullies on the site which appear to have originally been cattle trails. The soil erosion condition was classified stable in 2005 and 2010.

Trend Assessments

Browse:

- **2000 to 2005 - down (-2):** The density of Wyoming big sagebrush decreased by 71% from 6,500 plants/acre to 1,860 plants/acre, and cover decreased from 16% to 3%. Decadence of sagebrush increased from 32% to 89% and poor vigor increased from 14% to 82%.
- **2005 to 2010 - slightly down (-1):** The Wyoming big sagebrush density decreased by 13% to 1,620 plants/acre, but cover remained similar. Decadence decreased to 48% and poor vigor decreased to 41%, but both are still considered high. Recruitment of young plants increased from 2% to 25% of the population.

Grass:

- **2000 to 2005 - up (+2):** The sum of nested frequency of perennial grasses increased by 49% and cover increased from 5% to 20%. There was a significant increase in the nested frequency of Sandberg bluegrass and needle-and-thread.

- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased to 29%.

Forb:

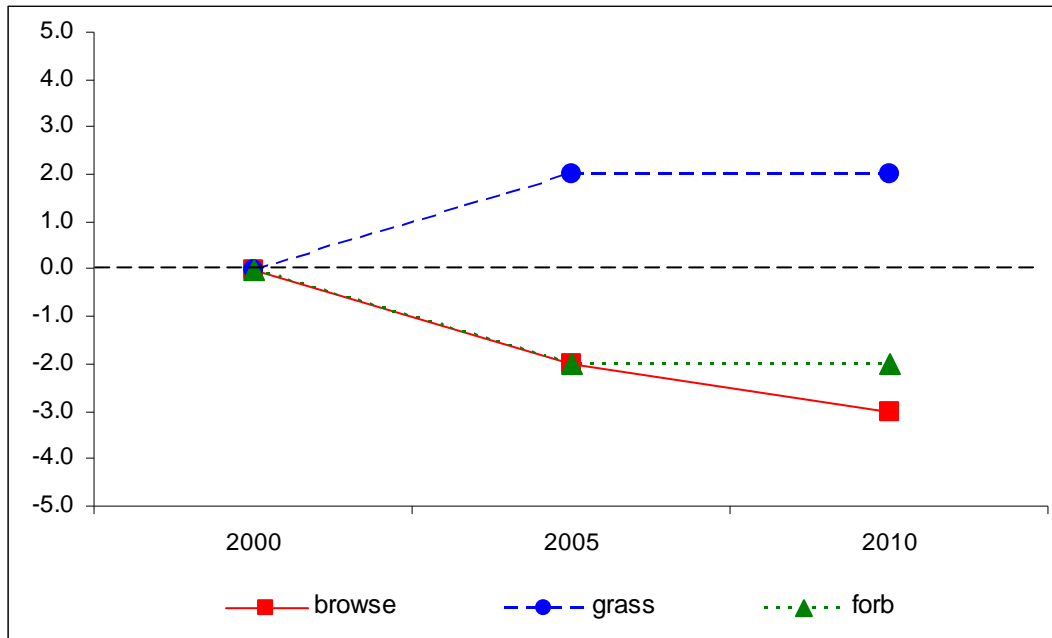
- **2000 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased by 89% and cover decreased from 2% to less than 1%. Perennial forbs became rare on the site.
- **2005 to 2010 - stable (0):** Perennial forbs remained rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 8B, study no: 14

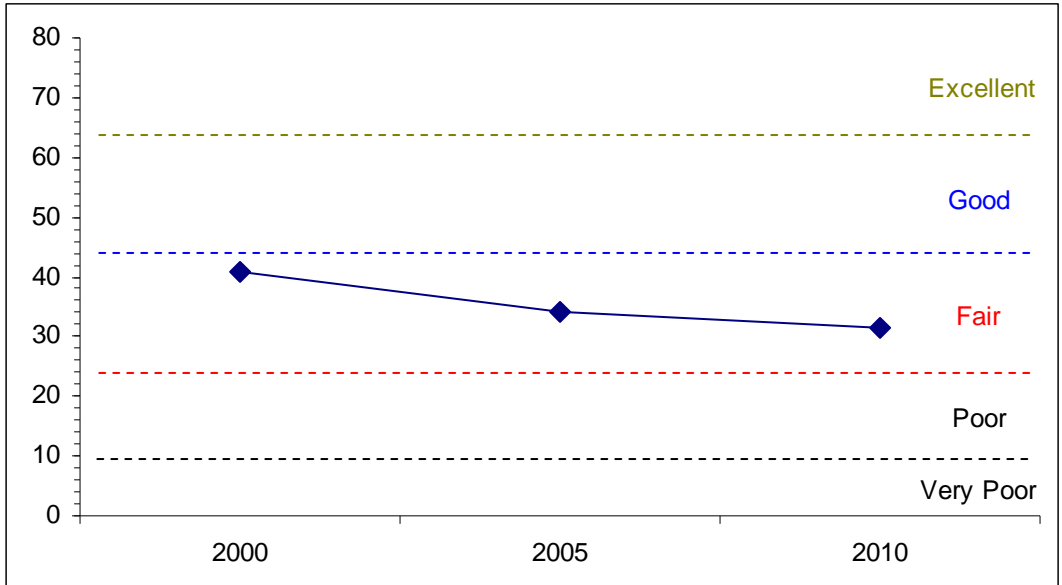
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
00	19.9	5.5	1.0	10.7	-0.1	3.9	0.0	40.8	Fair
05	3.7	0.0	0.0	30.0	0.0	0.4	0.0	34.1	Fair
10	3.1	0.0	0.0	30.0	-2.0	0.5	0.0	31.5	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 8B, Study no: 14



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 8B, Study no: 14



HERBACEOUS TRENDS--
 Management unit 08B, Study no: 14

Type	Species	Nested Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
G	<i>Agropyron smithii</i>	b ₁₃₄	ab ₁₂₀	a ₉₇	1.30	1.66	2.88
G	<i>Agropyron spicatum</i>	a ₋	a ₅	b ₃₀	-	.03	.96
G	<i>Bromus tectorum</i> (a)	a ₁₈	a ₂	b ₁₂₈	.10	.00	2.70
G	<i>Oryzopsis hymenoides</i>	b ₇₁	ab ₄₂	a ₂₅	1.12	.79	1.11
G	<i>Poa bulbosa</i>	-	-	6	-	-	.18
G	<i>Poa fendleriana</i>	a ₄	b ₃₈	a ₂₅	.00	.76	.91
G	<i>Poa secunda</i>	a ₈₀	b ₂₆₉	b ₃₀₇	.36	10.15	13.51
G	<i>Sitanion hystrix</i>	ab ₁₄	b ₂₂	a ₁₄	.10	.38	.33
G	<i>Stipa comata</i>	a ₁₃₂	b ₁₅₄	b ₁₈₇	2.43	5.77	9.19
Total for Annual Grasses		18	2	128	0.10	0.00	2.70
Total for Perennial Grasses		435	650	691	5.33	19.56	29.10
Total for Grasses		453	652	819	5.44	19.56	31.80
F	<i>Alyssum alyssoides</i> (a)	-	-	2	-	-	.00
F	<i>Collinsia parviflora</i> (a)	-	3	4	-	.01	.03
F	<i>Descurainia pinnata</i> (a)	a ₋	b ₁₄	a ₃	-	.38	.00
F	<i>Erigeron pumilus</i>	2	-	-	.01	-	-
F	<i>Hymenoxys richardsonii</i>	4	-	-	.00	-	-
F	<i>Lappula occidentalis</i> (a)	a ₋	b ₃₆	a ₁₂	-	.31	.02
F	<i>Lepidium sp.</i> (a)	a ₋	ab ₈	b ₁₄	-	.02	.06
F	<i>Machaeranthera canescens</i>	-	3	1	-	.01	.00
F	<i>Penstemon sp.</i>	1	-	-	.00	-	-
F	<i>Phlox hoodii</i>	b ₁₃₄	a ₁₂	a ₂₃	1.92	.13	.20
F	<i>Ranunculus testiculatus</i> (a)	-	11	-	-	.04	-
F	<i>Salsola iberica</i> (a)	a ₋	a ₋	b ₃₃	-	-	1.57

T y P e	Species	Nested Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
F	Schoenocrambe linifolia	2	1	9	.00	.03	.02
F	Townsendia incana	4	-	-	.01	-	-
F	Tragopogon dubius	-	-	1	-	-	.03
Total for Annual Forbs		0	72	68	0	0.76	1.69
Total for Perennial Forbs		147	16	34	1.95	0.18	0.25
Total for Forbs		147	88	102	1.95	0.94	1.95

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

BROWSE TRENDS--

Management unit 08B, Study no: 14

T y P e	Species	Strip Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
B	Artemisia frigida	0	0	1	-	-	-
B	Artemisia tridentata wyomingensis	97	54	48	15.67	2.75	2.24
B	Ceratoides lanata	10	10	6	.21	.24	.21
B	Chrysothamnus viscidiflorus viscidiflorus	5	6	6	.03	-	.06
B	Eriogonum microthecum	6	0	1	.00	-	-
B	Gutierrezia sarothrae	82	0	39	3.92	-	1.23
B	Opuntia sp.	43	47	39	1.75	2.71	3.10
Total for Browse		243	117	140	21.60	5.71	6.85

CANOPY COVER, LINE INTERCEPT--

Management unit 08B, Study no: 14

Species	Percent Cover	
	'05	'10
Artemisia frigida	-	.01
Artemisia tridentata wyomingensis	1.75	2.00
Ceratoides lanata	-	.11
Chrysothamnus viscidiflorus viscidiflorus	.05	.16
Gutierrezia sarothrae	-	1.45
Opuntia sp.	1.75	1.25

BASIC COVER--

Management unit 08B, Study no: 14

Cover Type	Average Cover %		
	'00	'05	'10
Vegetation	28.52	24.39	44.29
Rock	.20	.16	0
Pavement	.60	.12	.15
Litter	29.68	29.11	43.61
Cryptogams	22.77	9.35	5.79
Bare Ground	43.54	46.50	29.29

SOIL ANALYSIS DATA --

Management unit 8B, Study no: 14, Study Name: Clay Basin Bench

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.9	7.3	65.6	17.1	17.3	1.2	6.3	89.6	0.5

PELLET GROUP DATA--

Management unit 08B, Study no: 14

Type	Quadrat Frequency			Days use per acre (ha)		
	'00	'05	'10	'00	'05	'10
Rabbit	9	83	6	-	-	-
Elk	3	2	1	5 (13)	3 (8)	-
Deer	47	18	8	56 (139)	25 (63)	62 (154)
Cattle	4	7	3	17 (43)	12 (30)	15 (38)

BROWSE CHARACTERISTICS--

Management unit 08B, Study no: 14

		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>Artemisia frigida</i>									
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	9/9
<i>Artemisia tridentata wyomingensis</i>									
00	6500	2	66	32	-	51	8	14	13/25
05	1860	2	9	89	-	34	65	82	12/13
10	1620	25	27	48	260	51	5	41	11/16
<i>Ceratoides lanata</i>									
00	320	0	81	19	-	63	25	13	3/6
05	380	11	84	5	-	5	95	0	6/7
10	200	10	90	0	-	0	0	0	9/7
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
00	100	0	100	-	-	40	0	0	8/7
05	120	17	83	-	-	33	0	0	14/16
10	120	0	100	-	-	0	0	0	12/24

		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>Eriogonum microthecum</i>										
00	140	0	100	-	-	14	57	0	4/5	
05	0	0	0	-	-	0	0	0	-/-	
10	20	0	100	-	-	0	0	0	3/5	
<i>Gutierrezia sarothrae</i>										
00	12660	4	93	3	80	0	0	.78	4/7	
05	0	0	0	0	-	0	0	0	-/-	
10	1300	15	85	0	-	0	0	0	8/11	
<i>Opuntia sp.</i>										
00	1240	3	84	13	-	0	0	0	3/14	
05	2160	0	72	28	-	0	0	3	4/16	
10	1620	0	88	12	20	5	0	10	4/14	
<i>Sarcobatus vermiculatus</i>										
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	21/31	

SUMMARY
WILDLIFE MANAGEMENT UNIT 8B - NORTH SLOPE, DAGGETT

Community Types

Deer winter range within a unit is summarized into three categories based on ecological potentials which include low potential, mid-level potential and high potential. Low potential sites include desert shrub, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and cliffrose (*Cowania mexicana* ssp. *stansburiana*) communities. Mid-level potential sites include mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) communities. High potential sites include mountain brush communities. Black sagebrush (*A. nova*) and basin big sagebrush (*A. tridentata* ssp. *tridentata*) communities are placed within the low potential or mid-level potential scales based on precipitation and elevation. Deer summer range is summarized separately from winter range as a fourth category and typically includes aspen (*Populus tremuloides*) and high elevation mountain brush communities. Ten interagency range trend studies were sampled in Unit 8B during the summer of 2010. Two of the range trend studies in the unit [Death Valley (8B-6) and Phil Pico Mountain (8B-8)] are categorized as high potential sites for deer winter range and sample mountain brush communities. Both of these studies are also classified as crucial elk winter range. Four of the studies [Goslin Mountain (8B-2), Bear Top Mountain (8B-3), Greendale (8B-4) and West Goslin (8B-9)] are categorized as mid-level potential sites for deer winter range and sample mountain big sagebrush communities. Though categorized as deer winter range in this summary, the Goslin Mountain and West Goslin studies are considered to be crucial deer summer range and fawning habitat. Also, the Bear Top Mountain study area is managed by the U.S. Forest Service primarily as big horn sheep habitat. Three of the studies [Bennett Ranch (8B-5), Antelope Flat (8B-7) and Clay Basin Bench (8B-14)] are classified as low potential deer winter range sites and sample Wyoming big sagebrush communities. Both studies are also considered to be elk winter range. One study [Big Meadow (8B-12)] is considered to be crucial deer and elk summer range and samples a wet meadow. For further detail on this study, refer to the discussion section.

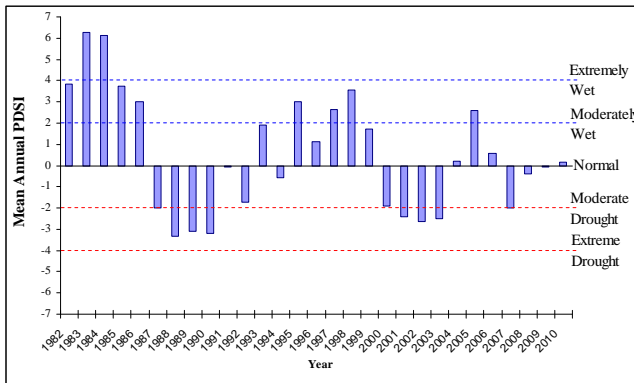


Figure 1. The 29 year mean annual Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

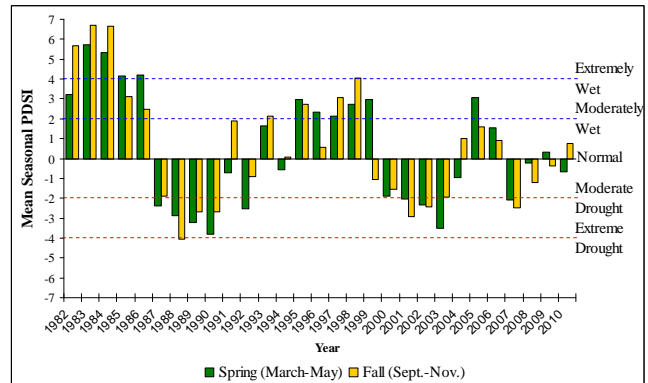


Figure 2. The 29 year mean spring (March-May) and fall (Sept.-Nov.) Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Precipitation and Palmer Drought Severity Index (PDSI) data for the unit were compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the Northern Mountains (Division 5). The Northern Mountains had a historic annual mean precipitation of 19.11 inches from 1895 to 2010. The

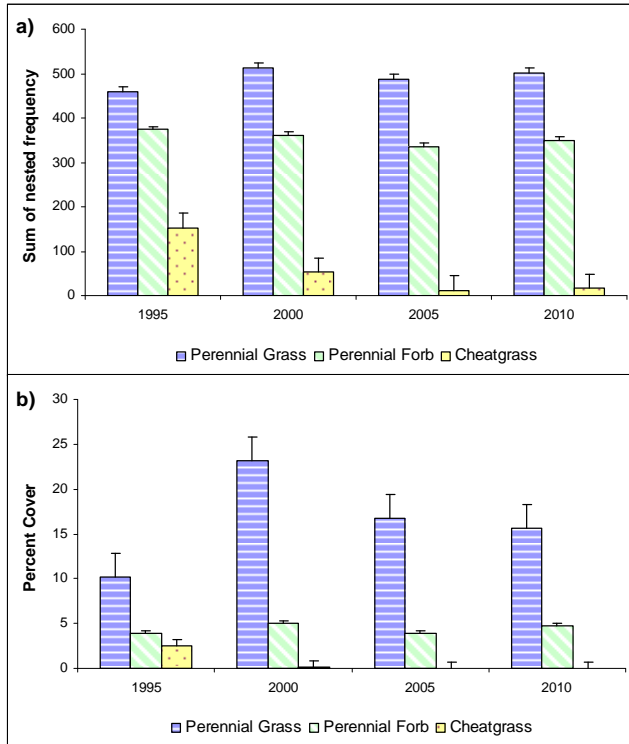


Figure 3. a) High potential sites mean perennial grass, perennial forb and cheatgrass sum of nested frequency (n=2) by year for WMU 8B, North Slope, Daggett. b) High potential sites mean perennial grass, perennial forb and cheatgrass cover (n=2) by year for WMU 8B.

mean annual PDSI of the Northern Mountains displays a cycle of several wet years followed by several drought years, over the course of study years in the unit. Wetter than normal years in the Northern Mountains included 1982-1986, 1993, 1995-1999 and 2005, and drought years included 1987-1992, 2000-2003 and 2007 (Figure 1 and Figure 2) (Time Series Data 2011).

Mountain Brush Communities (High Potential Winter Range)

Browse: The high potential site cumulative median browse trend decreased from 1988 to 2000, but has remained fairly stable since 2000 (Figure 10a). The dominant browse species on both of the high potential studies is true mountain mahogany (*Cercocarpus montanus*) with a mixture of other mountain brush. The density of true mountain mahogany is moderately high on the Death Valley study and high on Phil Pico Mountain study. The mean density of true mountain mahogany was significantly lower in 2000 than in any other sample year (Figure 4a). Cover of true mountain mahogany is also high on the unit. There was a slight, but significant, decrease in cover in 2000 and cover remained lower in subsequent sample years (Figure 4b). The decrease in cover of mahogany in 2000 was primarily due to a decrease in cover on the Death Valley study. Decadence of mahogany was also significantly higher in 2000 than in any other sample year (Figure 4c).

Herbaceous Understory: The high potential median cumulative grass trend for the unit has fluctuated somewhat over the sample years, decreasing slightly in 1995, but returning to the base levels again in 2000 (Figure 10a). Grasses within these communities are fairly diverse and abundant. The annual species cheatgrass (*Bromus tectorum*) was fairly common on the Phil Pico Mountain study in 1995, but decreased in

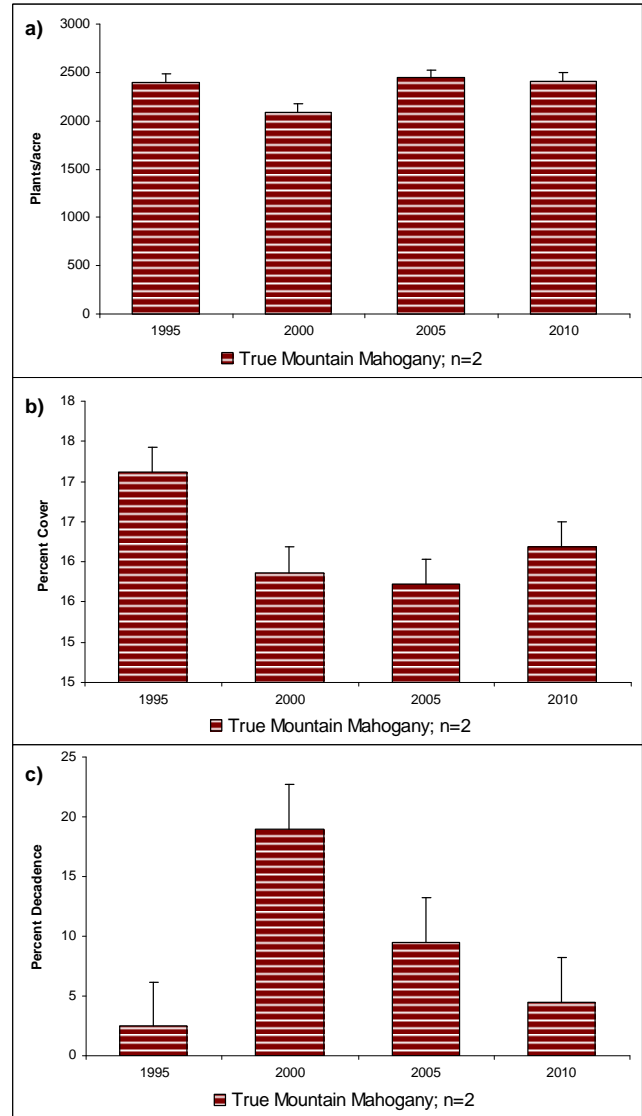


Figure 4. a) High potential sites mean density of true mountain mahogany (*Cercocarpus montanus*) by year for WMU 8B, North Slope, Daggett. b) High potential sites mean cover of true mountain mahogany by year for WMU 8B. c) High potential sites mean population decadence of true mountain mahogany by year for WMU 8B.

subsequent sample years. Mean cover and sum of nested frequency of perennial grasses increased significantly in 2000 and remained higher throughout the following sample years (Figure 3a and Figure 3b).

The high potential median cumulative forb trend for the unit decreased slightly in 1995, but remained relatively stable throughout the remaining sample years (Figure 10a). Perennial forbs are also diverse within the sampled communities, but are not as abundant as perennial grasses. The mean sum of nested frequency and cover of perennial forbs has remained fairly similar over the sample years (Figure 3a and Figure 3b).

Utilization: Pellet group transect data indicates that elk predominantly use the area. The mean elk days use/acre on the unit has been moderately heavy over the course of the study years. The mean deer days use/acre has been moderate on the high potential sites within the unit. Deer use was lower in 2005 than in 2000 or 2010. The decrease in deer use was due to a large decrease in deer pellets on the Death Valley (8B-6) study in 2005. Cattle use appears to be light on the two studies (Figure 11a). Moose pellets have also occasionally been sampled on the Death Valley study.

Deer Desirable Components Index (DCI): The high potential deer DCI has remained relatively similar, though with a slight general trend upward over the sample years. The ranking of the DCI has been good throughout the sample years (Table 1 and Figure 9).

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	30.0	13.6	5.8	20.3	-0.9	7.8	0.0	76.5	Good
00	28.8	8.8	3.5	30.0	-0.1	8.9	0.0	79.9	Good
05	30.0	11.3	6.3	30.0	0.0	7.9	0.0	85.4	Good
10	29.6	13.0	6.8	29.2	0.0	8.6	0.0	87.1	Good

Table 1. High potential scale mean deer DCI scores (n=2) by year for WMU 8B, North Slope, Daggett. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

Mountain Big Sagebrush Communities (Mid-Level Potential Winter Range)

Browse: The mid-level potential site cumulative median browse trend increased in 1988, remained stable through 2000, then decreased slightly in 2005 (Figure 10b). The dominant browse species on all four of the mid-level potential studies is mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*). The density and cover of mountain big sagebrush has decreased over the sample years due to a prescribed fire that removed most of the browse from the Bear Top Mountain study in 1998 and a wildfire that burned the West Goslin study in 2002 (Figure 6a and Figure 6b). Prior to the fires, density and cover were high on all of the sites. Decadence of mountain big sagebrush is quite high on the studies. Decadence was significantly higher in the 2000 sample year than the other sample years (Figure 6c).

Herbaceous Understory: The mid-level potential median cumulative grass trend for the unit decreased slightly in 1995, but remained relatively stable in subsequent sample years (Figure 10b). Grasses within these communities are diverse and very abundant. The annual species cheatgrass (*Bromus tectorum*) is not prevalent on most of the studies, but increased substantially on the Bear Top Mountain study in 2010. Mean sum of nested frequency of perennial grasses has remained similar throughout the sample years, but cover has steadily increased since 1995, with a significant increase in 2000 (Figure 5a and Figure 5b). Most of the increase in perennial grass cover occurred on the two studies (8B-3 and 8B-9) that burned.

The mid-level potential median cumulative forb trend for the unit increased in 1995, but decreased to previous levels in 2000. The trend then decreased slightly again in 2010 (Figure 10b). Perennial forbs are also diverse and fairly abundant within the sampled communities. The mean sum of nested frequency of perennial forbs

decreased significantly in 2000, with smaller, but not significant, decreases in each of the subsequent sample years (Figure 5a). Mean cover of perennial forbs has also been decreasing slowly since 1995, but the only significant decrease occurred in 2010 (Figure 5b).

Utilization: Pellet group transect data indicates that deer/antelope predominantly use the study areas. The mean deer/antelope days use/acre on the unit has been moderate to moderately heavy over the course of the study years with the highest use occurring in 2005. There was a substantial increase in deer/antelope days use/acre in 2005. The mean elk days use/acre has been mostly moderate on the sites, though elk use decreased markedly in 2010. Cattle use appears to be light on the studies (Figure 11b).

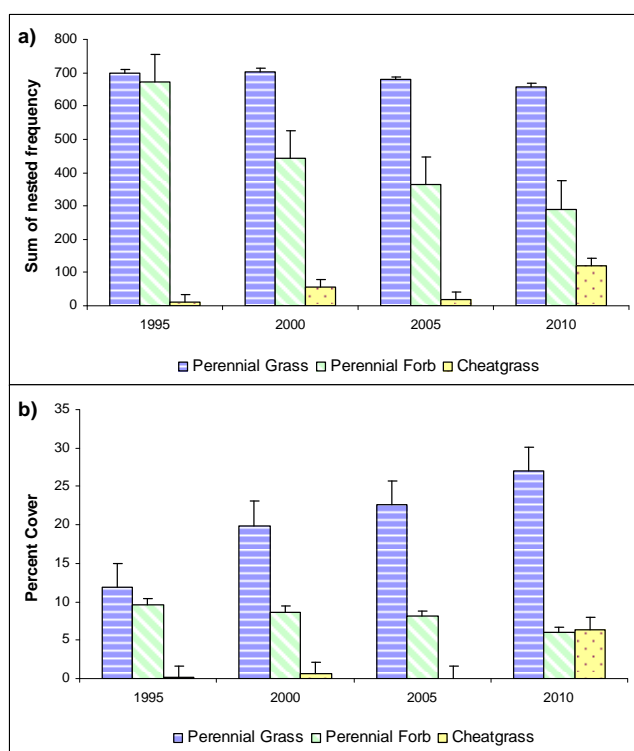


Figure 5. a) Mid-level potential sites mean perennial grass, perennial forb and cheatgrass sum of nested frequency (n=4) by year for WMU 8B, North Slope, Daggett. b) Mid-level potential sites mean perennial grass, perennial forb and cheatgrass cover (n=4) by year for WMU 8B.

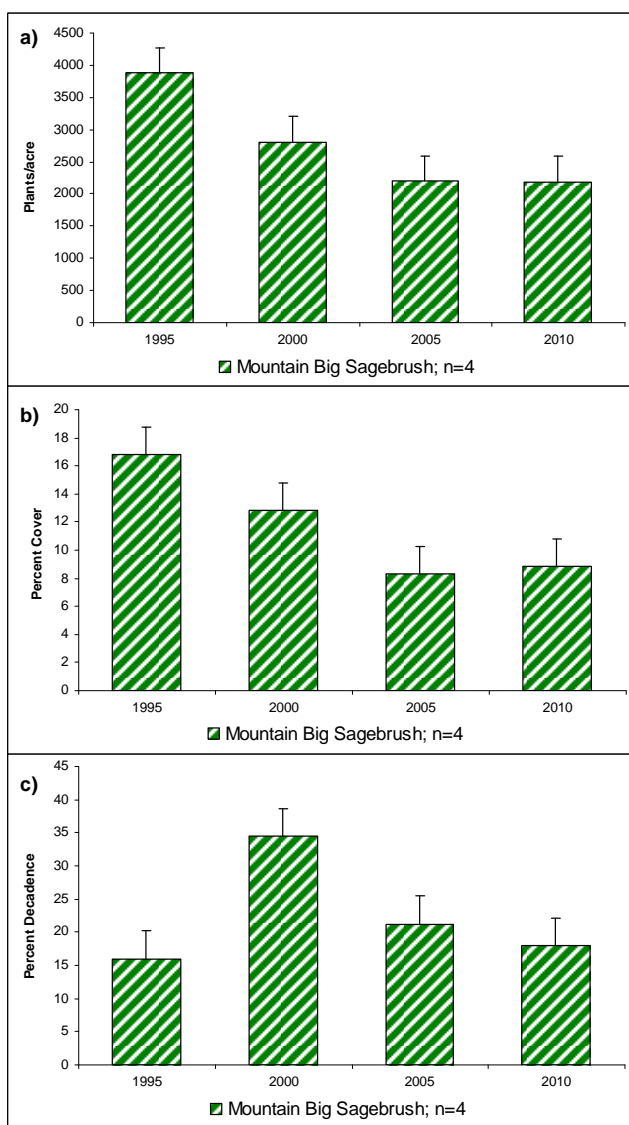


Figure 6. a) Mid-level potential sites mean density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) by year for WMU 8B, North Slope, Daggett. b) Mid-level potential sites mean cover of mountain big sagebrush by year for WMU 8B. c) Mid-level potential sites mean population decadence of mountain big sagebrush by year for WMU 8B.

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	24.5	10.9	3.9	23.7	-0.1	9.1	0.0	72.1	Good
00	20.9	5.4	3.0	29.2	-0.1	10.0	0.0	68.5	Good
05	15.7	4.4	2.8	30.0	0.0	7.9	0.0	60.7	Fair
10	15.6	8.4	3.7	30.0	-3.7	8.8	0.0	62.8	Fair

Table 2. Mid-level potential scale mean deer DCI scores (n=4) by year for WMU 8B, North Slope, Daggett. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

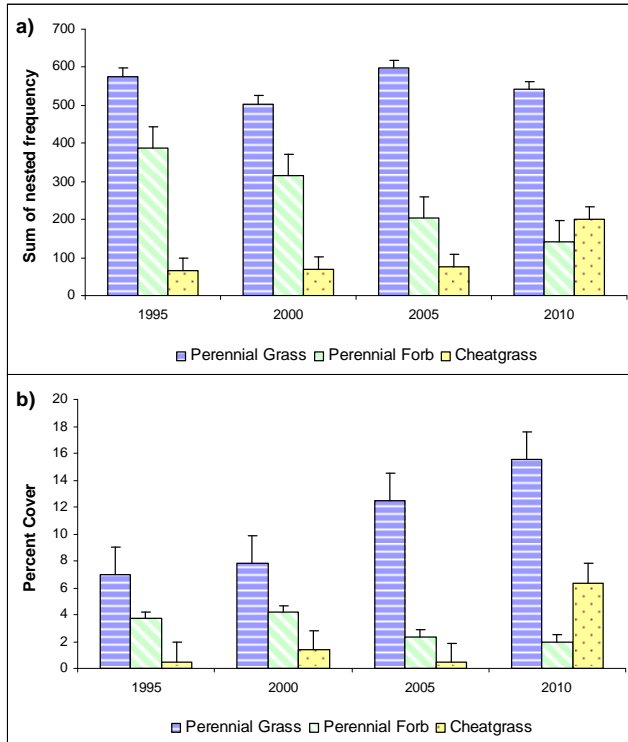


Figure 7. a) Low potential sites mean perennial grass, perennial forb and cheatgrass sum of nested frequency (n=3) by year for WMU 8B, North Slope, Daggett. b) Low potential sites mean perennial grass, perennial forb and cheatgrass cover (n=3) by year for WMU 8B.

Deer Desirable Components Index (DCI): The mid-level potential deer DCI remained fairly stable over the sample years with rankings ranging from fair to good throughout the sample years (Table 2 and Figure 9). The DCI ranking decreased to fair condition in 2005 primarily due to a decrease in browse cover caused by prior fires on two of the study sites.

Wyoming Big Sagebrush Communities (Low Potential Winter Range)

Browse: The low potential site cumulative median browse trend increased from 1982 to 1995, but has steadily decreased through 2010 (Figure 10c). The dominant browse species the three low potential studies is Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*). The density and cover of Wyoming big sagebrush decreased significantly in 2005 (Figure 8a and Figure 8b). Much of the decrease was due to a large die-off of sagebrush on the Clay Basin Bench study. Decadence also increased substantially in 2005, but the increase was not significant (Figure 8c).

Herbaceous Understory: The low potential median cumulative grass trend for the unit has fluctuated over the sample years decreasing from 1988 to 2000, increasing in 2005 and slightly decreasing in 2010 (Figure 10c). Grasses within these communities are fairly diverse and abundant, especially on the Clay Basin Bench study. The annual species cheatgrass (*Bromus tectorum*) is fairly common on these studies and increased significantly in nested frequency and cover in 2010. Mean sum of nested frequency of perennial grasses has remained similar throughout the sample years, but cover increased significantly in 2005 and increased again in 2010, though not significantly (Figure 7a and Figure 7b). Most of the increase in perennial grass cover occurred on the Clay Basin Bench study.

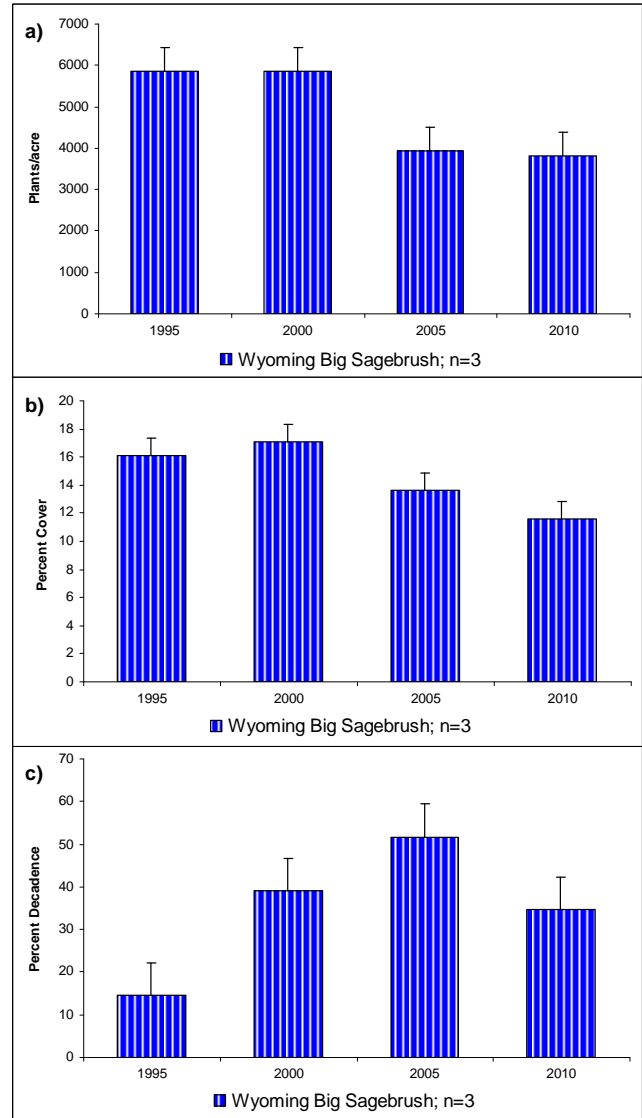


Figure 8. a) Low potential sites mean density of Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*) by year for WMU 8B, North Slope, Daggett. b) Low potential sites mean cover of Wyoming big sagebrush by year for WMU 8B. c) Low potential sites mean population decadence of Wyoming big sagebrush by year for WMU 8B.

The low potential median cumulative forb trend has steadily decreased since 2000 (Figure 10c). Perennial forbs are not as abundant as perennial grasses within the sampled communities. The mean sum of nested frequency of perennial forbs has steadily decreased since 1995 (Figure 7a). Mean cover of perennial forbs decreased significantly in 2005 (Figure 7b).

Utilization: Pellet group transect data indicates that deer predominantly use these study areas. The mean deer days use/acre on the unit has been mostly moderate over the course of the study years with a substantial increase in use in 2010. The mean elk and cattle days use/acre have been mostly light on the study sites (Figure 11c).

Deer Desirable Components Index (DCI): The low potential deer DCI remained fairly stable over the sample years with a ranking of good throughout the sample years. The DCI score did decrease slightly in 2000 primarily due to a decrease in browse decadence score, indicating an increase in decadence over the unit. The ranking remained good, however (Table 3 and Figure 9).

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	24.1	10.9	5.6	13.9	-0.2	7.4	0.0	61.6	Good
00	23.4	4.0	2.2	15.7	-0.7	8.0	0.0	52.6	Good
05	20.0	4.4	1.9	21.9	-0.2	4.6	0.0	52.7	Good
10	17.8	5.3	5.8	21.9	-3.2	4.0	0.0	51.6	Good

Table 3. Low potential scale mean deer DCI scores (n=3) by year for WMU 8B, North Slope, Daggett. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

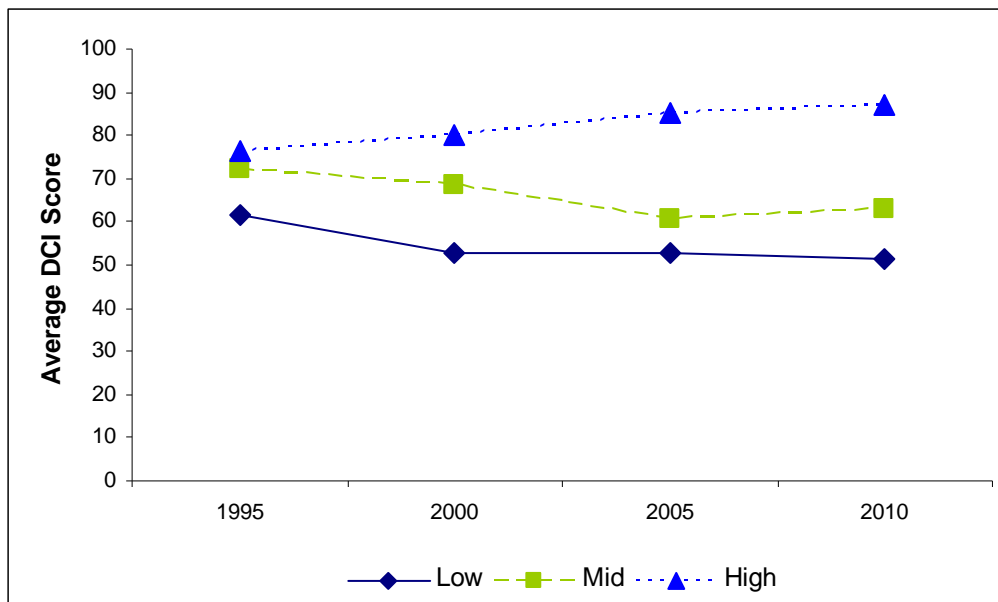


Figure 9. Mean low (n=3), mid-level (n=4) and high (n=2) potential scale deer DCI scores by year for WMU 8B, North Slope, Daggett. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

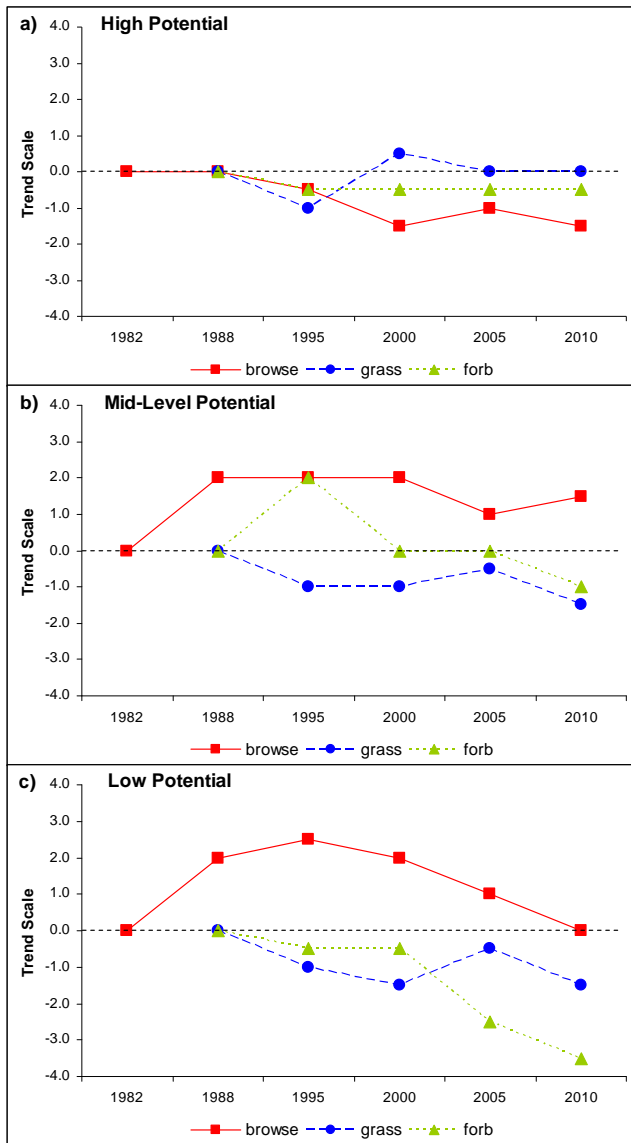


Figure 10. a) High potential sites cumulative median browse, grass and forb trends by year for WMU 8B, North Slope, Daggett. b) Mid-level potential sites cumulative median browse, grass and forb trends by year for WMU 8B. c) Low potential sites cumulative median browse, grass and forb trends by year for WMU 8B.

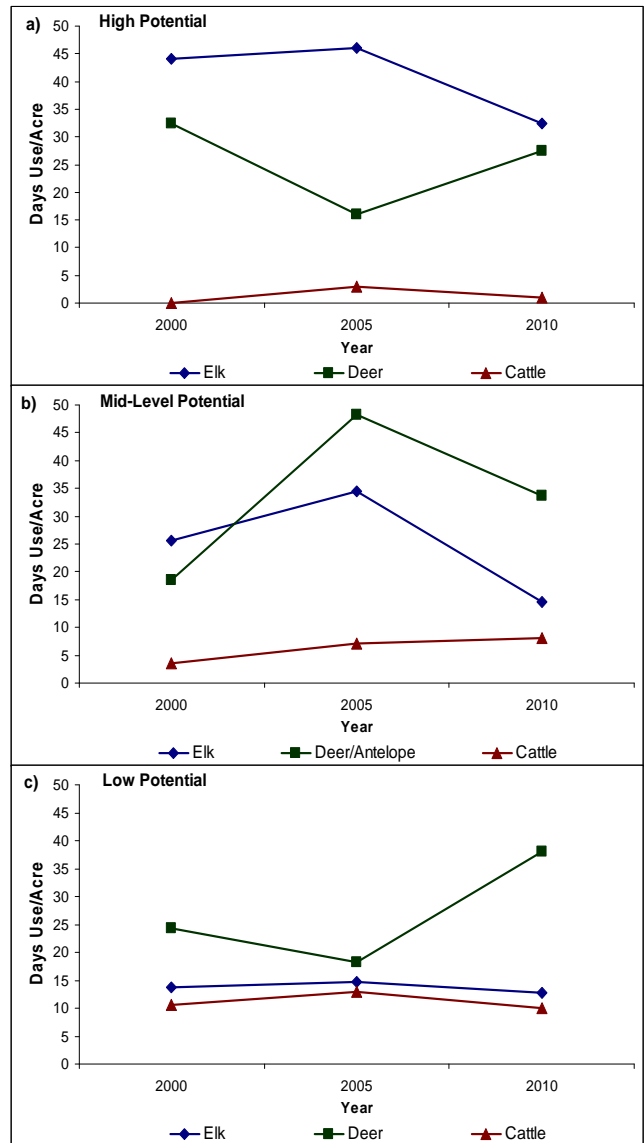
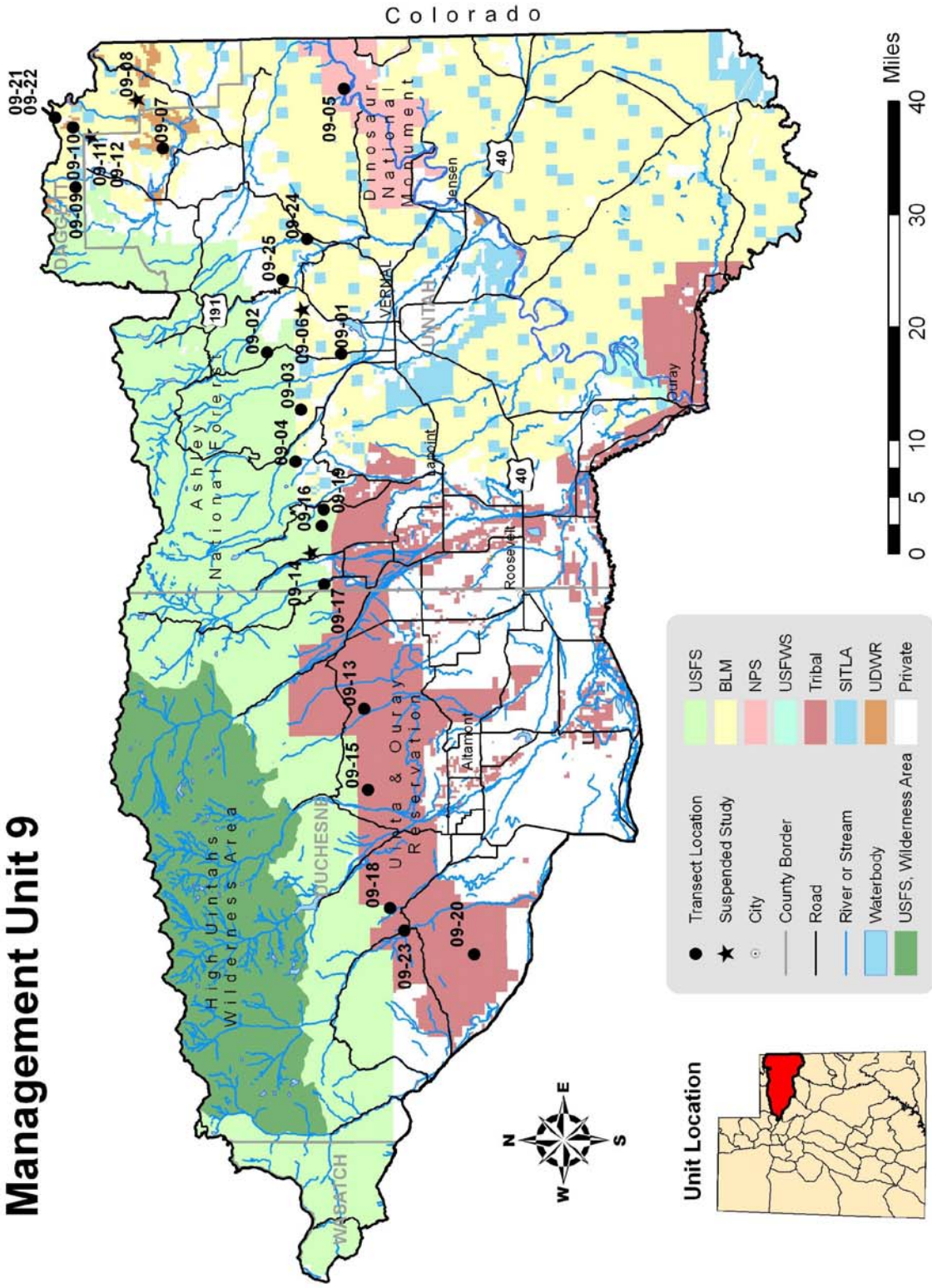


Figure 11. a) High potential sites mean animals days use/acre (n=2) by year for WMU 8B, North Slope, Daggett. b) Mid-level potential sites mean animal days use/acre (n=4) by year for WMU 8B. c) Low potential sites mean animal days use/acre (n=3) by year for WMU 8B.

Management Unit 9



WILDLIFE MANAGEMENT UNIT 9 - SOUTH SLOPE, VERNAL

Boundary Description

Wasatch, Summit, Daggett, Uintah, Duchesne counties - Boundary begins at the junction of Highway US-40 and Highway SR-87 in Duchesne; then north on SR-87 to Highway SR-35; then northwest on SR-35 to the Provo River; north along the Provo River to the North Fork Provo River; north along the North Fork Provo River to Highway SR-150; northerly along SR-150 to the Summit/Duchesne county line (summit of the Uinta Mountains); east along the summit of the Uinta Mountains to Highway SR-191; north along SR-191 to Cart Creek; northeast along Cart Creek to Flaming Gorge Reservoir; east along Flaming Gorge Reservoir to the Green River; east along the Green River to the Utah-Colorado state line; south along the Utah-Colorado state line to the White River; west along the White River to the Green River; north along the Green River to the Duchesne River; northwest along the Duchesne River to US-40 at Myton; west along US-40 to SR-87 in Duchesne and beginning point; excludes Dinosaur National Monument and all Indian Tribal Lands.

Management Unit Description

The South Slope, Vernal Wildlife Management Unit is located along the south slope of the Uinta Mountains and extends south into the Uintah Basin in Duchesne and Uintah counties. The unit encompasses the land area of two former deer herd units, the Vernal Unit (11) and the South Slope Unit (12). Elevation ranges from 13,528 feet at Kings Peak, the highest point in Utah, to 4,650 feet at the confluence of the White River and the Green River. Habitat also varies widely from alpine tundra above the timberline, to aspen and conifer communities, to sagebrush and mountain brush communities along the foothills of the Uintah Mountains, to desert shrub communities in the desert below Vernal and Roosevelt.

The South Slope unit contains an estimated 2.8 million acres of deer range with summer, year-long and winter ranges making up 40%, 34% and 26% of this area, respectively. Of all the land area classified as deer range, 32% is managed by the U.S. Forest Service, 25% by the Bureau of Land Management, and 22% are privately owned lands. In addition, 13% are Native American trust lands, and 5% are State of Utah trust lands. The South Slope unit also contains about 1.8 million acres classified as elk range. Of this amount, 64% is classified as elk summer range, 32% elk winter range, and 4% year-long range. The U.S. Forest Service and Bureau of Land Management manage 53% and 13%, respectively, of the acreage classified as elk range, with private and Native American trust lands each making up 15% of the area.

Winter range within the old Vernal deer herd unit (11) is comprised mainly of closely associated areas of pinyon-juniper woodlands on the south-facing slopes and foothill benches of the Diamond, Blue and Taylor Mountains. The upper limits generally follow the 8,500 foot contour. The lower limits are defined by agricultural lands and the desert below Vernal. Winter ranges within the old South Slope (12) unit are more limiting, and management is complicated in that a large portion of these lands are part of Uintah and Ouray Indian Reservations. Summer range within the new South Slope unit are plentiful, ranging from aspen and conifer communities, to mountain big sagebrush and mountain brush communities.

Key areas for winter range consist of the small sagebrush/grass parks found throughout the pinyon and juniper woodlands, especially on the Vernal side of the unit. Sparse pinyon and juniper communities dominate the foothills where diversity and productivity of desirable browse is usually relatively low. Areas with a sagebrush understory or sagebrush/grass associations are more productive. Therefore, these areas normally receive more use by big game and livestock. Key areas that represent this are Red Mountain, Dry Fork Mountain, Island Park, and Brown's Park. Key areas at Toliver Creek and Brown's Park represent winter range in pinyon and juniper communities, including areas that have either been chained or burned. Higher winter ranges in the mountain brush and mountain big sagebrush zones also provide important winter range for big game in this unit, especially along the south slope of the Uinta Mountains. Key areas within these

vegetation types include Little Hole, John Starr Flat, Mosby Mountain, Gooseberry Spring and Seep Hollow. Key areas in transitional and summer ranges are sampled on the Taylor, Mosby, and Diamond Mountains.

Range Trend Studies

Twenty interagency range trend studies were sampled on Unit 9 in 2010. Thirteen of the studies were established in the summer of 1982 with continued monitoring through 2010. Six of these studies [Little Hole (9-9), John Starr Flat (9-13), Mud Springs Draw (9-15), Gooseberry Spring (9-18), Mosby Mountain South (9-19) and Seep Hollow (9-20)] sample mountain brush communities, four studies [Taylor Mountain (9-2), Sawtooth-Flat Spring (9-4), Warren Draw (9-7) and Mosby Mountain (9-16)] sample mountain big sagebrush communities, two studies [Red Mountain Allotment (9-1) and Island Park (9-5)] sample Wyoming big sagebrush communities and one study [Dry Fork Mountain (9-3)] samples a basin big sagebrush community. Another study [Toliver Creek Chaining (9-10)] was established in 1988 to monitor a chained and seeded pinyon and juniper community. One more study [Farm Creek (9-17)] was established in 1995 and monitors a mountain big sagebrush community. Two further studies [Browns Park River Corridor-Livestock (9-21) and Browns Park River Corridor-Wildlife (9-22)] were established in 2000 in Wyoming big sagebrush communities to monitor differences in grazing. One study [Rock Creek (9-23)] was established in 2005 and samples a mountain big sagebrush community. Two studies, Brush Creek Substation (9-24) and Buckhorn Canyon (9-25), were established as special studies in 1997 and 2001, respectively. Both studies were converted to regular range trend studies in 2005 and sample Wyoming big sagebrush communities. There were five range trend studies [Above Steineker Draw (9-6), Rye Grass (9-8), Toliver Creek P-J (9-11), Browns Park Burn & P-J (9-12) and Red Pine Canyon (9-14)] that have been suspended for various reasons and were not monitored in 2010. For further info on suspended studies, refer to past reports at <http://wildlife.utah.gov/range/>.

RED MOUNTAIN ALLOTMENT - TREND STUDY NO. 9-1-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Sand (Fourwing Saltbush), R034XY214UT

Land Ownership: BLM

Elevation: 6070 ft. (1851 m)

Aspect: Northwest

Slope: 2%-4%

Transect bearing: frequency baseline 0'-100' is 9° magnetic, 100'-500' is 105° magnetic

Belt placement: line 1 (4ft), line 2 (28ft), line 3 (45ft), line 4 (77ft), line 5 (89ft).

Directions:

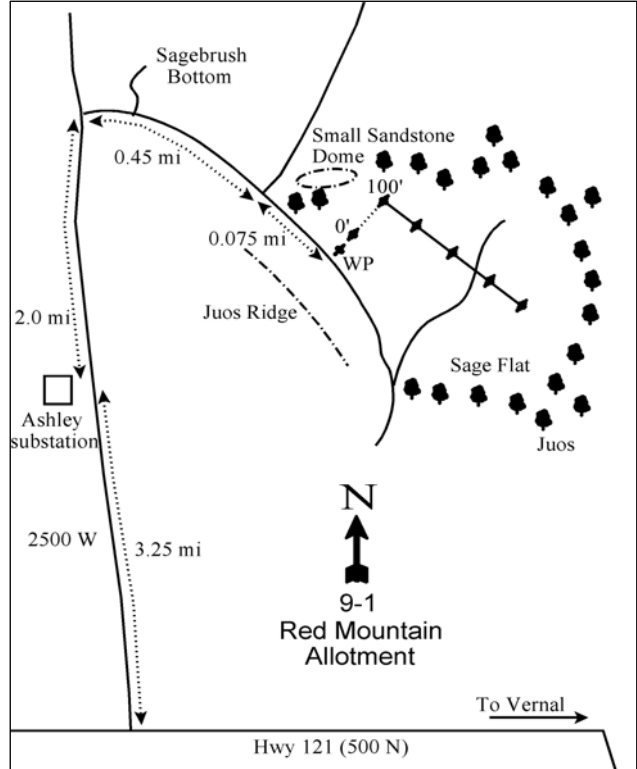
From Highway 121 (500 N) west of Vernal in Maeser, go north on 2500 West for 3.25 miles to the Ashley substation. From there, continue 2.0 miles to a dirt road to the right in the sagebrush bottom. Turn and go east for 0.45 miles to a fork. Stay right and proceed less than 0.1 miles to the witness post on the left. The 0-foot stake should be visible in the sagebrush along the left side of the road. The study can also be located by walking 75 paces bearing 167°M from the east end of the sandstone dome to the 0-foot baseline stake.

Map Name: Steinaker Reservoir



Township: 3S Range: 21E Section: 29

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 620329 E 4487869 N

RED MOUNTAIN ALLOTMENT - TREND STUDY NO. 9-1

Site Information

Site Description: The study is located on big game winter range above Vernal that supports a nearly pure stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) covered rocky ridges. The area was treated by with a lop and scatter in the fall of 2005 as part of the Steinaker Draw PJ Project ([WRI Project #28](#)) to remove encroaching juniper trees. This study is in the Red Mountain cattle allotment managed by the Bureau of Land Management. Pellet group transect data has estimated heavy use by deer and light use by elk and cattle since 2000 (Table - Pellet Group Data).

Browse: Wyoming big sagebrush is the dominant browse species and provides nearly all of the browse cover on the site (Table - Browse Trends). The sagebrush stand is fairly dense, but density has decreased substantially since 2000. The population is comprised of large, mature plants with high decadence and mostly light to moderate use. Heavy use of sagebrush was noted in 1982 and 2005. Recruitment of young sagebrush plants has been mostly poor over the course of the study. All other browse species present are found infrequently which include stickleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), prickly pear cactus (*Opuntia* sp.), Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*) and prickly phlox (*Leptodactylon pungens*) (Table - Browse Characteristics).

Herbaceous Understory: Herbaceous vegetation occurs mainly under the canopy of sagebrush, leaving bare interspaces between individual shrubs. The annual grass cheatgrass (*Bromus tectorum*) dominates the site and provides nearly all of the herbaceous cover. The annual grass species six weeks fescue (*Vulpia octoflora*) has also been prevalent at times. Perennial grasses are rare on the site, providing little cover. Forbs have been sparse during all sampling periods. Annual forbs comprise the majority of the forb component with perennial forbs being extremely rare (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam and has a moderately alkaline reaction (pH 7.9) and is low in organic matter (Table - Soil Analysis Data). Bare ground cover is relatively low, but much of the protective vegetation cover is provided by cheatgrass (Table - Basic Cover). Limited soil movement is apparent in the form of soil pedestals around plants, although runoff is low and the terrain is relatively flat. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly down (-1):** The density of the primary browse species, Wyoming big sagebrush, increased substantially from 5,131 plants/acre to 9,665 plants/acre, but decadence increased from 8% to 53% and poor vigor increased from 5% to 19%. Recruitment of young plants remained poor at 3% of the population.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of sagebrush decreased to 15% and poor vigor decreased to 6% of the population. Recruitment of young sagebrush plants increased, but was still poor at 8%.
- **1995 to 2000 - slightly down (-1):** The density of sagebrush increased by 25% from 4,360 plants/acre to 5,440 plants/acre, though cover remained similar. Decadence of sagebrush increased to 65% and poor vigor increased to 25% of the population. Recruitment of young sagebrush plants decreased to just 1%.
- **2000 to 2005 - down (-2):** There was a 20% decrease in the density of Wyoming big sagebrush to 4,360 plants/acre and cover decreased to from 20% to 15%. Decadence remained high at 62% and poor vigor increased slightly to 30%. However, recruitment of young sagebrush plants increased to 11%, the highest value of any sample year.

- **2005 to 2010 - down (-2):** The Wyoming big sagebrush density decreased by 29% to 3,080 plants/acre, though cover increased slightly to 16%. Decadence decreased, but remained high at 32% and poor vigor was high at 28%. Recruitment of young sagebrush plants decreased to 3% of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The perennial grass sum of nested frequency decreased by 37%.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 24% and cover decreased from 2% to 1%.
- **2000 to 2005 - down (-2):** There was a 42% decrease in the sum of nested frequency of perennial grasses and cover decreased to less than 1%. Cheatgrass and six weeks fescue increased significantly in nested frequency and annual grass cover increased from 7% to 22%.
- **2005 to 2010 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 20% and cover increased to 2%. Cheatgrass still dominated the site, but decreased significantly in nested frequency. Six weeks fescue was not sampled.

Forb:

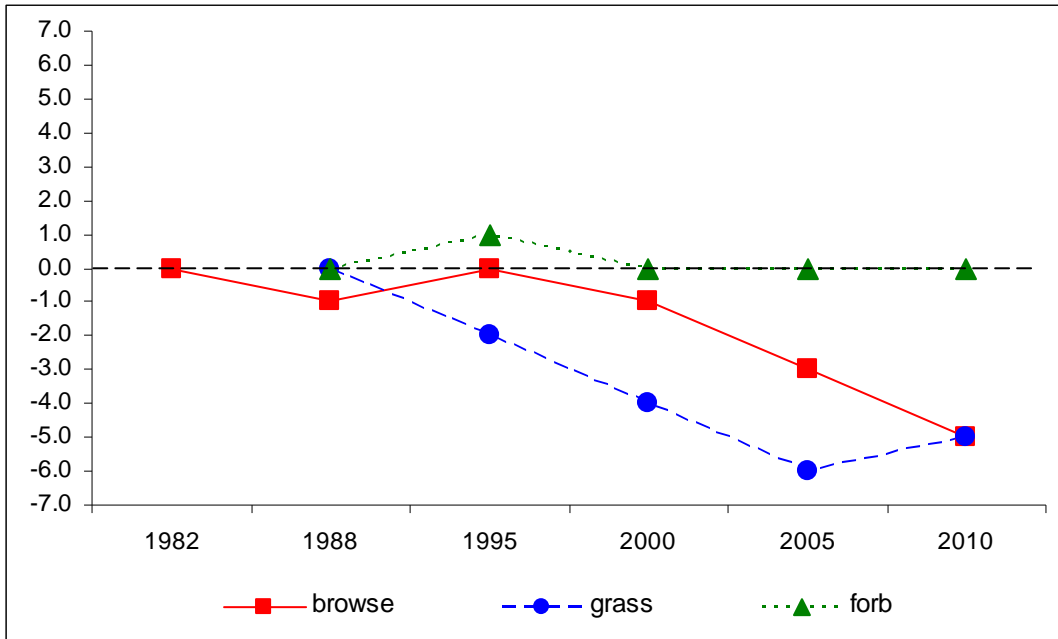
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased two-fold, but remained very rare on the site. Annual forbs were abundant on the site.
- **1995 to 2000 - slightly down (-1):** There was a substantial decrease in the sum of nested frequency of perennial forbs and they provide almost no cover. Annual forbs also decreased and forbs were extremely rare on the site.
- **2000 to 2005 - stable (0):** Forbs were extremely rare on the site.
- **2005 to 2010 - stable (0):** Forbs were extremely rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 9, study no: 1

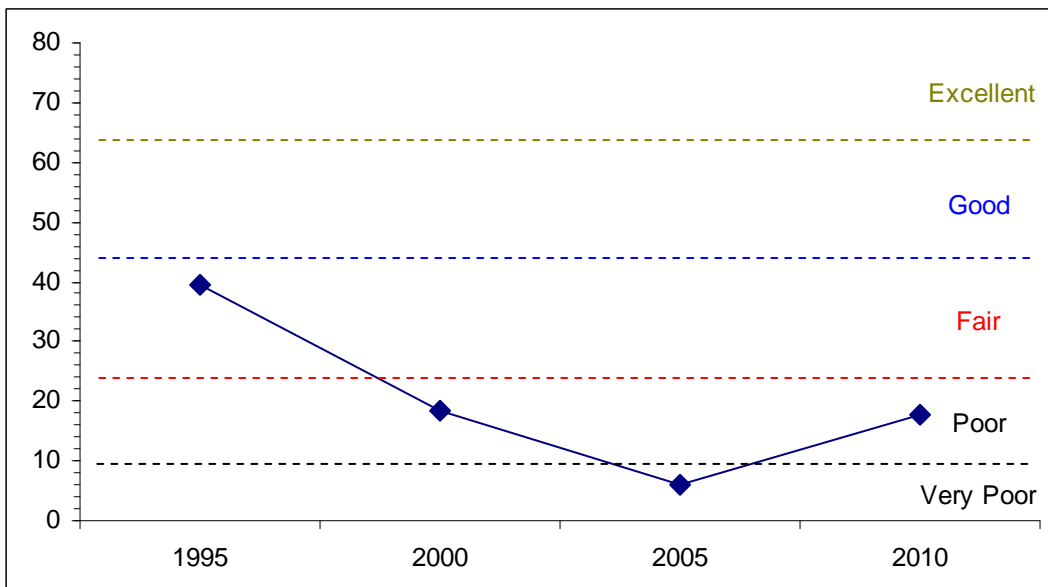
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	26.7	10.5	4.0	3.4	-5.6	0.7	0.0	39.6	Fair
00	25.3	-4.5	0.5	2.3	-5.2	0.2	0.0	18.5	Poor
05	18.6	-3.6	5.5	1.7	-16.2	0.1	0.0	6.1	Very Poor
10	20.6	5.4	1.5	3.1	-13.3	0.4	0.0	17.7	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 9, Study no: 1



HERBACEOUS TRENDS--
Management unit 09, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	b71	b53	a15	a14	a4	.33	.12	.06	.03
G	Bromus tectorum (a)	-	a251	a290	c380	b332	5.64	6.90	19.26	17.72
G	Oryzopsis hymenoides	2	-	-	-	4	-	-	-	.03
G	Poa fendleriana	c111	b51	b45	ab23	a7	.66	.35	.52	.24
G	Poa secunda	a-	b17	c47	b15	c52	.40	.61	.15	1.20
G	Sitanion hystrix	c50	b25	a4	a9	a2	.23	.03	.07	.00
G	Stipa comata	3	3	2	5	10	.06	.03	.03	.05
G	Vulpia octoflora (a)	a-	c252	b31	c251	a-	1.82	.09	2.31	-
Total for Annual Grasses		0	503	321	631	332	7.47	6.99	21.57	17.72
Total for Perennial Grasses		237	149	113	66	79	1.69	1.15	0.84	1.57
Total for Grasses		237	652	434	697	411	9.17	8.14	22.42	19.30
F	Allium sp.	b12	b11	a-	a-	a-	.02	-	-	-
F	Androsace septentrionalis (a)	-	4	-	-	-	.01	-	-	-
F	Astragalus sp.	-	-	-	2	-	-	-	.00	-
F	Calochortus nuttallii	1	2	-	2	-	.01	-	.01	-
F	Chaenactis sp.	-	2	-	-	-	.00	-	-	-
F	Chenopodium leptophyllum(a)	-	b16	a-	a-	a-	.04	-	-	-
F	Collinsia parviflora (a)	-	3	-	7	-	.00	-	.01	-
F	Cryptantha sp.	a2	b18	a-	ab7	a1	.07	-	.04	.15
F	Descurainia pinnata (a)	-	c92	a-	b11	ab4	.25	-	.07	.03
F	Erigeron pumilus	-	8	2	2	-	.02	.00	.00	-
F	Eriogonum cernuum (a)	-	2	-	-	-	.00	-	-	-
F	Gilia sp. (a)	-	b16	ab7	a-	a2	.03	.01	-	.00
F	Lappula occidentalis (a)	-	a3	ab3	b22	c87	.00	.03	.05	1.18
F	Lepidium montanum	b12	b13	b12	a-	ab10	.06	.07	-	.01
F	Machaeranthera canescens	a6	b16	a-	a-	a-	.04	-	-	-
F	Oenothera pallida	-	1	-	-	-	.00	-	-	-
F	Orobancha sp.	3	-	-	-	-	-	-	-	-
F	Phlox longifolia	ab3	b11	a-	ab1	ab5	.05	-	.00	.01
F	Plantago patagonica (a)	-	c207	a94	b142	a69	1.23	.27	.62	.32
F	Polygonum douglasii (a)	-	2	-	-	-	.00	-	-	-
F	Salsola iberica (a)	-	-	-	-	1	-	-	-	.00
F	Schoenrambe linifolia	-	5	6	-	3	.04	.01	-	.01
F	Senecio multilobatus	-	-	-	-	-	-	.00	-	-
F	Sisymbrium altissimum (a)	-	-	-	-	1	-	-	-	.00
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	345	104	182	164	1.59	0.32	0.76	1.55
Total for Perennial Forbs		40	87	20	14	19	0.33	0.09	0.06	0.18
Total for Forbs		40	432	124	196	183	1.93	0.41	0.83	1.74

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

BROWSE TRENDS--

Management unit 09, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	90	96	83	85	21.34	20.20	14.88	16.44
B	Chrysothamnus viscidiflorus viscidiflorus	40	34	14	6	4.00	2.15	.16	-
B	Leptodactylon pungens	1	0	0	0	.15	-	-	-
B	Opuntia sp.	2	3	5	3	-	-	.03	.18
Total for Browse		133	133	102	94	25.50	22.36	15.08	16.62

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 1

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	20.06	17.61
Chrysothamnus viscidiflorus viscidiflorus	.81	.36
Opuntia sp.	-	.18

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 1

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.9	1.5

BASIC COVER--

Management unit 09, Study no: 1

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	.25	3.25	34.27	30.36	37.63	36.78
Rock	0	0	.02	0	.00	.01
Pavement	0	0	.01	.06	.05	0
Litter	63.50	55.50	43.87	43.37	45.06	56.87
Cryptogams	1.00	11.75	15.97	18.43	14.35	9.77
Bare Ground	35.25	29.50	21.13	25.96	16.45	20.83

SOIL ANALYSIS DATA --

Management unit 9, Study no: 1, Study Name: Red Mountain Allotment

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.4	7.9	77.0	12.7	10.3	0.6	6.3	64.0	0.6

PELLET GROUP DATA--

Management unit 09, Study no: 1

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	14	65	90	28
Elk	2	1	1	2
Deer	47	30	29	40
Cattle	-	1	1	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
-	-	6 (15)
47 (116)	59 (146)	65 (160)
1 (2)	2 (5)	-

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 1

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>									
82	5131	1	91	8	-	34	52	5	23/26
88	9665	3	44	53	199	41	17	19	24/21
95	4360	8	77	15	120	39	8	6	33/42
00	5440	1	34	65	40	28	3	25	29/31
05	4360	11	26	62	3280	9	30	30	36/37
10	3080	3	65	32	-	34	.64	28	35/42
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	1000	6	86	8	-	0	0	2	23/32
00	1020	8	65	27	20	0	0	12	18/22
05	320	13	63	25	40	0	0	6	17/17
10	120	0	50	50	-	0	0	50	20/25
<i>Cowania mexicana stansburiana</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	30/41
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	12/23
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Juniperus osteosperma										
82	66	0	100	-	-	100	0	0	36/15	
88	66	100	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	-/-	
Leptodactylon pungens										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	60	0	100	-	-	0	0	0	5/19	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Opuntia sp.										
82	66	0	100	0	-	0	0	0	4/16	
88	399	17	83	0	-	0	0	0	3/6	
95	40	0	100	0	20	0	0	0	4/13	
00	100	0	60	40	-	0	0	0	3/7	
05	100	20	80	0	-	0	0	0	5/6	
10	80	0	100	0	-	0	0	0	4/12	

TAYLOR MOUNTAIN - TREND STUDY NO. 9-2-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 8400 ft. (2561 m)

Aspect: East

Slope: 3%

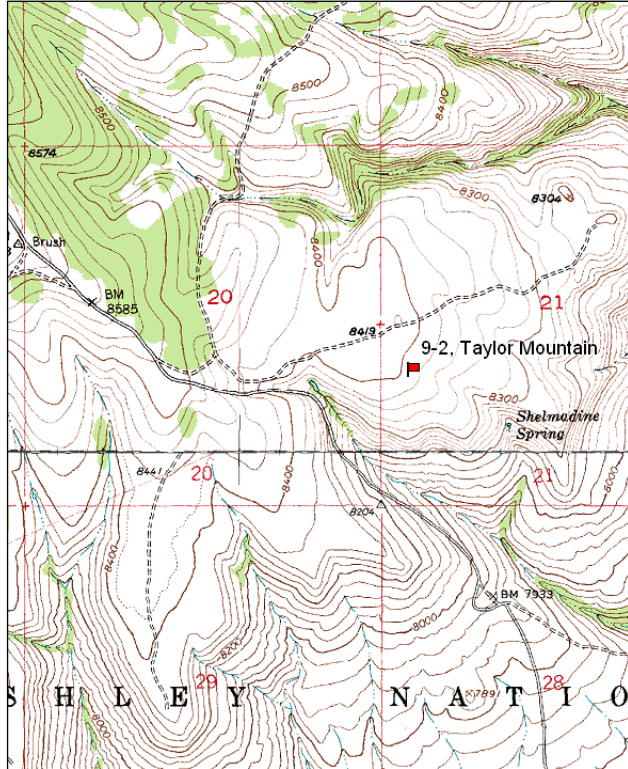
Transect bearing: 0° magnetic

Belt placement: line 1 (14 & 82ft), line 2 (28ft), line 3 (59ft), line 4 (77ft).

Directions:

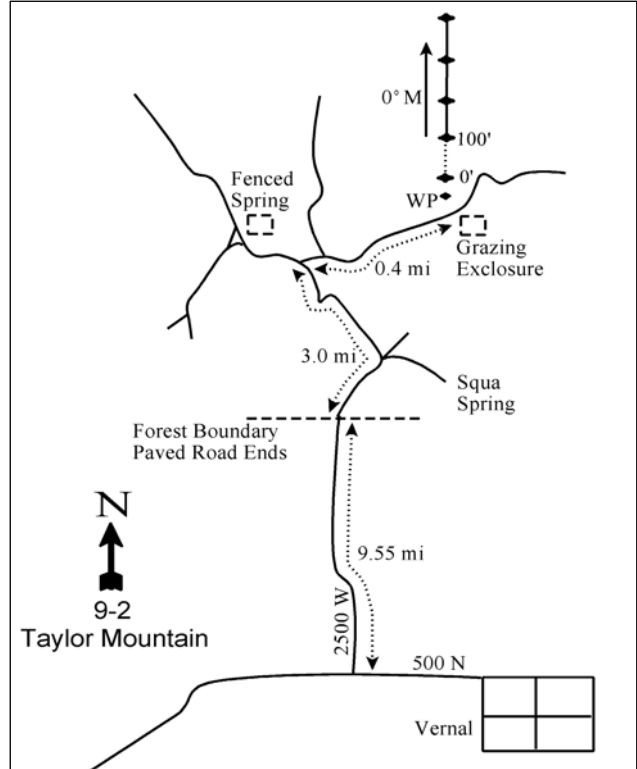
From Vernal, travel west on 500 North Street to 2500 West. Turn right on 2500 West and drive north 9.55 miles to the National Forest boundary. Continue north 3 miles to a fork. Turn right and go 0.4 miles toward the Taylor Mountain Exclosure. From the sign on the west side of the exclosure, walk 54 paces north to the 0-foot end of the baseline. There is also a witness post 4 feet south of the 0-foot stake. The 0-foot stake is marked by an 18 inch tall fencepost with browse tag #7091.

Map Name: Dyer Mountain



Township: 2S Range: 21E Section: 21

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 620520 E 4498442 N

TAYLOR MOUNTAIN - TREND STUDY NO. 9-2

Site Information

Site Description: The study is adjacent to the Taylor Mountain Exclosure which was built in 1962. The study is within the Taylor Mountain Complex allotment, which is managed by the U.S. Forest Service in a 6-pasture rest-rotation system. The area is on the border of crucial summer range and winter range for both deer and elk, and is likely used during both seasons. Pellet group transect estimated moderate use by deer in 2000 with heavier use in 2005 and 2010. Estimated use by elk has been light since 2000. Estimated cattle use has been light since 2000, but has increased steadily over that period (Table - Pellet Group Data).

Browse: Browse is not as crucial on this site since it is not true winter range, but a dense stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) are present and provide nearly all of the browse cover on the site (Table - Browse Trends). Mountain big sagebrush is comprised of a population of large, moderately used plants with low to moderate decadence and fairly good vigor. Recruitment of young mountain big sagebrush has been poor over the course of the study. Antelope bitterbrush has a prostrate growth form that averages about one and a half feet in height. The bitterbrush population is comprised of mostly mature with moderate to heavy use and good vigor. Decadence of bitterbrush was high in 2000, but has been low in all other sample years. Recruitment of young plants has been marginal over the sample years. Other browse species encountered on the site include small populations of mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier utahensis*) and true mountain mahogany (*Cercocarpus montanus*). Both serviceberry and mahogany are heavily utilized, but neither species is very abundant (Table - Browse Characteristics). It was noted in 2010 that most serviceberry plants were small and found growing in the shelter of other browse species. The adjacent livestock exclosure was similar, but had more highlined, tree-like serviceberry plants within it. The adjacent total exclosure had vigorous browse growth with many large tree-like serviceberry plants within it.

Herbaceous Understory: Grasses on the site are diverse, but are only moderately abundant. The dominant grasses are mutton bluegrass (*Poa fendleriana*), Kentucky bluegrass (*P. pratensis*), needle-and-thread (*Stipa comata*), thickspike wheatgrass (*Agropyron dasystachyum*) and bottlebrush squirreltail (*Sitanion hystrix*). Forbs are very diverse and abundant with perennial forbs dominating the herbaceous understory. The most abundant species include sandwort (*Arenaria* sp.), Hooker balsamroot (*Balsamorhiza hookeri*), silvery lupine (*Lupinus argenteus*), hollyleaf clover (*Trifolium gymnocarpon*) and Hoods phlox (*Phlox hoodii*) (Table - Herbaceous Trends).

Soil: Soils are a dark clay loam to loam with a very strongly acidic soil reaction (pH 5.0). Phosphorus may have limited availability for plant growth and development at 4.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is low on the site with abundant protective cover provided by vegetation and litter cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - up (+1):** Mountain big sagebrush density increased by 40% and bitterbrush density increased by 10%, and both populations remained healthy with low decadence and good vigor.
- **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. There was a slight decrease in the decadence of mountain big sagebrush and bitterbrush, but decadence was already low in each species. Recruitment of young plants decreased from 15% to 8% in mountain big sagebrush and from 15% to 11% in bitterbrush.

- **1995 to 2000 - slightly down (-1):** The density of mountain big sagebrush and cover increased slightly, but density of bitterbrush remained similar and cover decreased 15% to 12%. Decadence of mountain big sagebrush increased from 4% to 22% and recruitment of young plants decreased to 4%. Decadence of bitterbrush increased from 3% to 30% and recruitment of young plants decreased to 9%.
- **2000 to 2005 - slightly down (-1):** The mountain big sagebrush density decreased by 16% from 5,120 plants/acre to 4,300 plants/acre, though cover remained similar. Decadence remained high at 27% of the sagebrush population, poor vigor increased from 5% to 10% and recruitment was low at 5%. Density of bitterbrush has decreased slightly since 2000, but has decreased 13% since 1995 from 2,620 plants/acre to 2,320 plants/acre. Cover of bitterbrush remained similar. Decadence has decreased to 8% in the bitterbrush population.
- **2005 to 2010 - slightly down (-1):** The bitterbrush population remained similar, though cover increased from 12% to 14%. Density of mountain big sagebrush decreased by 14% to 3,700 plants/acre, but there was little change in cover. Decadence of sagebrush decreased to 10%, but poor vigor increased slightly to 13%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1995 to 2000 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased slightly from 1995, but decreased 17% since 1988. However, cover of perennial grasses increased from 7% to 13%.
- **2000 to 2005 - down (-2):** The perennial grass sum of nested frequency decreased by 24% and cover decreased to 6%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, though cover increased to 10%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 12%.
- **1995 to 2000 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 14%, but cover increased from 12% to 17%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover increased slightly to 20%.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 31% and cover decreased to 14%.

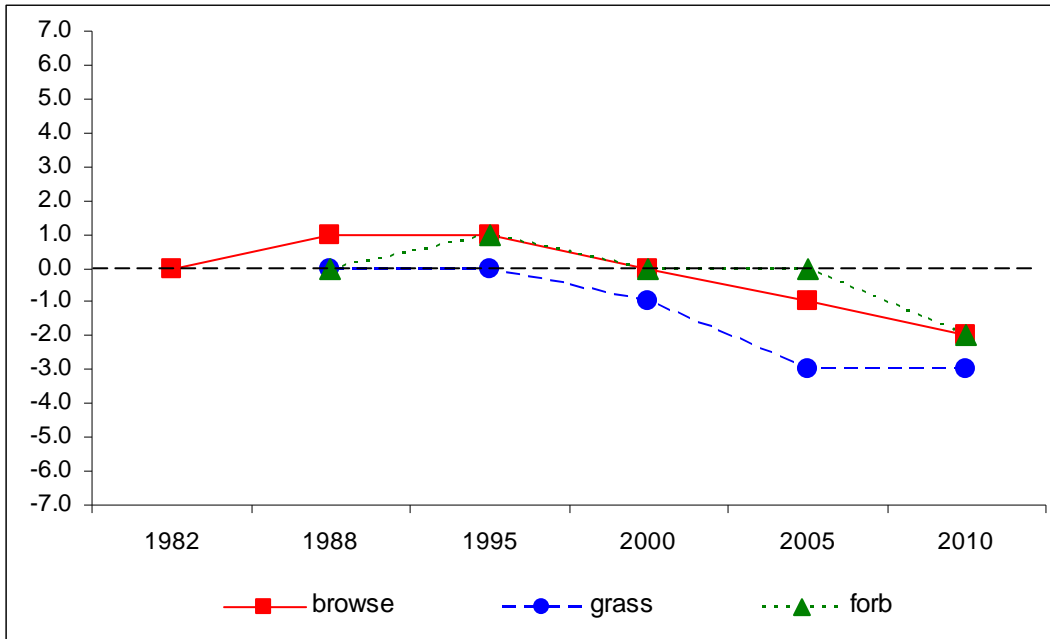
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 9, study no: 2

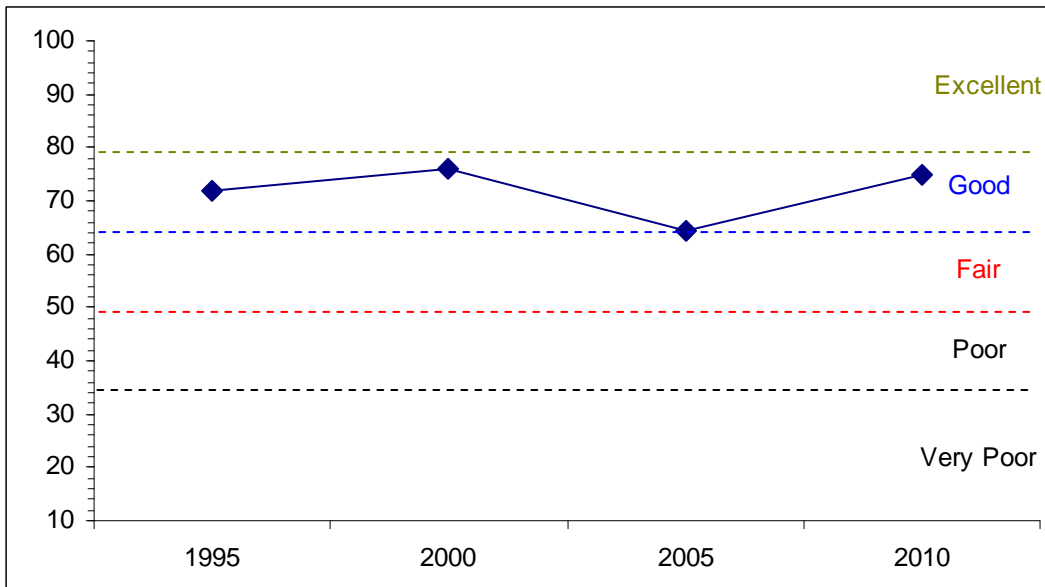
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.9	4.6	13.2	0.0	10.0	0.0	71.7	Good
00	30.0	7.8	2.7	25.5	0.0	10.0	0.0	76.0	Good
05	30.0	8.7	3.1	12.4	0.0	10.0	0.0	64.2	Fair-Good
10	30.0	13.0	2.5	19.5	0.0	10.0	0.0	75.0	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 2



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
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HERBACEOUS TRENDS--
Management unit 09, Study no: 2

T y p e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a-	c157	c171	b70	b89	1.12	2.01	.39	.93
G	Agropyron spicatum	-	2	7	1	-	.03	.09	.00	.00
G	Bouteloua gracilis	-	3	-	-	1	.00	-	-	.00
G	Bromus anomalus	a-	a-	b15	ab8	b12	-	.52	.22	.10
G	Bromus tectorum (a)	-	3	-	-	-	.00	-	-	-
G	Carex sp.	a-	ab7	ab20	a7	b32	.02	.41	.04	1.07
G	Festuca ovina	3	19	15	5	13	.09	.17	.09	.20
G	Koeleria cristata	b46	a18	a5	a2	a2	.08	.06	.03	.03
G	Poa fendleriana	b173	b154	b206	a86	b180	1.96	7.09	1.47	4.50
G	Poa pratensis	ab22	bc50	a12	d89	c68	.99	.27	1.31	1.88
G	Poa secunda	c77	a1	ab20	b27	b25	.00	.24	.18	.26
G	Sitanion hystrix	c177	b106	a39	a38	a11	1.57	.66	1.00	.12
G	Stipa comata	d90	bc46	ab30	cd61	a8	.30	.62	1.03	.56
G	Stipa lettermani	c76	bc56	ab28	b36	a5	.39	.55	.38	.06
Total for Annual Grasses		0	3	0	0	0	0.00	0	0	0
Total for Perennial Grasses		664	619	568	430	446	6.58	12.74	6.18	9.75
Total for Grasses		664	622	568	430	446	6.59	12.74	6.18	9.75
F	Agoseris glauca	a-	ab4	b9	ab6	ab5	.01	.10	.18	.01
F	Androsace septentrionalis (a)	-	b20	a2	a-	a-	.04	.00	-	-
F	Antennaria rosea	b107	a59	a54	a44	a43	1.67	.99	.82	1.51
F	Arabis sp.	c45	b16	ab9	ab2	a-	.06	.02	.01	-
F	Arenaria sp.	a112	c216	c208	b173	a104	2.62	5.02	4.28	2.05
F	Aster chilensis	a-	b16	ab15	a2	ab8	.04	.10	.00	.02
F	Astragalus convallarius	b15	ab5	ab3	a-	a3	.04	.18	-	.00
F	Astragalus sp.	-	2	5	-	-	.00	.01	-	-
F	Astragalus tenellus	-	6	1	-	-	.06	.03	-	-
F	Balsamorhiza hookeri	ab72	ab72	b87	ab77	a38	.73	1.38	1.67	1.07
F	Castilleja flava	-	2	4	4	-	.00	.01	.01	-
F	Castilleja linariaefolia	b15	ab14	ab5	a1	a-	.03	.06	.01	-
F	Cirsium sp.	-	3	-	-	-	.00	-	-	-
F	Collinsia parviflora (a)	-	b78	a25	c190	a4	.15	.09	1.25	.01
F	Collomia linearis (a)	-	b69	a12	b51	a10	.17	.10	.12	.07
F	Comandra pallida	3	4	9	1	4	.03	.01	.00	.03
F	Crepis acuminata	a-	b17	ab11	a-	a2	1.06	.08	-	.03
F	Cryptantha sp.	-	2	-	-	-	.01	-	-	-
F	Cymopterus sp.	-	-	-	-	2	-	-	-	.01
F	Descurainia pinnata (a)	-	-	-	1	-	-	-	.00	-
F	Draba sp. (a)	-	a1	a4	a1	b21	.00	.01	.00	.08
F	Erigeron eatonii	b100	a42	a50	a26	a23	.13	.22	.17	.08
F	Erigeron flagellaris	-	-	1	2	-	-	.00	.03	-
F	Erigeron pumilus	a-	a-	a5	b19	a-	-	.01	.03	-
F	Eriogonum alatum	-	1	-	1	2	.00	-	.00	.03
F	Eriogonum racemosum	-	-	3	-	-	-	.03	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Eriogonum umbellatum</i>	58	63	39	39	44	.83	.75	.64	.55
F	<i>Gayophytum ramosissimum</i> (a)	-	3	-	2	-	.00	-	.01	-
F	<i>Hymenoxys acaulis</i>	-	3	-	-	-	.03	-	-	-
F	<i>Ipomopsis aggregata</i>	5	4	-	-	2	.01	-	-	.00
F	<i>Lactuca serriola</i>	a ⁻	a ⁻	a ⁻	a ⁻	b ¹³	-	-	-	.10
F	<i>Lepidium sp. (a)</i>	-	-	-	-	6	-	-	-	.01
F	<i>Lesquerella sp.</i>	-	5	5	3	-	.01	.01	.01	-
F	<i>Lithospermum sp.</i>	a ⁻	a ¹	a ⁻	b ¹⁶	a ³	.00	-	.10	.01
F	<i>Lomatium sp.</i>	a ⁻	bc ¹⁹	b ¹⁷	c ⁴⁰	b ¹²	.09	.09	.25	.05
F	<i>Lupinus argenteus</i>	a ¹⁸	b ⁸⁰	b ⁸²	b ⁸⁴	b ⁶⁸	1.79	2.37	4.55	3.61
F	<i>Lychnis drummondii</i>	a ⁻	a ⁻	a ⁻	b ⁹	ab ⁶	-	-	.03	.04
F	<i>Mertensia sp.</i>	-	8	-	5	1	.02	-	.01	.00
F	<i>Microsteris gracilis (a)</i>	-	-	-	1	-	-	-	.00	-
F	<i>Penstemon humilis</i>	a ⁻	c ⁴⁰	b ¹⁴	b ¹⁴	b ¹⁴	.12	.08	.07	.13
F	<i>Penstemon sp.</i>	c ¹⁰⁰	b ¹⁰	a ⁻	b ¹¹	ab ⁴	.02	-	.07	.01
F	<i>Petrorhiza pumila</i>	c ⁹⁴	bc ⁵⁹	ab ³⁷	a ²⁶	a ¹⁷	1.12	1.08	.72	.53
F	<i>Phlox hoodii</i>	b ⁹³	a ²³	a ⁴⁰	b ¹⁰⁷	b ⁹¹	.10	1.22	2.37	2.07
F	<i>Phlox longifolia</i>	ab ⁵⁰	ab ⁶⁰	b ⁷⁹	a ³⁶	a ⁴⁴	.32	1.31	.11	.46
F	<i>Polygonum douglasii (a)</i>	-	c ¹⁶⁵	a ³	b ⁹⁹	a ⁶	.36	.00	.27	.01
F	<i>Potentilla gracilis</i>	a ¹²	b ²⁸	ab ²³	a ¹⁰	ab ²⁵	.10	.11	.05	.33
F	<i>Sedum lanceolatum</i>	a ⁻	c ⁵¹	b ¹⁷	a ¹	ab ⁴	.25	.11	.00	.02
F	<i>Senecio debilis</i>	c ¹⁰¹	a ³³	a ²⁰	b ⁶³	a ¹³	.08	.21	.80	.25
F	<i>Senecio multilobatus</i>	-	2	4	6	-	.00	.01	.06	-
F	<i>Streptanthus cordatus</i>	-	4	-	-	3	.00	-	-	.00
F	<i>Taraxacum officinale</i>	a ⁻	b ³³	b ¹⁵	b ¹⁶	b ²⁰	.15	.05	.15	.12
F	<i>Trifolium gymnocarpon</i>	14	131	109	136	89	.54	1.13	2.06	.79
F	Unknown forb-annual (a)	-	8	-	-	-	.01	-	-	-
F	Unknown forb-perennial	b ¹¹	a ⁻	a ⁻	c ³⁷	a ⁻	-	-	.22	-
F	<i>Zigadenus elegans</i>	a ⁻	ab ¹⁴	ab ¹¹	b ¹⁷	a ⁴	.05	.19	.17	.06
Total for Annual Forbs		0	344	46	345	47	0.75	0.21	1.67	0.18
Total for Perennial Forbs		1025	1152	991	1034	711	12.23	17.09	19.73	14.07
Total for Forbs		1025	1496	1037	1379	758	12.99	17.31	21.41	14.25

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

BROWSE TRENDS--

Management unit 09, Study no: 2

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	1	1	1	1	.00	.15	.38	.63
B	Artemisia tridentata vaseyana	91	94	93	85	22.71	26.12	25.46	24.54
B	Cercocarpus montanus	2	2	2	2	.15	.38	.03	.15
B	Chrysothamnus viscidiflorus lanceolatus	24	18	18	13	.60	1.22	1.08	.57
B	Purshia tridentata	75	70	72	73	14.75	11.55	11.78	14.22
B	Symphoricarpos oreophilus	11	14	12	10	.56	1.50	1.67	1.67
Total for Browse		204	199	198	184	38.78	40.95	40.40	41.78

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 2

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	.11	.21
Artemisia tridentata vaseyana	29.79	31.39
Cercocarpus montanus	.23	.23
Chrysothamnus viscidiflorus lanceolatus	.66	.98
Purshia tridentata	17.23	19.78
Symphoricarpos oreophilus	1.46	2.04

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 2

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	1.7	1.5
Purshia tridentate	2.4	2.8

BASIC COVER--

Management unit 09, Study no: 2

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	11.00	7.25	50.54	61.97	55.36	57.72
Rock	.50	.75	.58	.13	.13	.58
Pavement	4.25	3.25	2.70	1.94	1.63	.93
Litter	63.75	77.25	65.15	71.75	53.91	72.90
Cryptogams	0	0	1.87	1.22	.08	.07
Bare Ground	21.00	11.50	6.45	7.75	7.76	9.60

SOIL ANALYSIS DATA --

Management unit 9, Study no: 2, Study Name: Taylor Mountain

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.5	7.2	37.4	36.0	26.6	5.0	4.5	153.6	1.3

PELLET GROUP DATA--

Management unit 09, Study no: 2

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	2	6	33	7
Grouse	-	-	-	5
Elk	8	3	8	7
Deer	21	20	25	28
Cattle	3	-	10	9

Days use per acre (ha)		
'00	'05	'10
-	-	-
-	-	-
13 (31)	3 (7)	9 (23)
39 (96)	66 (164)	64 (157)
5 (9)	16 (39)	25 (63)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 2

		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>Amelanchier utahensis</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	100	0	0	31/43	
00	20	0	100	-	-	0	100	0	30/28	
05	20	0	100	-	-	0	0	0	19/31	
10	60	33	67	-	-	0	0	0	22/43	
<i>Artemisia tridentata vaseyana</i>										
82	4664	26	56	19	266	11	0	0	23/29	
88	6531	15	71	13	-	12	1	0	23/26	
95	4620	8	87	4	180	72	12	.43	24/39	
00	5120	4	74	22	40	10	0	5	27/37	
05	4300	5	68	27	-	34	27	10	29/40	
10	3700	3	86	10	200	60	10	13	31/47	
<i>Cercocarpus montanus</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	40	0	100	0	-	0	100	0	32/41	
00	40	0	100	0	-	0	100	0	27/34	
05	60	0	0	100	-	33	67	0	29/34	
10	60	0	100	0	-	33	67	0	25/42	
<i>Chrysothamnus viscidiflorus lanceolatus</i>										
82	1532	39	61	0	-	0	0	0	17/14	
88	2599	41	59	0	-	3	0	0	10/11	
95	600	0	100	0	-	0	0	0	11/13	
00	580	0	100	0	-	0	3	0	15/15	
05	500	4	92	4	40	16	0	0	14/16	
10	320	0	94	6	-	6	19	13	15/16	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
82	2065	13	84	3	66	45	19	0	13/27	
88	2265	15	71	15	-	68	15	0	16/24	
95	2620	11	85	3	-	57	36	2	16/42	
00	2500	9	61	30	-	23	52	12	16/37	
05	2320	9	83	8	-	12	79	2	17/37	
10	2380	7	92	1	-	46	35	0	19/43	
<i>Symphoricarpos oreophilus</i>										
82	266	0	100	0	-	0	0	0	19/11	
88	532	25	63	12	-	0	0	13	14/16	
95	380	11	89	0	80	0	0	0	14/37	
00	320	6	88	6	20	13	0	0	16/39	
05	360	6	94	0	-	0	0	0	15/29	
10	260	23	77	0	-	0	0	0	19/37	

DRY FORK MOUNTAIN - TREND STUDY NO. 9-3-10

Vegetation Type: Basin Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XC430UT](#)

Land Ownership: BLM

Elevation: 7870 ft. (2399 m)

Aspect: Southeast

Slope: 13%

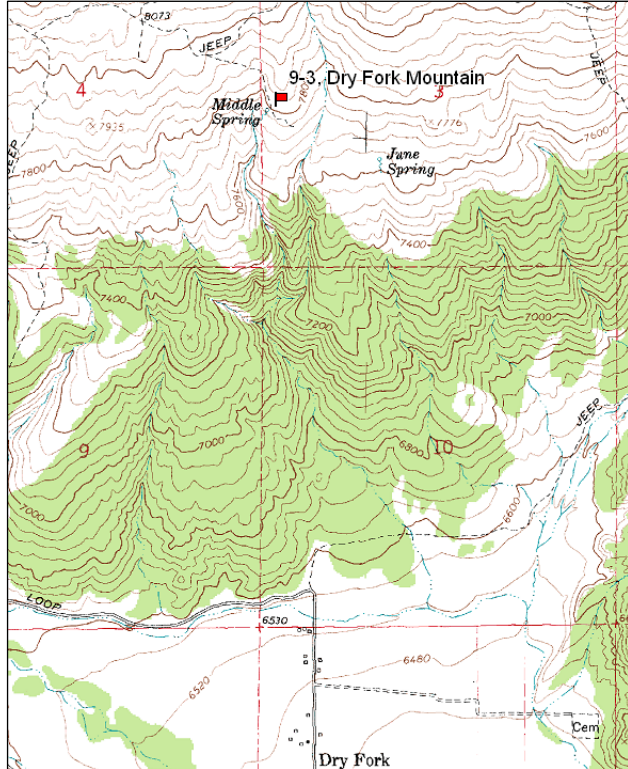
Transect bearing: 0'-100': 2° magnetic, 100'-400': 107° magnetic

Belt placement: line 1 (18 & 81ft), line 2 (33ft), line 3 (66ft), line 4 (79ft.).

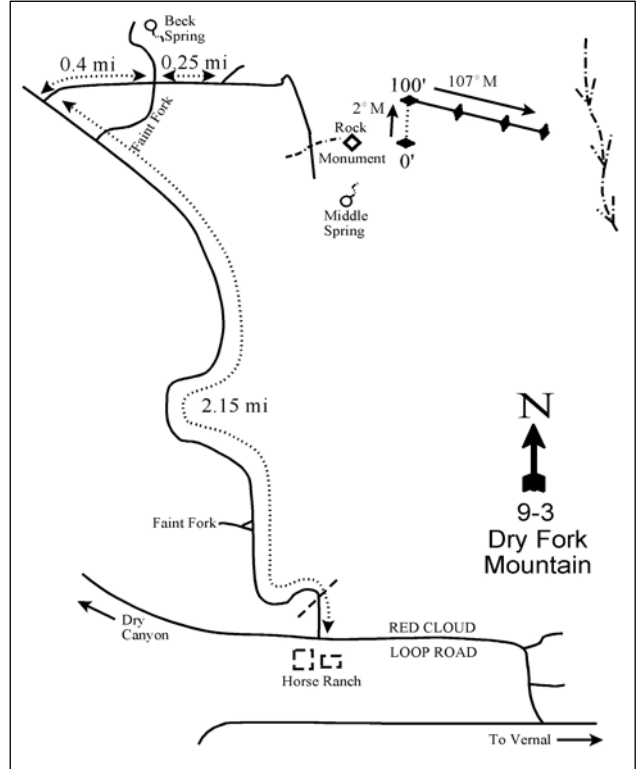
Directions:

From Vernal, proceed west on 500 North to 3500 West. Turn right and go up Dry Fork 8.5 miles to the Red Cloud Loop Road. Bear right onto this road and continue up Dry Fork Canyon 1.7 miles to a horse ranch on the left. North across the road from the ranch is a dirt road. Turn right onto this road, go through the gate and go 2.15 miles to a fork. Bear right and proceed 0.4 miles to an intersection. Continue straight for 0.25 miles to a faint turnoff on the right. Turn right and drive across the meadow toward Middle Spring. Go 0.2 miles to the base of the hill just before Middle Spring. Walk to the highest point on the hill. There is a rock monument on top. From the monument, the 0-foot baseline stake is 12paces away bearing 90°M.

Map Name: Dry Fork



Diagrammatic Sketch:



Township: 3S Range: 20E Section: 3

GPS: NAD 83, UTM 12T 612408 E 4493597 N

DRY FORK MOUNTAIN - TREND STUDY NO. 9-3

Site Information

Site Description: The study is located in a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community near Middle Spring. Much of the browse was removed in the Dry Fork fire that burned 517 acres of the area in July of 2005, so no sampling occurred in that year. The area is administered by the Bureau of Land Management and is grazed as part of the Dry Fork allotment. Pellet group transect data indicated heavy use by deer in 2000, but use was much lighter in 2010. Estimated use by elk and cattle has been light since 2000 (Table - Pellet Group Data).

Browse: Mountain big sagebrush is the primary browse species on the site and provides the majority of the browse cover. Prior to the fire in 2005, the cover of sagebrush was over 20%, but cover decreased to 7% five years after the fire (Table - Browse Trends). Prior to the fire, mountain big sagebrush was comprised of a moderately dense stand of mostly mature plants with moderate to high decadence. In 2010, the population was comprised of a much less dense stand of mostly mature sagebrush plants with low decadence and good vigor. Recruitment of young sagebrush plants has been low throughout the study, and utilization has been light to moderate. Antelope bitterbrush (*Purshia tridentata*) was also prevalent prior to the fire, but was much less common in 2010. Utilization of bitterbrush was historically heavy, but was light to moderate in 2010. Other browse species encountered on the site include brittle pricklypear cactus (*Opuntia fragilis*), mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), broom snakeweed (*Gutierrezia sarothrae*), Oregon grape (*Mahonia repens*), wax current (*Ribes cereum* ssp. *cereum*) and snowberry (*Symphoricarpos oreophilus*). Pricklypear cactus had a dense population and appeared to be increasing in density prior to the fire, but was extremely rare in 2010 (Table - Browse Characteristics).

Herbaceous Understory: Grasses were fairly diverse and abundant, prior to the fire, but diversity decreased in 2010. Perennial grasses were dominated by just two species in 2010, needle-and-thread (*Stipa comata*) and thickspike wheatgrass (*Agropyron dasystachyum*), with needle-and-thread providing the majority of the cover. Cheatgrass (*Bromus tectorum*) was also prevalent in 2010 and was co-dominant to the two perennial grass species. Forbs were diverse, but were rare prior to the fire. However, forbs increased substantially in 2010, primarily due to a large increase in the nested frequency and cover of hairy goldaster (*Heterotheca villosa*) and scarlet globemallow (*Sphaeralcea coccinea*) (Table - Herbaceous Trends).

Soil: The soil is a course sandy loam with a slightly acidic soil reaction (pH 6.1) (Table - Soil Analysis Data). Bare ground cover increased slightly following the fire, but remained very low with many large rocks dispersed over the site providing good protective ground cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** The density of mountain big sagebrush and bitterbrush increased substantially, though decadence of sagebrush also increased from 15% to 42%.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of mountain big sagebrush decreased to 11%. The bitterbrush population remained similar.
- **1995 to 2000 - stable (0):** Density and cover of mountain big sagebrush and bitterbrush remained similar. Decadence of sagebrush increased to 18% and decadence of bitterbrush increased from 4% to 14%, but was still considered moderately low for both species.
- **2000 to 2010 - down (-2):** Fire removed much of the browse from the site. Mountain big sagebrush density decreased by 52% from 2,720 plants/acre to 1,300 plants/acre and cover decreased from 22% to 7%. Bitterbrush density decreased by 85% from 1,880 plants/acre to 280 plants/acre, and cover decreased from 12% to just 1%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The perennial grass sum of nested frequency increased by 14%.
- **1995 to 2000 - stable (0):** There was no change in the sum of nested frequency of perennial grasses, though cover increased from 17% to 26%. There was a significant decrease in the nested frequency of cheatgrass and cover decreased from 3% to no notable cover.
- **2000 to 2010 - down (-2):** The sum of nested frequency of perennial grasses decreased by 25% and cover decreased to 17%. Only two perennial species provided notable cover. Cheatgrass increased significantly in nested frequency and cover increased to 6%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased substantially, though perennial forbs remain rare on the site.
- **1995 to 2000 - stable (0):** There was a decrease in the sum of nested frequency of perennial grasses, but cover remained similar and forbs remained rare on the site.
- **2000 to 2010 - up (+2):** The sum of nested frequency increased four-fold and cover increased from 1% to 8%. There was a significant increase in the nested frequency of hairy goldaster and scarlet globemallow.

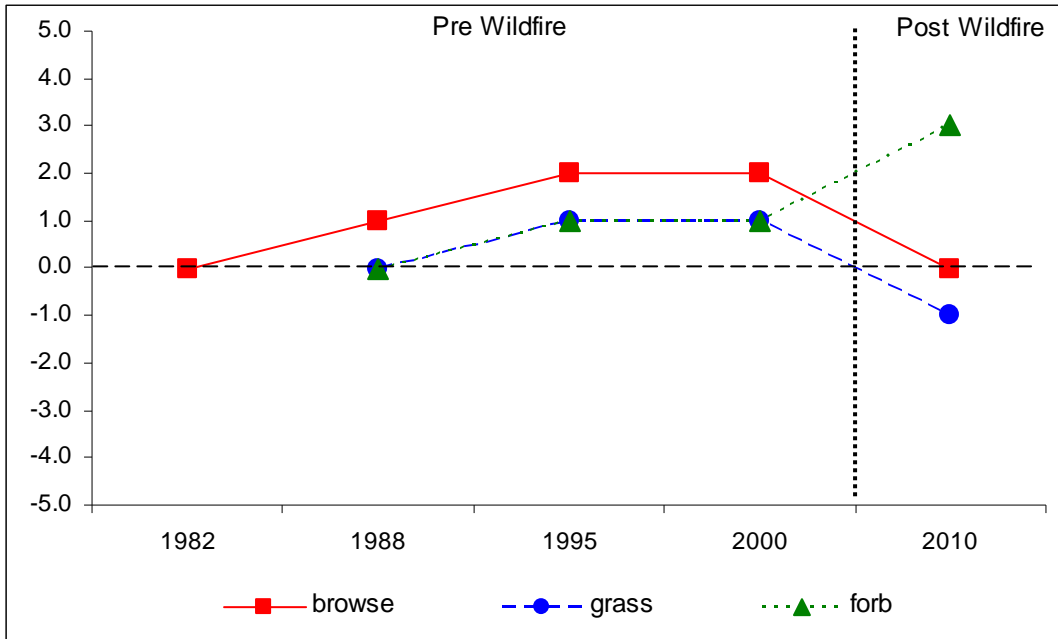
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 9, study no: 3

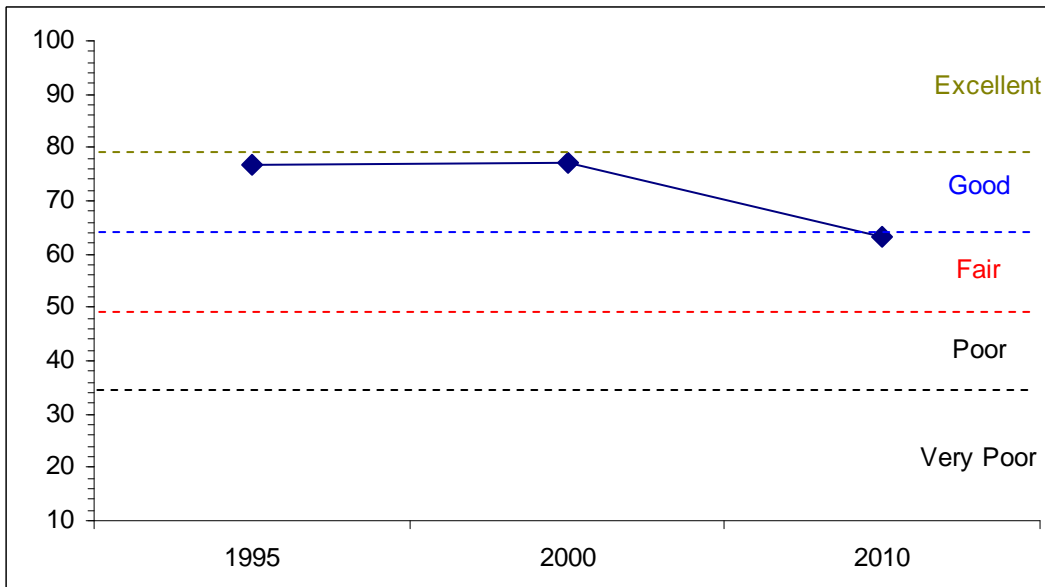
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	12.4	4.5	30.0	-2.2	2.0	0.0	76.7	Good
00	30.0	10.0	4.7	30.0	0.0	2.4	0.0	77.1	Good
10	10.5	15.0	2.2	30.0	-4.5	10.0	0.0	63.2	Fair-Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 3



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 9, Study no: 3



HERBACEOUS TRENDS--
Management unit 09, Study no: 3

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'10	'95	'00	'10
G	Agropyron dasystachyum	a-	b73	abc97	c113	1.35	2.73	4.29
G	Agropyron spicatum	d212	c86	b36	a-	3.33	1.73	-
G	Bromus tectorum (a)	-	b138	a1	c207	2.91	.00	6.03
G	Carex sp.	ab6	b17	b16	a-	.37	.48	-
G	Oryzopsis hymenoides	1	5	-	-	.06	-	-
G	Poa fendleriana	ab9	a8	b30	a1	.16	.43	.00
G	Poa pratensis	a-	a7	c60	b28	.31	5.63	.17
G	Sitanion hystrix	c55	bc36	b22	a-	.21	.34	-
G	Stipa comata	a121	b234	b207	b207	11.03	14.64	12.46
G	Stipa lettermani	-	6	4	6	.06	.15	.06
G	Unknown grass - perennial	10	-	-	-	-	-	-
Total for Annual Grasses		0	138	1	207	2.91	0.00	6.03
Total for Perennial Grasses		414	472	472	355	16.90	26.15	17.00
Total for Grasses		414	610	473	562	19.81	26.15	23.03
F	Agoseris glauca	-	-	-	2	-	-	.00
F	Arabis sp.	-	3	-	-	.01	-	-
F	Astragalus convallarius	a-	ab9	ab7	b14	.02	.06	.65
F	Calochortus nuttallii	8	9	-	2	.02	-	.00
F	Collinsia parviflora (a)	-	b58	a6	b-	.33	.01	-
F	Collomia linearis (a)	-	b152	a5	a-	1.64	.01	-
F	Comandra pallida	-	-	-	5	-	-	.06
F	Cryptantha sp.	3	9	2	4	.07	.03	.06
F	Cymopterus longipes	a-	ab7	b11	a-	.01	.12	-
F	Cymopterus sp.	-	-	-	5	-	-	.01
F	Descurainia pinnata (a)	-	1	-	7	.00	-	.01
F	Eriogonum racemosum	2	13	12	4	.10	.15	.03
F	Heterotheca villosa	a1	a-	a5	b45	-	.01	1.81
F	Hymenoxys acaulis	-	1	3	-	.00	.15	-
F	Lactuca serriola	a-	a3	a-	b64	.00	-	.83
F	Lappula occidentalis (a)	-	-	-	4	-	-	.01
F	Lepidium densiflorum (a)	-	ab2	a-	b11	.01	-	.07
F	Lithospermum ruderales	-	6	-	3	.16	-	.15
F	Lithospermum sp.	-	-	-	-	-	.03	-
F	Lupinus argenteus	-	7	6	1	.12	.24	.15
F	Machaeranthera canescens	-	3	-	-	.01	-	-
F	Orobancha fasciculata	a-	ab2	ab5	b8	.00	.07	.08
F	Penstemon humilis	2	3	3	-	.03	.03	-
F	Phlox longifolia	-	-	1	5	-	.00	.15
F	Polygonum douglasii (a)	-	b28	a2	a6	.06	.00	.01
F	Sphaeralcea coccinea	a6	a31	a15	b146	.36	.13	3.87
F	Taraxacum officinale	-	-	-	2	-	-	.00
F	Tragopogon dubius	a-	ab6	ab7	b15	.04	.04	.14
F	Zigadenus elegans	a-	b14	ab6	b12	.03	.09	.13

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'10	'95	'00	'10
	Total for Annual Forbs	0	241	13	28	2.05	0.03	0.11
	Total for Perennial Forbs	22	126	83	337	1.02	1.18	8.16
	Total for Forbs	22	367	96	365	3.08	1.21	8.27

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

BROWSE TRENDS--

Management unit 09, Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'10	'95	'00	'10
B	<i>Artemisia tridentata vaseyana</i>	76	70	33	22.85	21.93	7.27
B	<i>Ceanothus fendleri</i>	0	0	7	-	-	.81
B	<i>Chrysothamnus nauseosus</i>	0	0	3	-	-	.18
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	4	2	3	.06	.15	.78
B	<i>Gutierrezia sarothrae</i>	4	1	11	.00	-	.42
B	<i>Mahonia repens</i>	1	2	0	-	-	-
B	<i>Opuntia fragilis</i>	77	82	0	2.83	4.13	-
B	<i>Pediocactus simpsonii</i>	1	0	0	-	-	-
B	<i>Purshia tridentata</i>	65	71	11	10.91	12.03	.97
B	<i>Symphoricarpos oreophilus</i>	3	3	0	.56	.91	-
	Total for Browse	231	231	68	37.22	39.16	10.43

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 3

Species	Percent Cover '10
<i>Artemisia tridentata vaseyana</i>	11.46
<i>Ceanothus fendleri</i>	1.13
<i>Chrysothamnus nauseosus</i>	.65
<i>Chrysothamnus viscidiflorus lanceolatus</i>	.15
<i>Gutierrezia sarothrae</i>	.83
<i>Purshia tridentata</i>	2.56

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 3

Species	Average leader growth (in) '10
<i>Artemisia tridentata vaseyana</i>	2.3
<i>Purshia tridentata</i>	3.6

BASIC COVER--

Management unit 09, Study no: 3

Cover Type	Average Cover %				
	'82	'88	'95	'00	'10
Vegetation	4.00	6.50	58.21	64.25	45.79
Rock	9.50	17.00	9.85	13.81	22.67
Pavement	1.25	.50	.33	1.34	1.95
Litter	68.75	69.75	67.73	66.24	35.87
Cryptogams	4.25	0	.04	.22	0
Bare Ground	12.25	6.25	2.08	4.22	12.30

SOIL ANALYSIS DATA --

Management unit 9, Study no: 3, Study Name: Dry Fork Mountain

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
7.2	6.1	64.6	15.8	16.6	5.3	29.9	124.8	0.5

PELLET GROUP DATA--

Management unit 09, Study no: 3

Type	Quadrat Frequency			Days use per acre (ha)	
	'95	'00	'10	'00	'10
Rabbit	9	5	1	-	-
Elk	6	-	15	3 (8)	8 (20)
Deer	30	17	6	68 (167)	22 (55)
Cattle	2	-	2	7 (16)	6 (14)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 3

		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										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	14/59	
00	0	0	0	-	-	0	0	0	15/29	
10	0	0	0	-	-	0	0	0	13/24	
Artemisia tridentata vaseyana										
82	1731	4	81	15	-	0	0	0	27/40	
88	2531	8	50	42	-	26	0	0	26/31	
95	2880	7	82	11	-	39	11	7	30/48	
00	2720	7	74	18	160	11	0	3	31/44	
10	1300	5	95	0	20	40	3	0	19/35	

		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>Ceanothus fendleri</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
10	220	0	100	-	-	55	0	0	10/28	
<i>Chrysothamnus nauseosus</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
10	60	0	100	-	-	0	0	0	28/46	
<i>Chrysothamnus viscidiflorus lanceolatus</i>										
82	66	0	100	0	-	0	0	0	16/20	
88	133	0	0	100	-	0	100	0	-/-	
95	80	25	75	0	-	0	0	0	12/24	
00	40	0	100	0	-	0	0	0	8/7	
10	60	0	100	0	-	0	0	0	14/30	
<i>Eriogonum heracleoides</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	2/6	
10	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	100	0	100	-	-	0	0	0	8/7	
00	80	50	50	-	-	0	0	0	8/5	
10	360	0	100	-	-	0	0	0	9/14	
<i>Mahonia repens</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	40	0	100	-	-	0	0	0	4/9	
00	80	0	100	-	-	0	0	0	4/4	
10	0	0	0	-	-	0	0	0	2/3	
<i>Opuntia fragilis</i>										
82	3598	28	72	0	-	0	0	0	4/10	
88	6332	68	32	0	-	0	0	0	5/12	
95	4680	5	94	0	80	0	0	3	5/15	
00	6060	4	94	2	80	0	0	.66	4/11	
10	0	0	0	0	-	0	0	0	5/22	

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>Pediocactus simpsonii</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	20	0	100	-	-	0	0	0	4/4
00	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
82	799	0	100	0	-	0	0	0	20/36
88	1399	0	95	5	-	0	100	0	15/25
95	1960	13	83	4	-	32	58	1	18/46
00	1880	14	72	14	-	14	62	2	20/50
10	280	0	100	0	-	29	7	0	14/42
<i>Ribes cereum cereum</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	45/67
00	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
82	0	0	0	-	-	0	0	0	-/-
88	66	0	100	-	-	100	0	0	13/9
95	60	0	100	-	-	0	0	0	14/27
00	80	0	100	-	-	0	0	0	12/31
10	0	0	0	-	-	0	0	0	13/46

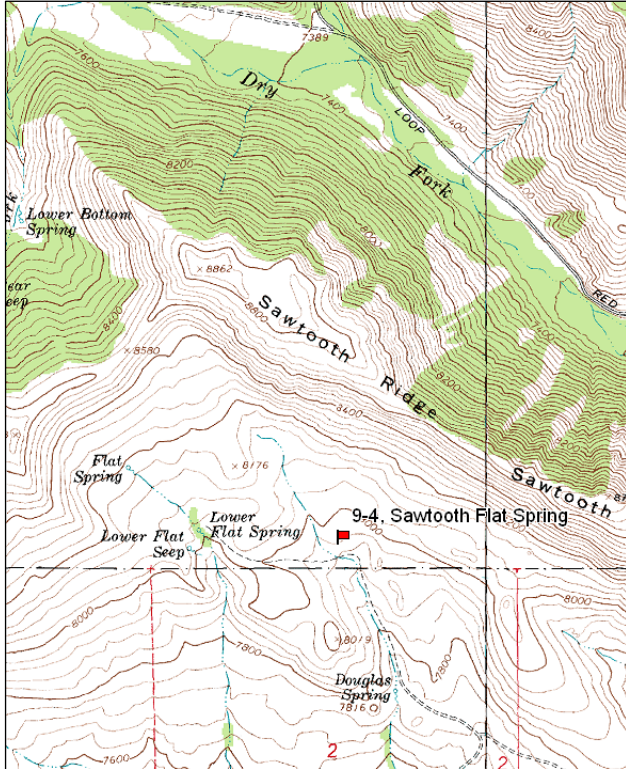
SAWTOOTH-FLAT SPRING - TREND STUDY NO. 9-4-10

Vegetation Type: Mountain Big Sagebrush-Bitterbrush
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 7965 ft. (2428 m)
Aspect: Southeast
Slope: 16%
Transect bearing: 0'-100': 359° magnetic, 100'-400': 323° magnetic
Belt placement: line 1 (13 & 92ft), line 2 (40ft), line 3 (52ft), line 4 (71ft).

Directions:

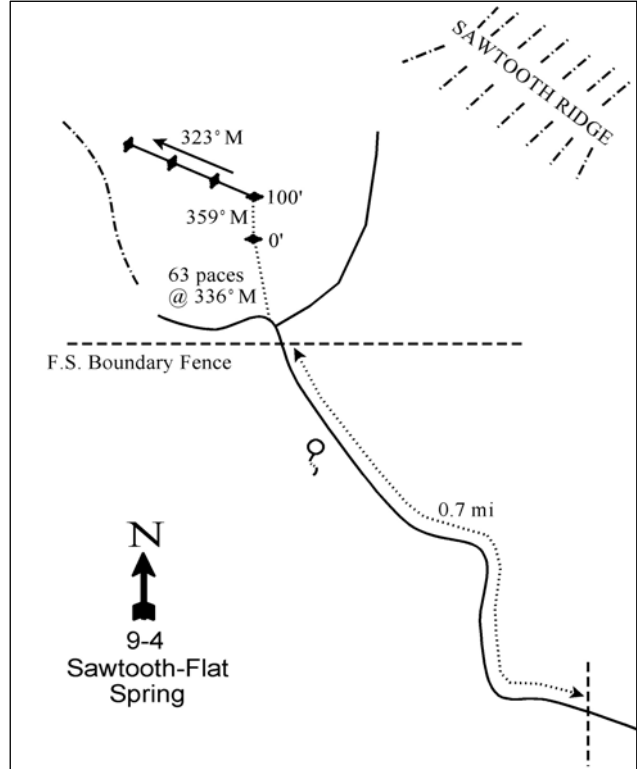
From Lapoint, drive east then turn north just before the bridge over Deep Creek. Proceed north for 6.85 miles to a fork. Bear right toward Deep Creek Ranch. Stay on this road for 9.8 miles to a dirt road on the left heading north up Pine Ridge. This road can also be reached by driving 3 miles west from Dry Fork. The gate may be locked. Turn left and drive 1.65 miles to a cattle guard. Continue 1.1 miles to a gate. Go through the gate and 0.7 miles to the fence on the Forest Service boundary. Go through the gate and stop. From the yellow fencepost near the gate, walk 63 paces north bearing 336°M to the 0-foot baseline stake.

Map Name: Lake Mountain



Township: 2S Range: 19E Section: 35

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 605042 E 4494348 N

SAWTOOTH FLAT SPRING - TREND STUDY NO. 9-4

Site Information

Site Description: The study is located on the south side of Sawtooth Ridge, east of Lows Flat Spring, and samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community with an important antelope bitterbrush (*Purshia tridentata*) component. This study is located in the Lake Mountain allotment which is managed by the U.S. Forest Service. Pellet group transect data has indicated decreasing use by deer, from heavy use in 2000 to more moderate use in 2010. Estimated use by elk has also decreased since 2000, but was already fairly light in 2000. Estimated cattle use has been light since 2000 (Table - Pellet Group Data).

Browse: Key browse on the site consist of antelope bitterbrush and mountain big sagebrush. Sagebrush is more abundant and provides the majority of the cover on the site (Table - Browse Trends). The sagebrush is comprised of a fairly dense stand of large, light to moderately used, mature plants with moderate decadence. Recruitment of young sagebrush plants has generally been good, though it has been marginal in several sample years. Antelope bitterbrush is the most preferred browse species, as is evident from the heavy use it has received over the course of the study. The bitterbrush population is comprised of mostly mature plants with a prostrate growth form that averages just over 1 foot tall. Decadence of bitterbrush has decreased since 1995 and was low in 2010. Recruitment of young bitterbrush plants has been generally good over the sample years. Other browse species are infrequent, but include snowberry (*Symphoricarpos oreophilus*), mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*) and a few scattered serviceberry plants (*Amelanchier utahensis*) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and abundant on the site. Needle-and-thread (*Stipa comata*), Letterman needlegrass (*S. lettermani*), Kentucky bluegrass (*Poa pratensis*) and mutton bluegrass (*P. fendleriana*) are the most abundant grass species. Due to recent seed head removal from livestock, species identification was difficult for some grasses in 1988 and 2005. Forbs are also diverse and abundant on the site. There are numerous valuable forb species with arrowleaf balsamroot (*Balsamorhiza sagittata*) and silvery lupine (*Lupinus argenteus*) being the most abundant. Combined, these two species provide nearly all of the forb cover. Annual forbs were moderately abundant in 1995 and 2005, but have been almost non-existent in other sample years (Table - Herbaceous Trends).

Soil: The soils are sandy loam in texture with a moderately acidic soil reaction (pH 6.1) and relatively high organic matter (4.3%) (Table - Soil Analysis Data). Bare ground cover is relatively low, though it increased in 2005 with a decrease in vegetation and litter cover provided by perennial grasses (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** The density of mountain big sagebrush and bitterbrush both increased substantially, but decadence also increased in both species. Decadence increased from 14% to 34% in sagebrush and from 0% to 18% in bitterbrush.
- **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 mountain big sagebrush decreased to 14%, but decadence of bitterbrush increased slightly to 22%.
- **1995 to 2000 - slightly up (+1):** The density of mountain big sagebrush increased by 34% from 2,040 plants/acre to 2,740 plants/acre, and cover increased from 12% to 15%. However, bitterbrush density decreased by 12% from 1,720 plants/acre to 1,520 plants/acre with a slight decrease in cover from 4% to 3%. Decadence of sagebrush increased to 23%, but decadence of bitterbrush decreased to 11%.
- **2000 to 2005 - stable (0):** There was little change in the mountain big sagebrush or bitterbrush populations.

- **2005 to 2010 - stable (0):** The mountain big sagebrush and bitterbrush populations changed little, though cover decreased from 14% to 11% in sagebrush and from 3% to 2% in bitterbrush.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** The perennial grass sum of nested frequency remained similar.
- **1995 to 2000 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 14%, but cover increased from 23% to 30%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover decreased substantially to 12%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 15%, but cover increased to 20%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 20%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 35%, despite cover remaining similar at 20%.
- **2000 to 2005 - slightly up (+1):** There was a 17% increase in the sum of nested frequency of perennial forbs with a slight increase in cover to 21%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial forbs and a slight decrease in cover to 20%.

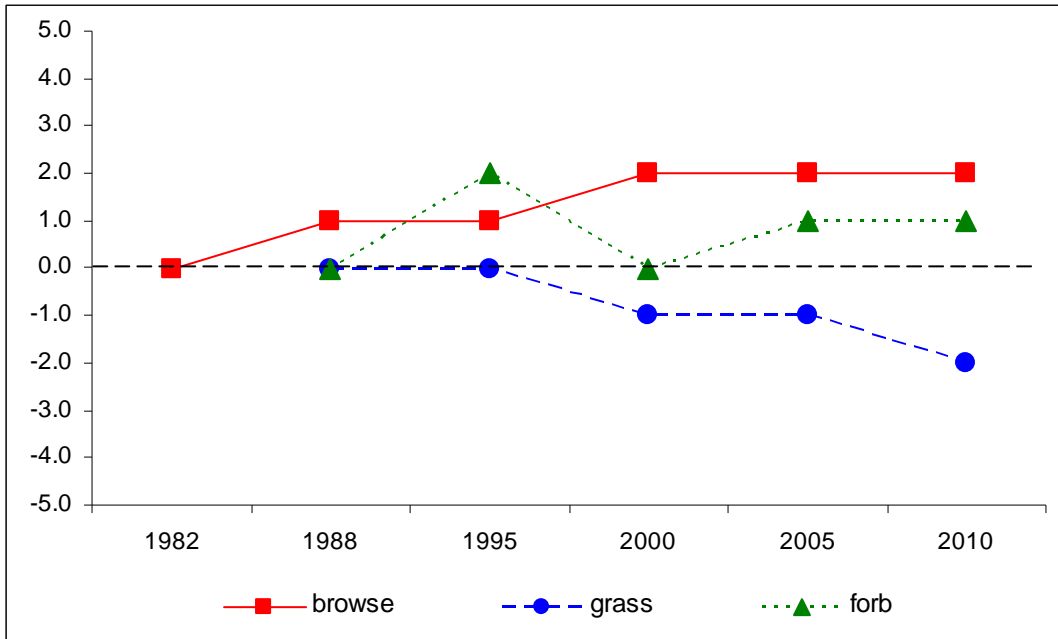
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 9, study no: 4

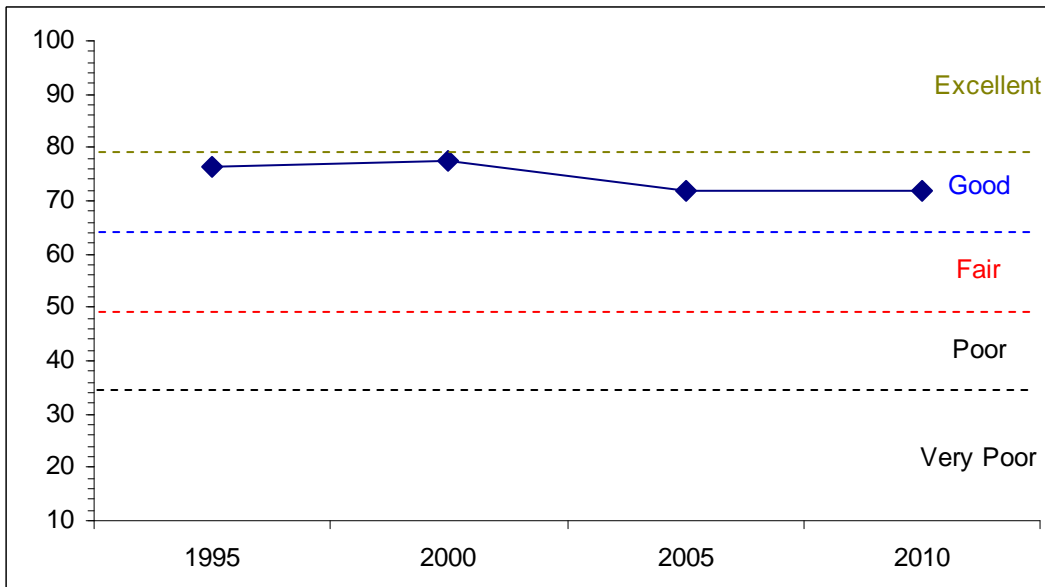
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	21.2	10.2	5.0	30.0	0.0	10.0	0.0	76.5	Good
00	23.9	8.7	4.9	30.0	0.0	10.0	0.0	77.6	Good
05	21.2	8.9	7.7	23.9	0.0	10.0	0.0	71.7	Good
10	17.0	10.6	4.3	30.0	0.0	10.0	0.0	71.9	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 9, Study no: 4



HERBACEOUS TRENDS--
Management unit 09, Study no: 4

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a ⁵⁹	b ¹¹⁶	a ⁷⁰	a ⁸⁰	a ³⁸	1.42	.69	.52	.42
G	Carex sp.	b ⁸⁵	a ²²	a ⁴⁹	a ²¹	a ³⁶	.24	2.16	.12	.60
G	Koeleria cristata	b ²³	a ⁻	a ⁵	a ²	a ⁷	.00	.06	.03	.18
G	Poa fendleriana	b ³¹⁵	a ¹³¹	a ¹³⁵	a ¹⁵³	a ¹⁶⁷	3.02	4.46	2.95	6.41
G	Poa pratensis	a ⁸¹	d ¹³⁸	d ¹⁶⁵	ab ⁹⁰	bc ¹³⁷	7.83	9.85	2.15	7.11
G	Poa secunda	b ²⁹	ab ¹⁴	a	b ²³	ab ¹¹	.09	.00	.27	.07
G	Sitanion hystrix	b ¹⁰	ab ⁵	a ¹	b ²	a ⁻	.03	.03	.00	-
G	Stipa comata	a ⁴⁵	b ¹⁶⁸	bc ¹⁹³	c ²⁰⁷	a ⁴⁸	5.97	12.59	4.78	1.74
G	Stipa lettermani	b ⁸³	c ¹⁴⁰	a ¹⁴	b ⁹²	bc ¹²⁵	4.17	.49	1.12	3.34
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		730	734	635	670	569	22.81	30.35	11.97	19.90
Total for Grasses		730	734	635	670	569	22.81	30.35	11.97	19.90
F	Agoseris glauca	ab ³	ab ⁷	ab ¹¹	b ¹²	a ⁻	.02	.07	.07	-
F	Allium sp.	a ²	c ¹¹⁸	ab ²⁸	b ⁵⁰	b ⁵³	.36	.19	.16	.15
F	Antennaria rosea	ab ⁵	b ¹³	a ¹	a ¹	a ⁻	.30	.03	.03	-
F	Arabis sp.	b ⁵¹	a ⁶	a ⁷	a ⁴	a ⁻	.01	.04	.01	-
F	Artemisia ludoviciana	-	-	4	-	-	-	.03	-	-
F	Aster sp.	-	-	-	-	1	-	-	-	.03
F	Astragalus sp.	4	6	-	-	-	.01	-	-	-
F	Balsamorhiza hookeri	-	-	-	1	-	-	-	.15	-
F	Balsamorhiza sagittata	152	160	148	141	153	14.00	15.28	16.07	14.87
F	Calochortus nuttallii	-	2	-	1	5	.01	-	.00	.01
F	Castilleja linariaefolia	-	4	2	1	-	.01	.03	.03	-
F	Chenopodium fremontii (a)	-	-	-	2	-	-	-	.00	-
F	Chenopodium leptophyllum(a)	-	b ¹⁵	a ⁻	ab ⁸	a ¹	.03	-	.01	.00
F	Collinsia parviflora (a)	-	c ¹⁷³	a ¹⁸	d ²⁵⁵	b ⁶⁸	1.33	.05	1.29	.15
F	Collomia linearis (a)	-	d ²⁶⁴	b ²⁴	c ¹³⁸	a ⁻	2.08	.08	.43	-
F	Comandra pallida	-	3	7	-	-	.01	.09	-	-
F	Crepis acuminata	a ²	b ²¹	a ¹	a ⁵	a ⁻	.45	.00	.01	-
F	Cryptantha sp.	a ⁻	a ²	a ⁻	a ⁵	b ²⁹	.00	-	.01	.13
F	Delphinium nuttallianum	-	-	-	4	-	-	-	.04	-
F	Descurainia pinnata (a)	-	b ¹³	a ⁻	b ²⁸	a ⁻	.07	-	.05	-
F	Draba sp. (a)	-	-	-	1	-	-	-	.00	-
F	Erigeron eatonii	6	-	4	5	5	-	.01	.04	.03
F	Erigeron flagellaris	8	1	5	-	-	.00	.06	.00	-
F	Eriogonum alatum	4	-	-	6	-	-	-	.01	-
F	Eriogonum racemosum	9	7	16	5	11	.09	.28	.03	.33
F	Eriogonum umbellatum	a ¹	ab ¹⁴	ab ¹³	b ¹⁷	ab ⁷	.30	.14	.12	.07
F	Heterotheca villosa	a ⁻	a ⁻	a ²	a ⁴	b ⁶²	-	.03	.03	.36
F	Lomatium sp.	18	11	5	7	3	.03	.06	.02	.00
F	Lupinus argenteus	a ⁵⁵	b ⁹¹	ab ⁷⁷	ab ⁷³	b ⁸⁴	3.35	2.72	3.32	3.17
F	Lychnis drummondii	ab ⁶	b ¹³	a ¹	ab ⁷	ab ⁵	.09	.00	.04	.01
F	Mertensia sp.	-	-	-	3	3	-	-	.15	.15

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Orobanche fasciculata	-	8	3	4	-	.02	.03	.00	-
F	Orthocarpus sp. (a)	-	-	-	-	3	-	-	-	.00
F	Penstemon humilis	_b 52	_b 34	_b 20	_a 3	_a 3	.17	.31	.01	.01
F	Phlox longifolia	_c 96	_b 43	_{ab} 20	_b 43	_a 9	.20	.07	.22	.02
F	Polygonum douglasii (a)	-	_b 76	_a 11	_b 73	_a 7	.22	.02	.17	.02
F	Potentilla gracilis	-	3	3	2	-	.03	.00	.00	-
F	Sedum lanceolatum	-	1	-	-	3	.00	-	-	.00
F	Senecio integerrimus	_a -	_{ab} 2	_{ab} 2	_b 12	_a -	.15	.03	.05	-
F	Senecio multilobatus	1	2	1	10	3	.03	.00	.02	.03
F	Taraxacum officinale	-	-	-	3	3	-	-	.15	.00
F	Tragopogon dubius	7	7	-	-	-	.01	-	-	-
F	Unknown forb-annual (a)	-	_a -	_a -	_a -	_b 13	-	-	-	.06
F	Unknown forb-perennial	5	-	-	-	-	-	-	-	-
F	Zigadenus elegans	_a -	_a 4	_a 1	_b 18	_{ab} 11	.01	.03	.09	.02
Total for Annual Forbs		0	541	53	505	92	3.76	0.15	1.97	0.23
Total for Perennial Forbs		487	583	382	447	453	19.71	19.58	20.95	19.45
Total for Forbs		487	1124	435	952	545	23.47	19.73	22.93	19.69

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

BROWSE TRENDS--

Management unit 09, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	0	1	0	2	-	-	-	-
B	Artemisia tridentata vaseyana	72	78	78	78	12.34	15.40	13.57	11.12
B	Chrysothamnus viscidiflorus lanceolatus	5	4	4	4	.30	.36	.18	.15
B	Eriogonum heracleoides	3	7	16	10	.06	.30	.12	.42
B	Mahonia repens	2	2	2	3	.00	.03	.06	.18
B	Opuntia fragilis	3	2	3	2	.01	.00	-	-
B	Pediocactus simpsonii	1	0	0	0	.03	-	-	-
B	Purshia tridentata	52	54	43	45	3.87	3.12	2.80	2.04
B	Symphoricarpos oreophilus	11	12	6	9	.30	.52	1.12	.71
Total for Browse		149	160	152	153	16.93	19.73	17.88	14.64

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 4

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	23.38	17.51
Mahonia repens	-	.15
Purshia tridentata	8.44	5.78
Symphoricarpos oreophilus	1.10	1.36

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 4

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	2.2	1.2
Purshia tridentata	9.2	1.5

BASIC COVER--

Management unit 09, Study no: 4

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	7.25	12.50	61.72	64.45	46.85	54.43
Rock	1.75	1.50	2.08	1.64	2.65	1.01
Pavement	0	2.00	1.07	1.77	.98	2.92
Litter	67.75	73.25	63.34	65.68	49.43	42.36
Cryptogams	.75	0	0	.42	.13	0
Bare Ground	22.50	10.75	5.61	7.58	19.03	12.91

SOIL ANALYSIS DATA --

Management unit 9, Study no: 4, Study Name: Sawtooth-Flat Spring

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.2	6.1	67.4	18.4	14.3	4.3	28.2	236.8	0.7

PELLET GROUP DATA--

Management unit 09, Study no: 4

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	5	4	38	8
Elk	5	8	7	-
Deer	31	30	25	14
Cattle	9	1	9	3

Days use per acre (ha)		
'00	'05	'10
-	-	-
25 (63)	11 (28)	3 (7)
75 (185)	58 (142)	31 (76)
16 (39)	23 (56)	2 (4)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 4

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>Amelanchier utahensis</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	13/16
10	80	100	0	-	-	0	0	0	14/13
<i>Artemisia tridentata vaseyana</i>									
82	1464	5	82	14	-	0	0	0	26/30
88	3931	15	47	37	133	34	5	2	22/20
95	2040	10	76	14	60	56	4	4	27/43
00	2740	9	67	23	600	4	.72	8	28/39
05	2680	16	63	22	2260	37	18	7	32/40
10	2760	9	75	17	100	38	19	7	28/37
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	120	0	100	-	-	0	0	0	14/28
00	120	0	100	-	-	0	0	0	15/24
05	100	20	80	-	-	20	20	0	10/16
10	100	0	100	-	-	0	0	0	14/18
<i>Eriogonum heracleoides</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	120	50	50	-	-	0	0	0	10/13
00	220	0	100	-	-	0	0	0	4/6
05	700	14	86	-	20	37	9	0	5/6
10	340	0	100	-	-	0	0	0	3/9
<i>Mahonia repens</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	80	100	0	-	-	0	0	0	4/5
00	60	100	0	-	-	0	0	0	2/4
05	460	0	100	-	-	0	0	0	2/4
10	360	11	89	-	-	0	0	0	4/6

		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>Opuntia fragilis</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	731	55	9	36	66	0	0	18	5/4	
95	80	25	75	0	-	0	0	0	2/5	
00	80	0	100	0	-	0	0	0	2/5	
05	120	33	67	0	-	0	0	0	1/2	
10	40	50	50	0	-	0	0	0	1/3	
<i>Pediocactus simpsonii</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	3/4	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
<i>Purshia tridentata</i>										
82	1066	0	100	0	-	44	38	0	19/28	
88	1865	14	68	18	-	21	79	0	17/28	
95	1720	10	67	22	-	33	48	9	13/32	
00	1520	14	75	11	20	13	62	8	14/32	
05	1440	13	75	13	-	8	89	6	14/31	
10	1420	7	90	3	-	3	92	1	13/29	
<i>Symphoricarpos oreophilus</i>										
82	266	100	0	0	-	0	0	0	-/-	
88	332	20	80	0	-	40	0	0	18/18	
95	460	26	74	0	40	43	0	0	19/38	
00	260	8	77	15	-	0	0	8	19/50	
05	220	9	91	0	-	45	0	0	17/35	
10	340	6	94	0	-	0	0	0	18/33	

ISLAND PARK - TREND STUDY NO. 9-5-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Year-Long (Fawning habitat), Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Sandy Loam (Fourwing Saltbush), R034XY216UT

Land Ownership: NPS

Elevation: 5000 ft. (1524 m)

Aspect: South-Southwest

Slope: 25%

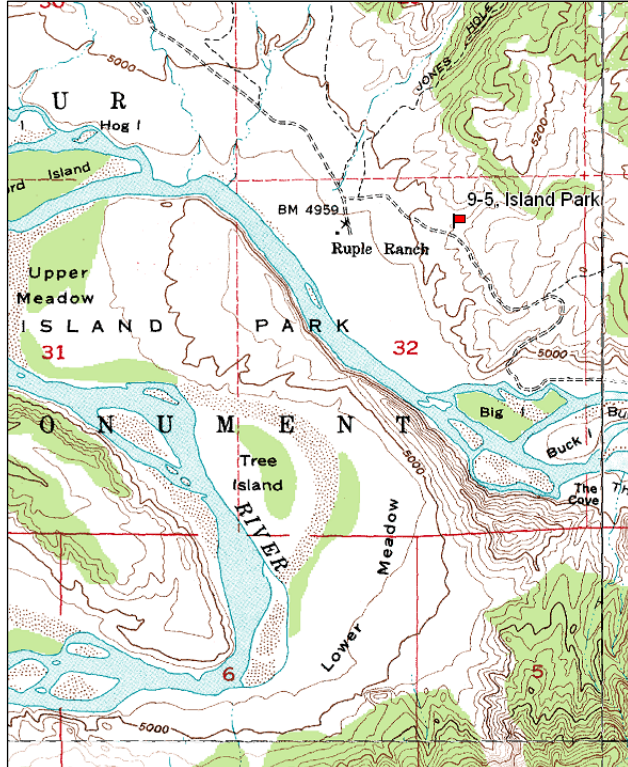
Transect bearing: 12° magnetic

Belt placement: line 1 (9 & 88ft), line 2 (26ft), line 3 (48ft), line 4 (73ft).

Directions:

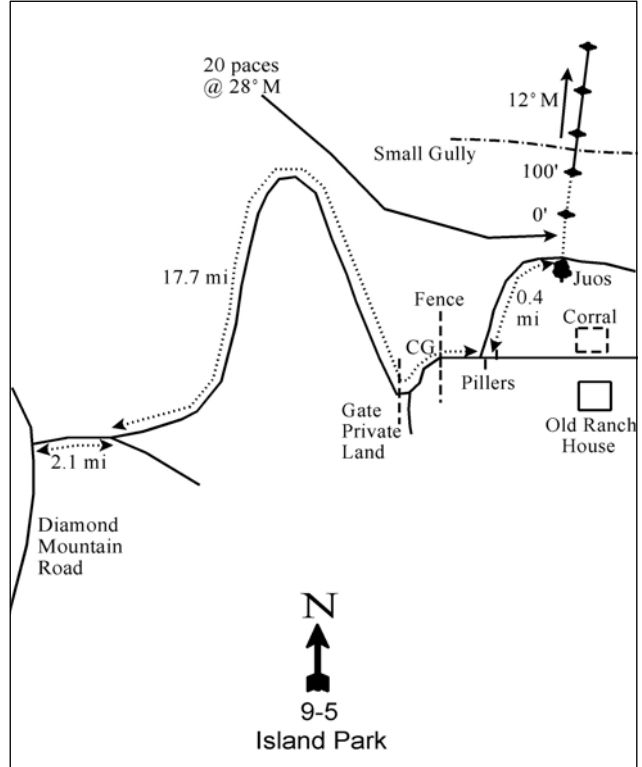
From the Diamond Mountain Road, take the Island Park turnoff to the right. Proceed east for 2.1 miles to a fork. Stay to the left and go 17.7 miles. Just past the Jones Hole trailhead and before Ruple Ranch, there is a turnoff to the left. The road may be closed. Go left and proceed up the ridge for 0.4 miles to a juniper next to the road on the right. From the juniper, the 0-foot baseline stake is 20 paces away at a bearing of 28°M.

Map Name: Island Park



Township: 3S Range: 25E Section: 32

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 658056 E 4487466 N

ISLAND PARK - TREND STUDY NO. 9-5

Site Information

Site Description: The study is located on a big sagebrush (*Artemisia tridentata*) and grass slope one-half mile north of the Green River in Dinosaur National Monument. There was a small fire that burned most of the study transect just prior to the site being read in 2010, but most of the surrounding area was unaffected. The area is administered by the U.S. National Park Service and livestock grazing is no longer permitted within the national monument. Pellet group transect data has indicated moderately heavy use by deer and elk since 2000, though deer use was lighter in 2005 (Table - Pellet Group Data).

Browse: The key browse species is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), although there may be some hybridization with basin big sagebrush (*A. tridentata* ssp. *tridentata*). Even before the fire, big sagebrush had been decreasing in cover (Table - Browse Trends) and density since 1995. The fire removed almost all of the remaining sagebrush from the study site. Prior to the fire, the big sagebrush population was comprised of moderately to heavily hedged, decadent plants with little recruitment of young plants. The weedy species, broom snakeweed (*Gutierrezia sarothrae*), has fluctuated in density over the sample years, but at times has dominated the browse component. There were few broom snakeweed plants sampled on the site following the fire in 2010. Other shrubs occur much less frequently, but include slenderbush eriogonum (*Eriogonum microthecum*) and pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: Grasses had become dominated by two species prior to the fire, the native perennial needle-and-thread (*Stipa comata*) and the introduced annual cheatgrass (*Bromus tectorum*). Other native perennial species are present and diverse, but provide little cover. Forbs are very rare on the site and provide little usable forage. Perennial forbs have provided less than 1% cover in all sample years (Table - Herbaceous Trends).

Soil: The soils are a sandy loam with a neutral to slightly alkaline soil reaction (pH 7.3). Phosphorus may have limited availability for plant growth and development 4 ppm (Tiedemann and Lopez 2004). Bare ground cover has been moderate on the site. Bare ground decreased in 2010 with a large amount of litter cover from the recent fire. Much of the litter was light and easily susceptible to surface movement. Cryptogam cover slowly increased from 1982 with no grazing, but declined sharply in 2005 with no cryptogams sampled following the fire (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly down (-1):** The density of Wyoming big sagebrush increased markedly with a substantial increase in the recruitment of young plants. However, decadence also increased and is very high at 51% of the population. The density of broom snakeweed also increased to over 30,000 plants/acre, dominating the browse component.
- **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 to 39%, but poor vigor increased from 14% to 29%. Broom snakeweed appears to have decreased on the site with cover less than 1%.
- **1995 to 2000 - down (-2):** The density of sagebrush decreased by 16% from 3,300 plants/acre to 2,780 plants/acre, and cover decreased from 8% to 6%. Decadence of sagebrush increased to 82% and poor vigor increased to 50%. Recruitment of young sagebrush plants decreased from 17% to 3% of the population. Broom snakeweed density increased eight-fold from 3,580 plants/acre to 30,120 plants/acre, and cover increased to 12%.
- **2000 to 2005 - down (-2):** Wyoming big sagebrush density decreased 68% to 900 plants/acre and cover decreased to 2%. Decadence of sagebrush decreased slightly, but remained high at 71%, and

poor vigor increased to 60%. Broom snakeweed also decreased substantially in density and cover decreased to 2%.

- **2005 to 2010 - down (-2):** A fire just prior to the sampling removed most of the shrub species from the site.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial grasses increased by 22%.
- **1995 to 2000 - down (-2):** The perennial grass sum of nested frequency decreased by 27% and cover decreased from 14% to 12%. There was a significant increase in the nested frequency of cheatgrass and cover increased from less than 1% to 2%.
- **2000 to 2005 - slightly down (-1):** There was little change in the sum of nested frequency or cover of perennial grasses, but cheatgrass increased significantly in nested frequency and cover increased to 13%.
- **2005 to 2010 - down (-2):** The fire removed much of the grass cover from the site. The sum of nested frequency of perennial grasses decreased by 32%, but cheatgrass also decreased significantly in nested frequency.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 69%, though forbs remained fairly rare on the site.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 77% and perennial forbs are very rare on the site.
- **2000 to 2005 - stable (0):** Perennial forbs were very rare on the site.
- **2005 to 2010 - stable (0):** Perennial forbs were very rare on the site.

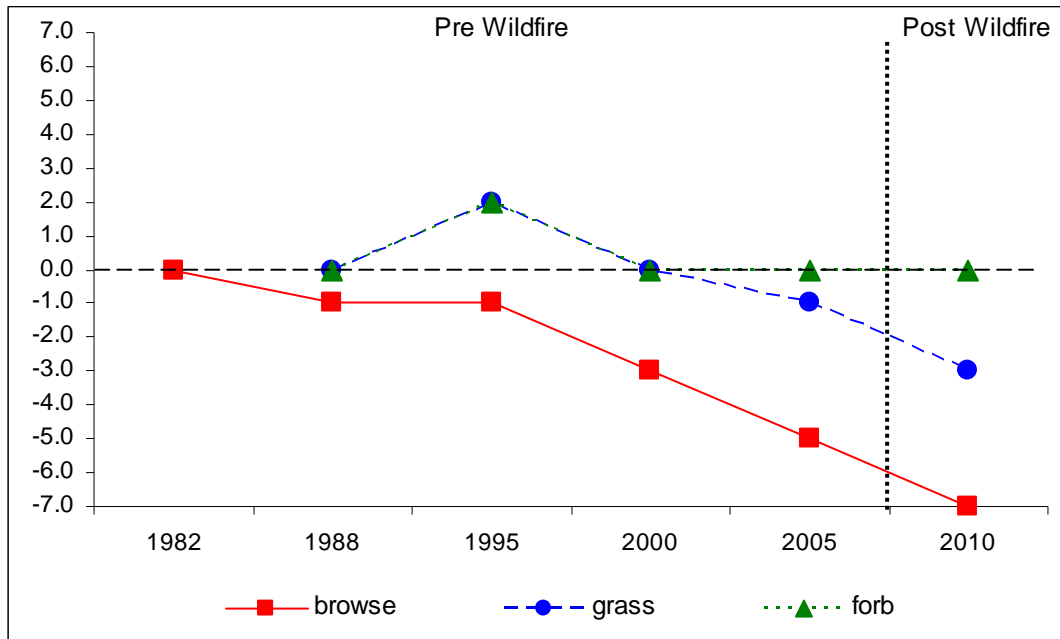
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 9, study no: 5

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	9.9	3.5	8.4	27.5	-2.3	1.7	0.0	48.6	Good
00	7.3	-9.0	1.5	24.3	-1.2	0.5	0.0	23.4	Poor-Fair
05	2.4	0.0	0.0	26.8	-11.6	2.0	0.0	19.5	Poor
10	0.0	0.0	0.0	6.9	-0.8	0.6	0.0	6.7	Very Poor

Trend Summary

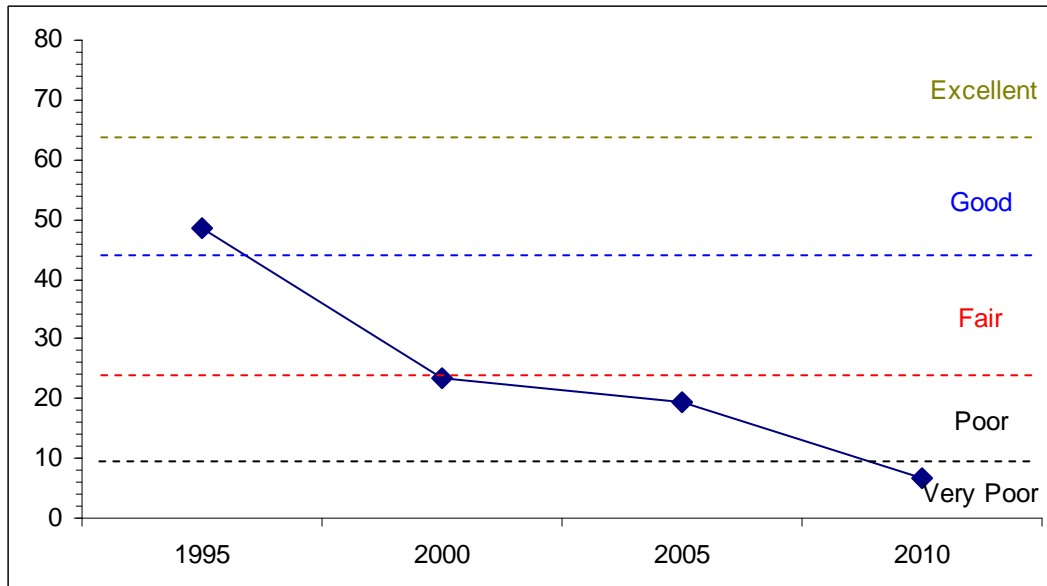
CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 9, Study no: 5



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--

Management unit 9, Study no: 5



HERBACEOUS TRENDS--

Management unit 09, Study no: 5

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	ab62	ab38	ab43	a29	a65	.10	1.42	.32	.97
G	Agropyron spicatum	-	4	4	1	-	.03	.18	.15	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Bromus tectorum (a)	a ⁻	b ⁴⁰	c ⁹⁷	d ³¹⁴	b ²⁹	.16	1.48	12.54	1.05
G	Dactylis glomerata	-	-	-	-	-	-	-	-	.00
G	Hilaria jamesii	25	43	21	45	39	.50	.24	1.07	.82
G	Oryzopsis hymenoides	12	6	11	6	6	.39	.62	.10	.07
G	Poa fendleriana	-	5	-	-	-	.06	-	-	-
G	Poa secunda	a ²	a ⁴	a ⁷	b ²⁶	a ⁻	.01	.01	.30	-
G	Sitanion hystrix	b ³¹	b ³⁶	a ⁴	a ⁹	a ⁻	.24	.15	.70	-
G	Stipa comata	b ²¹³	c ²⁸⁵	b ²¹⁷	b ²⁰²	a ¹⁰⁶	12.38	9.53	10.72	1.59
G	Vulpia octoflora (a)	-	c ³²⁴	a ⁵	b ²⁰⁸	a ⁻	2.97	.06	2.99	-
Total for Annual Grasses		0	364	102	522	29	3.13	1.55	15.53	1.05
Total for Perennial Grasses		345	421	307	318	216	13.73	12.16	13.38	3.46
Total for Grasses		345	785	409	840	245	16.86	13.71	28.92	4.52
F	Allium sp.	b ⁹	c ¹³⁰	ab ¹	a ⁻	a ⁻	.42	.00	-	-
F	Astragalus convallarius	ab ⁸	b ¹⁸	ab ⁵	a ⁻	a ⁻	.12	.01	-	-
F	Astragalus purshii	-	3	-	-	-	.01	-	-	-
F	Calochortus nuttallii	-	3	6	4	-	.01	.01	.01	-
F	Castilleja chromosa	-	3	4	-	-	.03	.03	-	-
F	Chenopodium leptophyllum(a)	-	1	-	3	-	.00	-	.00	-
F	Collinsia parviflora (a)	-	-	-	3	-	-	-	.00	-
F	Cymopterus sp.	-	-	-	-	2	-	-	-	.00
F	Descurainia pinnata (a)	a ¹	b ⁵⁷	a ⁻	a ⁴	a ¹	.12	-	.01	.00
F	Draba sp. (a)	-	b ³⁵	a ⁻	a ⁻	a ⁻	.06	-	-	-
F	Erigeron sp.	-	3	5	-	-	.00	.01	-	-
F	Euphorbia robusta	-	3	-	-	-	.03	-	-	-
F	Ipomopsis congesta	-	8	-	-	-	.02	-	-	-
F	Lepidium sp. (a)	-	b ²⁴	a ⁻	a ⁴	a ⁻	.09	-	.04	-
F	Lesquerella sp.	1	1	-	-	-	.00	-	-	-
F	Lygodesmia sp.	-	3	-	6	-	.01	-	.07	-
F	Machaeranthera grindelioides	3	-	-	-	-	-	-	-	-
F	Navarretia intertexta (a)	-	-	-	6	-	-	-	.01	-
F	Phlox longifolia	c ⁷²	b ²³	b ²²	a ⁸	a ⁻	.05	.15	.02	-
F	Plantago patagonica (a)	-	b ¹⁶	a ⁻	c ⁵¹	a ⁻	.05	-	.36	-
F	Polygonum douglasii (a)	-	3	4	-	-	.00	.01	-	-
F	Salsola iberica (a)	-	a ⁻	a ⁻	b ¹²	a ⁻	-	-	.04	-
F	Sisymbrium altissimum (a)	-	3	2	6	-	.15	.03	.06	-
F	Sphaeralcea coccinea	a ³	a ¹⁸	a ⁷	b ⁴⁰	b ⁴³	.13	.01	.89	.29
F	Taraxacum officinale	-	3	1	-	-	.00	.00	-	-
F	Unknown forb-perennial	7	-	-	-	-	-	-	-	-
Total for Annual Forbs		1	139	6	89	1	0.49	0.04	0.53	0.00
Total for Perennial Forbs		103	219	51	58	45	0.86	0.24	0.99	0.29
Total for Forbs		104	358	57	147	46	1.35	0.29	1.52	0.30

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

BROWSE TRENDS--

Management unit 09, Study no: 5

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	79	78	34	1	7.76	5.69	1.50	-
B	Eriogonum microthecum	30	15	22	0	.19	.16	.44	-
B	Gutierrezia sarothrae	76	100	66	4	.98	12.44	1.93	.00
B	Leptodactylon pungens	2	2	0	0	.03	.15	-	-
B	Opuntia sp.	20	16	19	13	.07	.36	.64	.30
Total for Browse		207	211	141	18	9.06	18.83	4.53	0.30

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 5

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	2.11	-
Eriogonum microthecum	.25	-
Gutierrezia sarothrae	2.83	-
Opuntia sp.	.51	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 5

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.3	-

BASIC COVER--

Management unit 09, Study no: 5

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	2.75	4.75	31.06	35.34	39.24	5.52
Rock	0	0	0	0	0	0
Pavement	0	0	.01	.15	.03	0
Litter	45.50	31.00	32.54	35.04	28.71	79.97
Cryptogams	1.00	4.50	10.82	12.38	1.02	0
Bare Ground	50.75	59.75	31.40	44.68	37.68	15.06

SOIL ANALYSIS DATA --

Management unit 9, Study no: 5, Study Name: Island Park

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.9	7.3	57.4	26.7	15.9	0.6	4.0	112.0	0.6

PELLET GROUP DATA--

Management unit 09, Study no: 5

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	45	10	51	7
Elk	6	25	48	27
Deer	32	21	29	29

Days use per acre (ha)		
'00	'05	'10
-	-	-
57 (141)	64 (159)	47 (116)
47 (116)	22 (55)	44 (107)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 5

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>									
82	3798	4	53	44	-	54	14	30	17/23
88	5665	20	29	51	133	42	34	14	20/21
95	3300	17	44	39	180	50	29	29	16/25
00	2780	3	15	82	20	53	28	50	16/25
05	900	7	22	71	-	29	44	60	17/22
10	20	0	0	100	-	0	0	100	27/28
<i>Eriogonum microthecum</i>									
82	199	0	100	0	-	0	0	0	13/6
88	732	27	73	0	-	0	0	0	9/5
95	1020	6	84	10	20	4	4	0	10/10
00	500	0	96	4	-	12	12	4	5/6
05	780	0	100	0	-	0	31	0	12/13
10	0	0	0	0	-	0	0	0	9/5
<i>Gutierrezia sarothrae</i>									
82	7465	11	89	0	-	0	0	0	12/10
88	30331	10	81	9	66	0	0	1	8/6
95	3580	36	63	1	26560	3	0	0	12/13
00	30120	1	92	7	-	0	0	3	8/9
05	2700	4	96	1	220	0	0	0	12/12
10	140	0	86	14	-	0	0	14	12/15
<i>Leptodactylon pungens</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	60	0	100	-	-	0	0	0	4/8
00	120	17	83	-	-	0	0	0	4/8
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Opuntia sp.										
82	133	0	100	0	-	0	0	0	3/5	
88	599	44	56	0	-	11	0	0	4/8	
95	440	0	95	5	-	0	0	0	4/16	
00	380	5	84	11	-	0	0	0	4/12	
05	560	0	79	21	-	0	0	18	5/18	
10	320	0	100	0	-	0	0	56	8/15	

WARREN DRAW - TREND STUDY NO. 9-7-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XC430UT](#)

Land Ownership: BLM

Elevation: 7400 ft. (2256 m)

Aspect: West

Slope: 4%-20%

Transect bearing: 2° magnetic

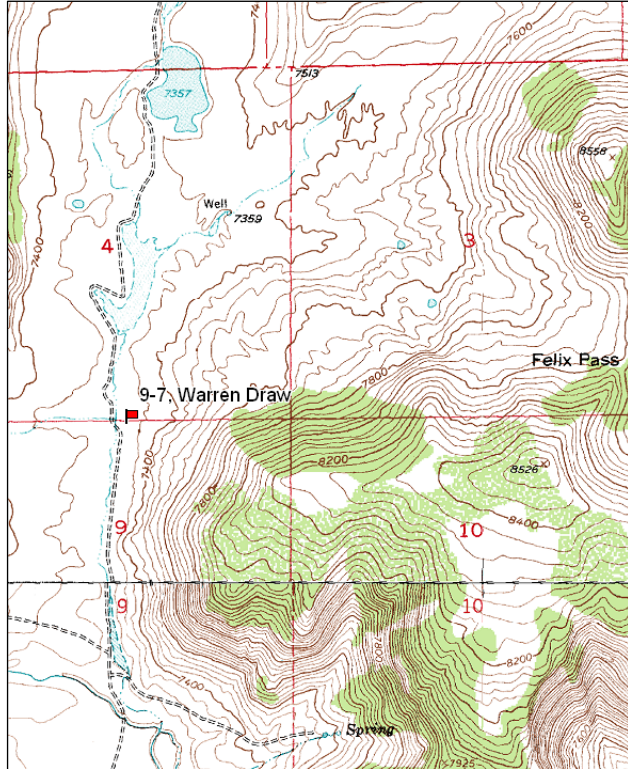
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

Directions:

From the junction between Crouse and Calder reservoirs proceed west 2.1 miles to an intersection. Turn right (north) and go 1.5 miles, past a fence and two forks. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces east to the 0-foot baseline stake.

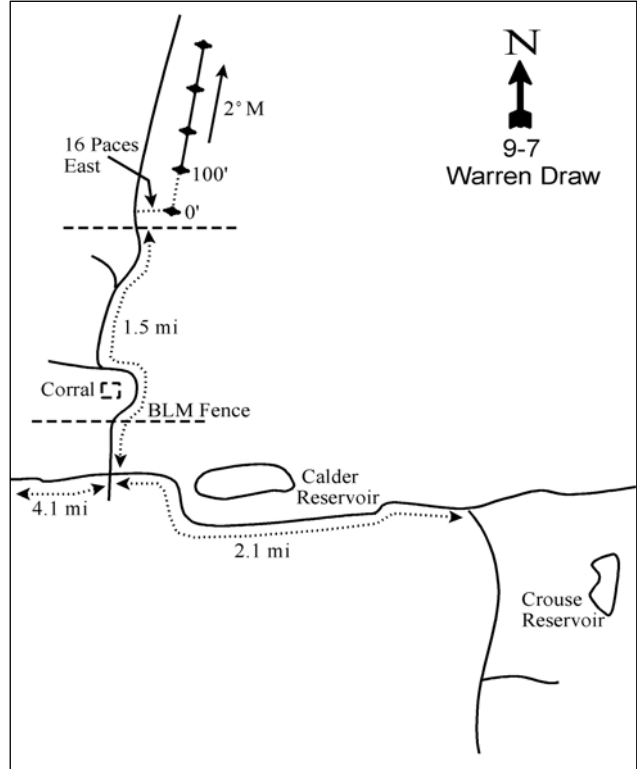
Alternative route: From the Diamond Mountain turnoff off US 191 travel east to an intersection just south of Matt Warner reservoir. Turn right toward Calder reservoir and proceed 4.1 miles to a fork. Turn left (north) at this fork and travel 1.5 miles passing through one fence and coming to another. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces east to the 0-foot baseline stake.

Map Name: Warren Draw



Township: 1S Range: 24E Section: 4

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 649578 E 4513221 N

WARREN DRAW - TREND STUDY NO. 9-7

Site Information

Site Description: The study is located on Utah Division of Wildlife Resources (UDWR) managed land just north of the UDWR-Bureau of Land Management (BLM) boundary fence in Warren Draw within the BLM's Warren Draw South allotment. The area is used year-round by deer and elk. Sage grouse also appear frequently in the area. Water is readily available in most years with several stock ponds within one mile of the site. Pellet group transect data estimated lightly moderate use by deer in 2000 and 2010, but heavy use in 2005. Estimated elk and cattle use has been light since 2000 (Table - Pellet Group Data).

Browse: The key browse species is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) which provides essentially all of the browse cover for the site (Table - Browse Trends). The mountain big sagebrush population is comprised of a dense stand of moderately used, small, mature plants which has displayed moderate to high decadence over the sample years. Recruitment of young sagebrush plants was generally good in the initial years of the study, but has been poor since 2005. Other browse species are very rare and include small numbers of slenderbush eriogonum (*Eriogonum microthecum*), fringed sagebrush (*Artemisia frigida*) and snowberry (*Symphoricarpos oreophilus*) (Table - Browse Characteristics).

Herbaceous Understory: Even with a high density and cover of sagebrush, the herbaceous understory is abundant. Grasses are diverse, though the low growing species Sandberg bluegrass (*Poa secunda*) provides the majority of the grass cover. Other prevalent perennial grass species include mutton bluegrass (*P. fendleriana*), thickspike wheatgrass (*Agropyron dasystachyum*) and pinewoods needlegrass (*Stipa pinetorum*). Forbs are diverse and abundant, though again, forbs are dominated by the mat forming, low forage value species Hoods phlox (*Phlox hoodii*). Other prevalent species are also mainly mat forming and include rose pussytoes (*Antennaria rosea*). Species with forage value include silvery lupine (*Lupinus argenteus*), penstemon (*Penstemon* sp.) and dandelion (*Taraxacum officinale*) (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a neutral reaction (pH 6.6) (Table - Soil Analysis Data). Bare ground cover is low on the site with vegetation and litter providing good protective cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** There was a substantial increase in the density of mountain big sagebrush due to a large increase in the recruitment of young plants, but decadence also increased from 7% to 51%.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of mountain big sagebrush decreased to 20% and recruitment of young sagebrush plants remained good at 13%.
- **1995 to 2000 - slightly up (+1):** The density of mountain big sagebrush increased by 22% from 7,320 plants/acre to 8,940 plants/acre, but cover remained similar. Decadence of sagebrush increased to 37% and poor vigor increased from 1% to 11%.
- **2000 to 2005 - slightly down (-1):** Mountain big sagebrush density decreased slightly to 8,220 plants/acre, but cover remained similar. Decadence of sagebrush increased to 42% and poor vigor increased to 20%. Recruitment of young sagebrush plants decreased from 12% to 5%.
- **2005 to 2010 - slightly down (-1):** The density of sagebrush decreased by 25% to 6,180 plants/acre with a decrease in quadrat cover from 20% to 17%. However, canopy cover showed an increase in cover from 25% to 28%. Decadence also decreased to 17% and poor vigor decreased to 11%. Recruitment of young sagebrush plants increased slightly, but was still low at 7%. There were numerous seedlings sampled in 2010.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 12%.
- **1995 to 2000 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 12%, but cover remained similar.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. There was a significant increase in the nested frequency of Sandberg bluegrass which led to a large increase in cover from 1% to 11%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 18%, but cover remained similar.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 19%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 28% and cover decreased from 20% to 15%.
- **2000 to 2005 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 17%, though cover decreased slightly to 14%.
- **2005 to 2010 - down (-2):** There was a 45% decrease in the sum of nested frequency of perennial forbs and cover decreased slightly to 13%.

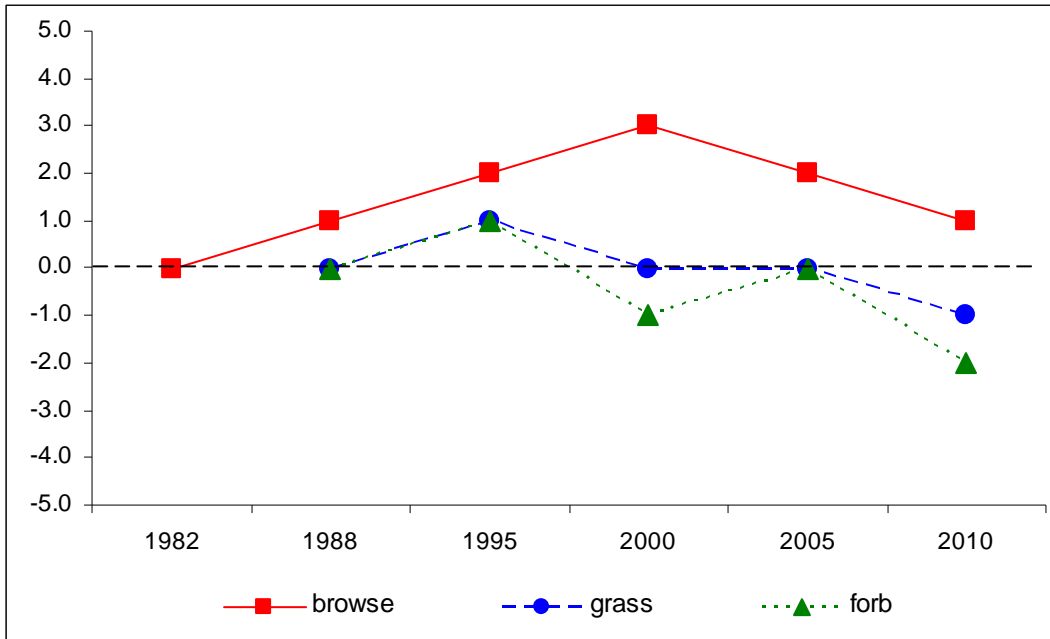
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 9, study no: 7

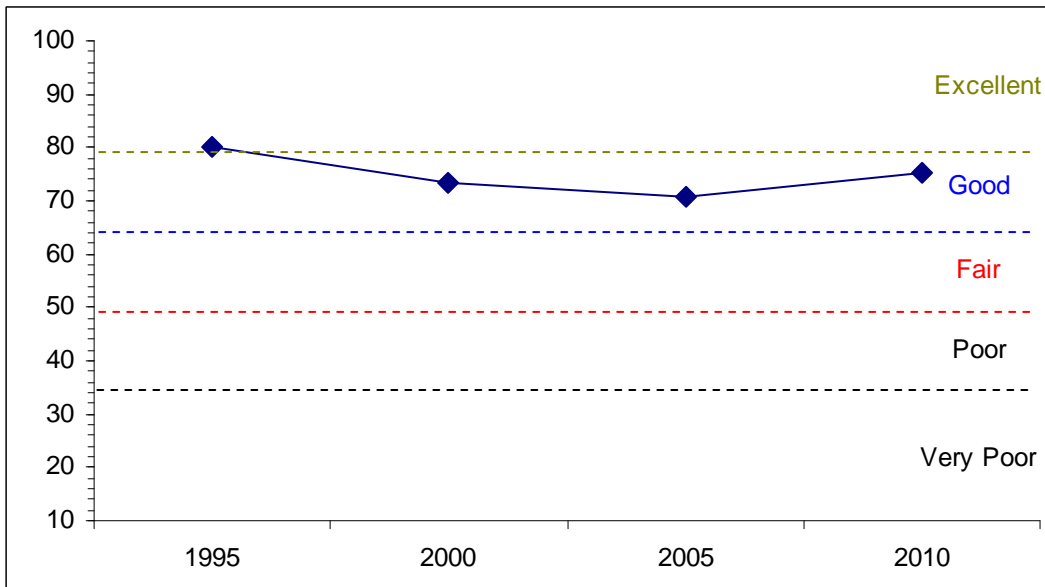
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	25.6	9.0	6.5	29.2	0.0	10.0	0.0	80.2	Good-Excellent
00	23.5	3.9	6.0	30.0	0.0	10.0	0.0	73.4	Good
05	25.7	2.5	2.5	30.0	0.0	10.0	0.0	70.6	Good
10	21.8	9.9	3.5	30.0	0.0	10.0	0.0	75.2	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 7



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 9, Study no: 7



HERBACEOUS TRENDS--
Management unit 09, Study no: 7

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a-	c265	c279	b207	b178	2.48	3.87	1.67	2.88
G	Agropyron intermedium	-	-	4	-	-	-	.15	-	-
G	Bouteloua gracilis	-	-	-	3	2	-	-	.03	.03
G	Bromus tectorum (a)	-	-	-	-	3	-	-	-	.00
G	Carex sp.	26	29	18	8	10	.14	.30	.02	.17
G	Festuca ovina	b20	c30	a-	ab1	b14	.29	-	.00	.40
G	Koeleria cristata	c51	ab9	b11	a-	a-	.04	.05	-	-
G	Poa fendleriana	ab41	b79	c153	c121	a14	1.52	5.07	4.39	.39
G	Poa pratensis	a-	ab27	a10	b36	a10	.43	.21	1.07	.16
G	Poa secunda	a89	a108	a79	b222	c283	1.08	.98	11.01	12.30
G	Sitanion hystrix	c278	b52	a13	ab42	ab36	2.23	.25	.45	.50
G	Stipa comata	bc57	c65	ab34	bc52	a15	1.72	.67	1.85	.83
G	Stipa pinetorum	b188	b177	b136	a86	a74	4.61	3.60	3.06	3.69
Total for Annual Grasses		0	0	0	0	3	0	0	0	0.00
Total for Perennial Grasses		750	841	737	778	636	14.58	15.18	23.57	21.36
Total for Grasses		750	841	737	778	639	14.58	15.18	23.57	21.37
F	Achillea millefolium	34	33	42	26	38	.34	.71	.46	1.22
F	Agoseris glauca	a-	a-	a5	b29	a-	-	.01	.14	-
F	Allium sp.	-	2	2	-	-	.01	.03	-	-
F	Androsace septentrionalis (a)	-	b36	ab18	a8	b14	.09	.04	.02	.06
F	Antennaria rosea	b191	ab189	b196	ab155	a142	5.49	6.70	3.07	4.63
F	Arabis drummondii	b24	ab7	ab4	a4	a-	.03	.01	.03	-
F	Artemisia ludoviciana	1	-	-	-	-	-	-	-	-
F	Aster sp.	15	24	23	34	31	.09	.17	.51	.36
F	Astragalus aretioides	1	1	-	-	-	.00	-	-	-
F	Chenopodium leptophyllum(a)	-	6	-	3	-	.01	-	.00	-
F	Collinsia parviflora (a)	-	b43	a7	c106	a-	.26	.01	.34	-
F	Cordylanthus sp. (a)	-	a-	a-	a-	b101	-	-	-	4.51
F	Cryptantha sp.	-	1	-	-	1	.00	-	-	.00
F	Delphinium nuttallianum	-	6	-	-	-	.03	-	.00	-
F	Descurainia pinnata (a)	1	1	-	-	3	.00	-	-	.00
F	Draba sp. (a)	-	-	3	-	-	-	.01	-	-
F	Erigeron eatonii	c136	c157	b65	b66	a21	.62	.37	.62	.10
F	Erigeron flagellaris	a-	a-	b11	a6	a3	-	.11	.03	.00
F	Gayophytum ramosissimum(a)	-	b18	a-	b23	a2	.09	-	.07	.00
F	Heterotheca villosa	-	2	-	-	-	.00	-	-	-
F	Hymenoxys richardsonii	3	3	3	-	-	.03	.03	-	-
F	Lupinus argenteus	a24	b44	a17	ab28	a15	1.44	.56	1.62	.65
F	Lychnis drummondii drummondii	-	5	-	-	-	.06	-	-	-
F	Mertensia sp.	a-	a-	a-	b8	a-	-	-	.12	-
F	Microsteris gracilis (a)	-	6	2	1	-	.02	.00	.00	-
F	Navarretia sp.	a-	b14	a-	b23	-	.08	-	.18	-

Type	Species	Nestled Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Oenothera sp.	-	-	-	3	-	-	-	.15	-
F	Orobanche sp.	-	2	-	-	-	.00	-	-	-
F	Orthocarpus luteus (a)	-	c109	b30	c106	a-	3.04	.16	1.74	-
F	Penstemon sp.	b13	a1	ab6	b10	a-	.00	.09	.18	-
F	Phlox hoodii	c234	b172	b161	ab127	a89	10.77	5.90	5.26	5.25
F	Phlox longifolia	b52	c81	ab39	ab43	a18	.34	.07	.12	.03
F	Polygonum douglasii (a)	-	b161	a12	a20	a11	.59	.03	.05	.05
F	Potentilla gracilis	-	2	6	8	8	.03	.01	.01	.04
F	Schoenocrambe linifolia	-	-	-	3	7	-	-	.00	.19
F	Sphaeralcea coccinea	-	-	-	-	6	-	-	-	.15
F	Taraxacum officinale	ab18	ab38	a16	b48	ab35	.13	.21	.66	.17
F	Tragopogon dubius	-	-	3	2	3	-	.01	.03	.01
F	Trifolium gymnocarpon	a-	c113	b41	d139	a-	.27	.23	.85	-
F	Unknown forb-annual (a)	-	3	-	-	-	.00	-	-	-
F	Unknown forb-perennial	b11	a-	a-	a-	a-	-	-	-	-
F	Zigadenus elegans	a-	ab3	b12	a-	a-	.00	.12	-	-
Total for Annual Forbs		1	383	72	267	131	4.12	0.26	2.24	4.63
Total for Perennial Forbs		757	900	652	762	417	19.82	15.39	14.11	12.83
Total for Forbs		758	1283	724	1029	548	23.94	15.65	16.35	17.47

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

BROWSE TRENDS--

Management unit 09, Study no: 7

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia frigida	0	1	1	1	-	-	-	-
B	Artemisia tridentata vaseyana	99	97	97	94	20.41	18.76	20.37	17.32
B	Eriogonum microthecum	3	3	3	3	.03	.01	.15	.09
Total for Browse		102	101	101	98	20.45	18.77	20.53	17.42

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 7

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	25.14	28.38

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 7

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	1.6	1.2

BASIC COVER--

Management unit 09, Study no: 7

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	18.25	23.00	53.39	57.93	51.55	54.37
Rock	1.25	1.50	.16	.08	.67	.39
Pavement	0	0	.07	.09	.10	.26
Litter	65.50	59.00	50.50	66.19	45.95	41.40
Cryptogams	.25	.50	1.31	1.22	.84	.68
Bare Ground	14.75	16.00	13.86	13.88	16.30	19.23

SOIL ANALYSIS DATA --

Management unit 9, Study no: 7, Study Name: Warren Draw

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.9	6.6	63.4	16.7	19.9	2.1	20.4	265.6	0.8

PELLET GROUP DATA--

Management unit 09, Study no: 7

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	3	13	67	2	-	-	-
Elk	14	21	15	4	8 (20)	13 (31)	1 (3)
Deer	10	24	39	13	22 (55)	78 (193)	19 (48)
Cattle	2	1	2	4	1 (2)	1 (2)	2 (4)

BROWSE CHARACTERISTICS--

Management unit 09, 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 frigida										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	0	0	0	4/5	
05	20	0	100	-	-	0	100	0	1/2	
10	20	0	100	-	-	0	0	0	-/-	
Artemisia tridentata vaseyana										
82	3799	0	93	7	-	30	26	7	18/31	
88	10731	13	36	51	2999	63	9	9	21/25	
95	7320	13	67	20	140	30	34	1	16/29	
00	8940	12	51	37	80	25	5	11	17/29	
05	8220	5	53	42	440	31	24	20	17/24	
10	6180	7	75	17	4800	26	19	11	16/27	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Chrysothamnus viscidiflorus viscidiflorus									
82	0	0	0	-	-	0	0	0	-/-
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	6/9
10	0	0	0	-	-	0	0	0	9/13
Eriogonum microthecum									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	100	0	100	-	-	0	0	0	4/15
00	60	0	100	-	-	0	0	67	6/9
05	120	0	100	-	-	0	0	0	5/9
10	120	0	100	-	-	0	0	0	5/9
Symphoricarpos oreophilus									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	13/11
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	19/13
Tetradymia canescens									
82	0	0	0	-	-	0	0	0	-/-
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	13/36
10	0	0	0	-	-	0	0	0	13/40

LITTLE HOLE - TREND STUDY NO. 9-9-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Mountain Shallow Sandy Loam (Ponderosa Pine), R047XC453UT

Land Ownership: UDWR

Elevation: 7800 ft. (2378 m)

Aspect: North

Slope: 20%

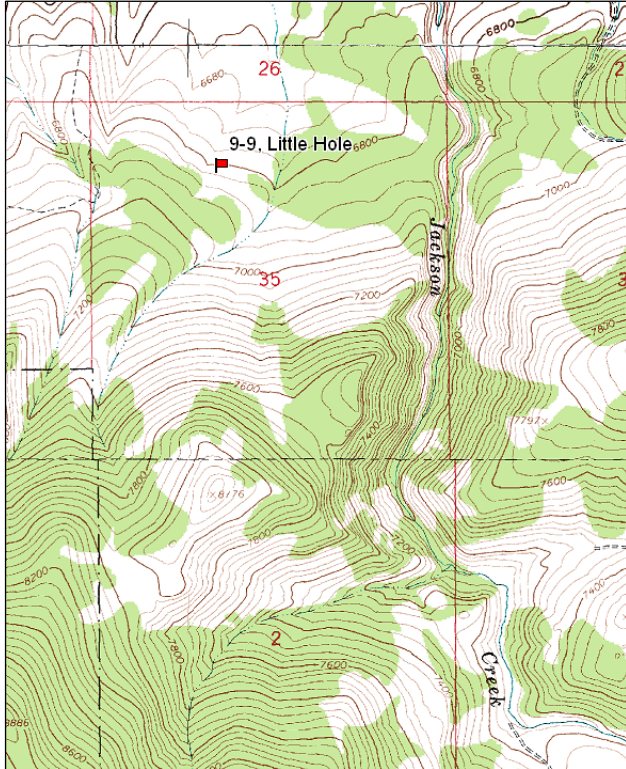
Transect bearing: 345° magnetic

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

Directions:

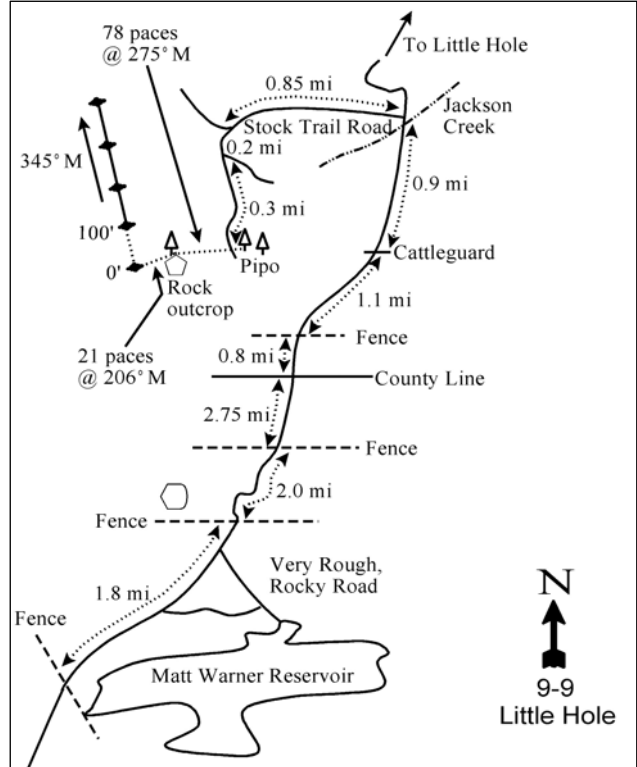
From the intersection of Highway U.S. 191 and the Diamond Mountain Road, take the Diamond Mountain Road north to a fork with a sign indicating Brown's Park Road 10 miles and Vernal 36 miles. Turn left (north) towards Jackson Draw and proceed down Jackson Draw toward Little Hole. When you get to Matt Warner Reservoir, continue past a fence for 1.8 miles to another fence. Continue on the very rocky road for 2.0 miles to the next fence, passing a pond on the left. Go through this fence and drive 2.75 miles to the county line. Continue 0.8 miles past the county line to a fence. From here, drive 1.1 miles to a cattle guard and continue 0.9 miles to Jackson Creek. Just after crossing Jackson Creek make a left turn and proceed 0.85 miles to an intersection. Bear left, drive 0.2 miles to a fork. Proceed to the right for 0.3 miles to two large ponderosa pine (*Pinus ponderosa*) trees near the road. From the trees, walk southwest (275°M) for 78 paces to a large rock outcropping just below another large ponderosa. From this tree, the 0-foot baseline stake is 21 paces at 206°M.

Map Name: Jackson Draw



Township: 2N Range: 23E Section: 35

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 644043 E 4525713 N

LITTLE HOLE - TREND STUDY NO. 9-9

Site Information

Site Description: The study samples a mixed mountain brush community with scattered pinyon pine (*Pinus edulis*) Utah juniper (*Juniperus osteosperma*), Ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) overlooking the Green River at Little Hole. This site is managed by the Utah Division of Wildlife Resources (UDWR) as part of the Little Hole Wildlife Management Area (WMA). The state section is small and is surrounded by Bureau of Land Management (BLM) lands, which are grazed by cattle as part of the Little Hole allotment. It appears that the BLM area to the north of the site was treated between 2005 and 2010 to remove pinyon and juniper. Most of the transect was not treated, but several small trees were removed on the lower portion of the transect. Pellet group transect data has indicated moderate use by deer, light use by elk and occasional use by moose since 2000. Estimated cattle use has been light since 2000 (Table - Pellet Group Data). Cattle were present on the site when it was read in 2010.

Browse: Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) are the key browse species. Combined, the two species provide the majority of the browse cover on the site, though sagebrush cover has decreased steadily since 2000 (Table - Browse Trends). Sagebrush consists of a dense stand of mostly mature plants, but density has decreased since 1995. Decadence in sagebrush has been generally high over the study, but was more moderate in 1982, 1995, and 2010. Utilization of sagebrush has been light to moderate over the course of the study. Antelope bitterbrush is more highly preferred and has shown heavier utilization than sagebrush. The population is comprised of mostly mature plants with low decadence and good vigor. A small number of true mountain mahogany (*Cercocarpus montanus*) and serviceberry (*Amelanchier utahensis*) are also present. Both species have had moderate to heavy use, but maintain healthy populations with low decadence and good vigor. Other browse species found on the site include mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), slenderbush eriogonum (*Eriogonum microthecum*), broom snakeweed (*Gutierrezia sarothrae*), Oregon grape (*Mahonia repens*) and snowberry (*Symphoricarpos oreophilus*) (Table - Browse Characteristics). There is also a small stand of pinyon pine and Utah juniper scattered over the site (Table - Point-Quarter Tree Data) with a few Ponderosa pine and Douglas fir trees.

Herbaceous Understory: Grasses are diverse and abundant on the site, though they are dominated by the introduced species Kentucky bluegrass (*Poa pratensis*) which provides the majority of the grass cover. Other common perennial grass species include thickspike wheatgrass (*Agropyron dasystachyum*), oniongrass (*Melica bulbosa*), Sandberg bluegrass (*P. secunda*) and needle-and-thread (*Stipa comata*). Forbs have been diverse, but not particularly abundant during any reading. The only common species are hairy goldaster (*Heterotheca villosa*) and silvery lupine (*Lupinus argenteus*) and they provide little cover (Table - Herbaceous Trends).

Soil: Soils are derived from igneous parent material and have a sandy clay loam texture and a slightly acidic soil reaction (pH 6.2) (Table - Soil Analysis Data). Bare ground cover is low with a large amount of vegetation and litter cover. There is a moderate amount of rock cover that also provides good protective ground cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** The density of mountain big sagebrush and bitterbrush both increased substantially. However, decadence of sagebrush increased from 18% to 74% of the population. The increase in density of bitterbrush was primarily due to a substantial increase in the recruitment of young plants, many of which may not survive to maturity.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of sagebrush decreased

to 19%, but recruitment of young plants decreased from 11% to 7%. The bitterbrush population remained similar.

- **1995 to 2000 - down (-2):** The density of mountain big sagebrush decreased 21% from 4,220 plants/acre to 3,320 plants/acre, but cover increased from 15% to 17%. Decadence of sagebrush increased to 47% and recruitment of young plants decreased to 5%. The density of bitterbrush decreased by 13% from 1,780 plants/acre to 1,540 plants/acre, but cover increased slightly from 8% to 9%. Decadence of bitterbrush increased from 1% to 12% and recruitment of young plants decreased to 5%.
- **2000 to 2005 - slightly down (-1):** The trend for the two primary browse species is mixed. Density of mountain big sagebrush decreased by 22% to 2,600 plants/acre and cover decreased to 11%. Decadence of sagebrush remained high at 46% and poor vigor increased from 5% to 29%. Recruitment of young sagebrush plants was very poor at 2%. Bitterbrush density, however, increased by 21% to 1,860 plants/acre and cover increased to 14%.
- **2005 to 2010 - slightly up (+1):** The density of both mountain big sagebrush and bitterbrush remained similar. Decadence of sagebrush decreased to 17% and poor vigor decreased to 14%. Recruitment of young sagebrush plants increased to 15% of the population. Bitterbrush decadence also decreased from 13% to 0%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 12%.
- **1995 to 2000 - down (-2):** The perennial grass sum of nested frequency decreased by 23% despite an increase in cover from 11% to 21%. The increase in cover was due to a significant increase in the nested frequency of Kentucky bluegrass with a subsequent increase in cover.
- **2000 to 2005 - up (+2):** The sum of nested frequency of perennial grasses increased by 22% and cover increased to 23%.
- **2005 to 2010 - slightly down (-1):** There was an 11% decrease in the sum of nested frequency of perennial grasses. Cover increased to 25%, but is dominated by Kentucky blue grass, which is an increaser species.

Forb:

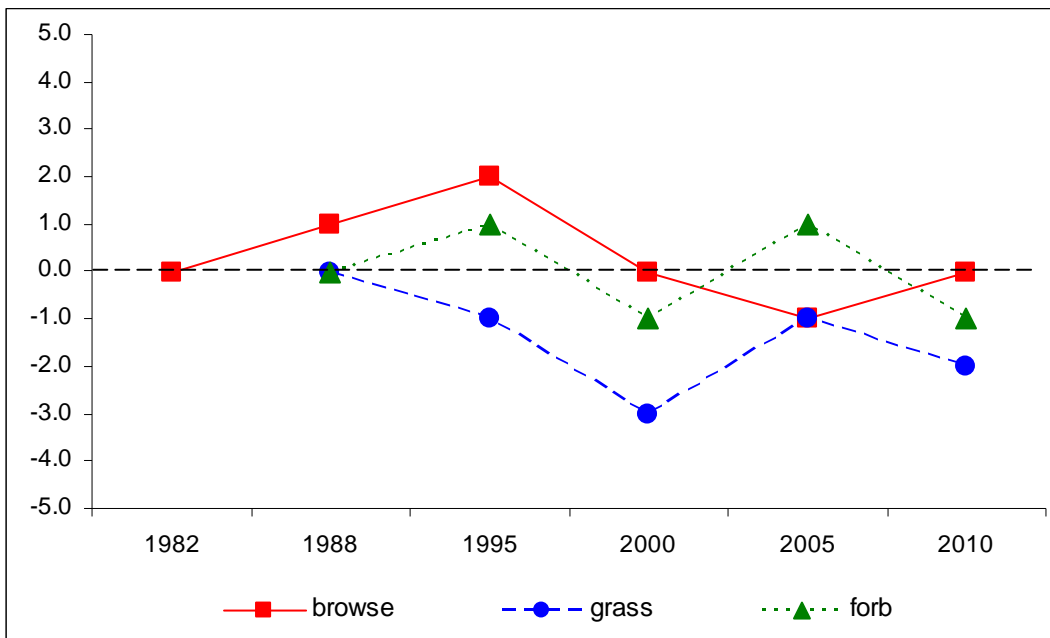
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 23%, but forbs remain fairly rare on the site.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 43%, but cover remained similar.
- **2000 to 2005 - up (+2):** There was a 60% increase in the sum of nested frequency, returning to 1995 levels. Perennial forb cover increased to 6% with a large increase in the cover of silvery lupine.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 38%, returning to 2000 levels. Cover of perennial forbs decreased to 3%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
 Management unit 9, study no: 9

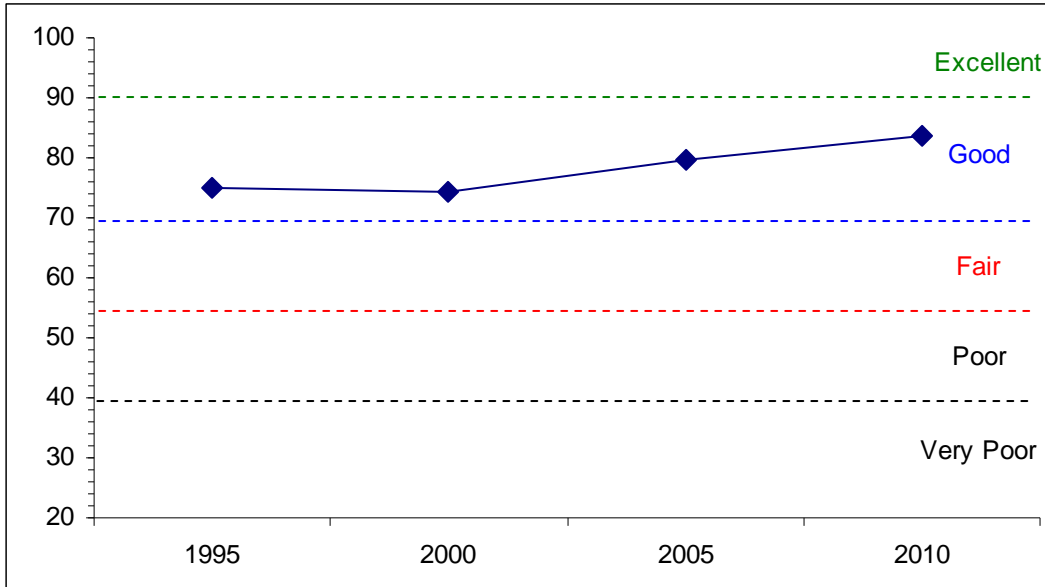
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	11.5	5.1	22.7	-0.3	6.2	0.0	75.1	Good
00	30.0	5.7	3.2	30.0	0.0	5.6	0.0	74.5	Good
05	30.0	7.2	2.5	30.0	-0.1	10.0	0.0	79.7	Good
10	30.0	13.1	5.2	30.0	-0.4	5.9	0.0	83.8	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 9



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 9, Study no: 9



HERBACEOUS TRENDS--
 Management unit 09, Study no: 9

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	a53	ab92	b115	b94	b123	1.24	1.89	1.49	4.11
G	Agropyron spicatum	c97	bc70	ab41	a39	a13	.84	1.12	1.03	.62
G	Bromus tectorum (a)	-	b50	a3	ab25	ab26	.45	.00	.12	.55
G	Carex sp.	2	9	7	1	4	.17	.18	.03	.06
G	Koeleria cristata	c61	ab5	a-	b13	ab4	.02	-	.22	.06
G	Melica bulbosa	a27	c98	ab43	b60	ab32	1.87	.69	1.89	.42
G	Poa fendleriana	a28	b92	a35	a12	a11	1.38	.92	.34	.11
G	Poa pratensis	a90	a140	b206	b231	b258	3.18	14.19	11.21	16.75
G	Poa secunda	c150	b75	a27	ab50	ab72	1.00	.22	1.50	1.87
G	Sitanion hystrix	b113	a33	a12	a18	a16	.35	.22	.56	.33
G	Stipa comata	d144	b57	a20	c96	ab33	1.03	.80	3.87	.61
G	Stipa lettermani	ab8	ab8	ab16	b24	a5	.21	.39	.73	.06
Total for Annual Grasses		0	50	3	25	26	0.45	0.00	0.12	0.55
Total for Perennial Grasses		773	679	522	638	571	11.33	20.68	22.90	25.03
Total for Grasses		773	729	525	663	597	11.79	20.68	23.03	25.58
F	Agoseris glauca	a-	bc15	ab3	c22	ab2	.06	.00	.13	.00
F	Alyssum alyssoides (a)	-	-	-	1	3	-	-	.03	.00
F	Antennaria rosea	15	8	16	9	18	.48	.86	.48	.66
F	Arabis sp.	3	3	-	5	-	.00	-	.01	-
F	Astragalus convallarius	1	11	12	5	5	.09	.39	.06	.06
F	Astragalus sp.	1	-	-	-	-	-	-	-	-
F	Calochortus nuttallii	-	3	-	2	-	.01	-	.02	-
F	Castilleja linariaefolia	-	1	-	-	-	.06	-	-	-
F	Chaenactis douglasii	b13	a-	ab1	a-	a-	-	.00	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Collinsia parviflora</i> (a)	-	_d 252	_b 10	_c 165	_a -	2.74	.02	.95	-
F	<i>Collomia linearis</i> (a)	-	_c 109	_a -	_b 41	_a 4	.33	-	.22	.01
F	<i>Comandra pallida</i>	_a -	_b 29	_{bc} 25	_{bc} 32	_c 43	.26	.18	.82	.54
F	<i>Crepis acuminata</i>	_b 8	_{ab} 7	_a -	_{ab} 3	_a -	.04	-	.06	-
F	<i>Cystopteris fragilis</i>	4	-	-	-	-	-	-	-	-
F	<i>Delphinium nuttallianum</i>	-	6	-	7	-	.01	-	.02	-
F	<i>Descurainia pinnata</i> (a)	-	2	-	4	-	.00	-	.03	-
F	<i>Draba sp.</i> (a)	-	-	-	3	-	-	-	.00	-
F	<i>Erigeron eatonii</i>	_b 15	_{ab} 1	_{ab} 7	_a -	_{ab} 2	.00	.01	.00	.00
F	<i>Eriogonum umbellatum</i>	2	-	2	-	-	-	.00	-	-
F	<i>Gayophytum ramosissimum</i> (a)	-	3	-	3	-	.00	-	.01	-
F	<i>Heterotheca villosa</i>	_b 84	_a 51	_a 40	_a 30	_a 27	1.01	.73	.96	1.02
F	<i>Ipomopsis aggregata</i>	3	6	5	-	10	.02	.06	.01	.07
F	<i>Lepidium densiflorum</i> (a)	-	7	-	4	3	.02	-	.04	.00
F	<i>Linum lewisii</i>	-	3	-	-	5	.00	-	.00	.01
F	<i>Lithospermum ruderales</i>	4	1	1	2	-	.03	.00	.18	.15
F	<i>Lomatium sp.</i>	-	7	-	7	-	.02	-	.04	-
F	<i>Lupinus argenteus</i>	_a -	_{cd} 38	_b 11	_d 49	_{bc} 22	.69	.10	2.15	.36
F	<i>Lychnis drummondii</i>	-	-	-	2	-	-	-	.00	-
F	<i>Microsteris gracilis</i> (a)	-	4	2	8	1	.01	.00	.01	.00
F	<i>Navarretia intertexta</i> (a)	-	-	-	1	-	-	-	.00	-
F	<i>Orobancha sp.</i>	-	5	-	5	-	.03	-	.06	-
F	<i>Penstemon sp.</i>	3	-	-	-	-	-	-	-	-
F	<i>Petroradia pumila</i>	7	-	-	-	-	-	-	-	-
F	<i>Phlox hoodii</i>	-	2	3	3	1	.00	.15	.15	.00
F	<i>Polygonum douglasii</i> (a)	-	_b 19	_a 8	_a 8	_a 1	.06	.02	.01	.01
F	<i>Sphaeralcea coccinea</i>	24	17	13	9	9	.09	.20	.09	.02
F	<i>Taraxacum officinale</i>	_b 17	_b 16	_a -	_{ab} 8	_a 2	.07	-	.08	.01
F	<i>Tragopogon dubius</i>	_b 9	_a -	_a -	_a -	_{ab} 1	-	-	.00	.03
F	<i>Trifolium gymnocarpon</i>	_a -	_b 29	_a 6	_b 31	_a -	.06	.04	.11	-
F	<i>Zigadenus paniculatus</i>	_a -	_a 2	_{ab} 4	_b 7	_a -	.00	.06	.10	-
Total for Annual Forbs		0	396	20	238	12	3.18	0.05	1.34	0.03
Total for Perennial Forbs		213	261	149	238	147	3.09	2.82	5.60	2.97
Total for Forbs		213	657	169	476	159	6.27	2.87	6.94	3.00

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

BROWSE TRENDS--

Management unit 09, Study no: 9

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	6	4	6	4	.03	.41	.93	.03
B	Artemisia tridentata vaseyana	91	82	71	77	15.07	16.77	11.15	9.38
B	Cercocarpus montanus	16	13	12	20	1.31	1.69	2.90	3.41
B	Chrysothamnus viscidiflorus lanceolatus	4	4	1	1	.18	.06	-	.03
B	Eriogonum heracleoides	2	1	3	1	.18	-	-	-
B	Eriogonum microthecum	32	24	22	19	1.07	1.12	.87	.55
B	Gutierrezia sarothrae	6	0	1	1	-	-	.15	.15
B	Juniperus scopulorum	0	0	0	1	-	-	-	-
B	Mahonia repens	2	0	0	0	-	-	-	-
B	Opuntia sp.	0	0	0	1	-	-	-	-
B	Pinus edulis	0	4	6	5	1.74	2.24	5.44	3.52
B	Pinus ponderosa	0	0	0	0	.38	-	-	-
B	Purshia tridentata	51	56	56	61	7.84	9.34	13.51	12.24
B	Symphoricarpos oreophilus	16	15	21	23	1.53	2.60	4.44	6.52
B	Tetradymia canescens	0	1	1	1	-	-	.15	-
Total for Browse		226	204	200	215	29.36	34.25	39.58	35.86

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 9

Species	Percent Cover		
	'00	'05	'10
Amelanchier utahensis	-	1.54	.41
Artemisia tridentata vaseyana	-	9.61	12.01
Cercocarpus montanus	-	3.59	6.51
Chrysothamnus viscidiflorus lanceolatus	-	.20	-
Eriogonum heracleoides	-	.11	-
Eriogonum microthecum	-	1.03	1.01
Pinus edulis	2.00	7.48	7.75
Pinus ponderosa	-	-	1.13
Purshia tridentata	-	22.01	20.58
Symphoricarpos oreophilus	-	10.26	7.66
Tetradymia canescens	-	.03	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 9

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	2.4	2
Purshia tridentata	4.1	3.3

POINT-QUARTER TREE DATA--

Management unit 09, Study no: 9

Species	Trees per Acre				Average diameter (in)			
	'95	'00	'05	'10	'95	'00	'05	'10
Juniperus Osteosperma	6	8	20	20	3.2	6.7	5.4	4.8
Pinus edulis	9	42	72	72	2.5	1.8	3.5	2.1

BASIC COVER--

Management unit 09, Study no: 9

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.75	12.25	52.22	56.11	57.41	60.65
Rock	6.00	12.50	8.00	5.73	6.80	7.85
Pavement	.25	.75	.20	.90	.14	.05
Litter	64.50	61.50	64.56	66.65	49.31	44.50
Cryptogams	5.00	4.25	1.27	1.97	1.02	2.02
Bare Ground	15.50	8.75	3.90	8.44	5.46	8.95

SOIL ANALYSIS DATA --

Management unit 9, Study no: 9, Study Name: Little Hole

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.5	6.2	64.4	18.0	20.6	2.6	6.4	153.6	0.5

PELLET GROUP DATA--

Management unit 09, Study no: 9

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	4	13	27	2	-	-	-
Moose	1	1	-	-	2 (5)	-	1 (1)
Elk	4	3	7	5	6 (15)	9 (23)	9 (23)
Deer	15	12	8	15	28 (69)	38 (93)	27 (66)
Cattle	6	7	10	7	9 (22)	15 (36)	9 (22)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 9

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>Amelanchier utahensis</i>									
82	33	0	100	0	-	100	0	0	27/22
88	66	50	50	0	-	0	0	0	26/20
95	120	17	83	0	-	33	0	33	29/38
00	120	33	67	0	-	17	17	17	35/44
05	280	36	57	7	20	50	50	0	32/37
10	100	40	60	0	-	20	0	0	27/31
<i>Artemisia tridentata vaseyana</i>									
82	1998	2	80	18	-	57	2	3	17/23
88	3565	11	15	74	-	42	3	4	16/20
95	4220	7	74	19	20	45	2	4	23/34
00	3320	5	48	47	140	1	0	5	25/32
05	2600	2	52	46	540	26	12	29	28/34
10	2780	15	68	17	160	19	5	14	25/32
<i>Ceanothus fendleri</i>									
82	0	0	0	-	-	0	0	0	-/-
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	8/23
10	0	0	0	-	-	0	0	0	12/26
<i>Cercocarpus montanus</i>									
82	33	0	100	0	-	100	0	0	28/31
88	66	50	50	0	99	50	50	0	22/31
95	380	11	89	0	20	21	11	0	37/50
00	280	21	71	7	-	29	21	21	35/49
05	280	7	71	21	-	21	79	0	39/45
10	460	17	83	0	-	13	26	0	45/47
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	220	0	100	-	-	0	0	0	16/19
00	180	22	78	-	-	0	0	0	14/10
05	60	0	100	-	-	0	100	0	16/19
10	20	0	100	-	-	0	0	0	16/21

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>Eriogonum heracleoides</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	0	100	-	-	0	0	0	7/19
00	40	0	100	-	-	0	0	0	-/-
05	60	0	100	-	-	0	0	0	9/21
10	20	0	100	-	-	0	0	0	4/17
<i>Eriogonum microthecum</i>									
82	199	0	100	0	-	0	0	17	9/8
88	731	36	50	14	33	0	0	9	7/6
95	1960	3	97	0	-	0	0	0	11/16
00	1100	9	89	2	40	2	0	0	9/11
05	740	5	92	3	-	5	3	0	8/12
10	740	8	92	0	-	8	0	0	10/14
<i>Gutierrezia sarothrae</i>									
82	266	0	100	-	-	0	0	0	9/6
88	166	0	100	-	-	0	0	0	7/6
95	160	0	100	-	-	0	0	0	10/10
00	0	0	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	11/17
10	20	0	100	-	-	0	0	0	11/16
<i>Juniperus scopulorum</i>									
82	0	0	0	-	-	0	0	0	-/-
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	20	100	0	-	-	0	0	0	-/-
<i>Mahonia repens</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	100	0	-	-	0	0	0	4/5
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
82	233	0	100	0	-	0	0	0	6/9
88	331	60	30	10	-	0	0	30	4/6
95	0	0	0	0	-	0	0	0	4/7
00	0	0	0	0	-	0	0	0	7/22
05	0	0	0	0	-	0	0	0	6/11
10	20	0	100	0	-	0	0	0	5/16

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Pinus edulis									
82	33	100	0	0	-	0	0	0	-/-
88	33	100	0	0	66	0	0	0	-/-
95	0	0	0	0	-	0	0	0	-/-
00	80	50	50	0	20	0	0	0	-/-
05	120	33	50	17	40	0	0	0	-/-
10	100	60	40	0	40	0	0	0	-/-
Pinus ponderosa									
82	66	50	50	-	-	0	0	0	41/69
88	133	100	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	-/-
Purshia tridentata									
82	399	17	83	0	-	33	0	0	22/32
88	1864	70	27	4	399	25	7	4	17/24
95	1780	17	82	1	20	49	1	0	22/50
00	1540	5	83	12	-	6	26	4	25/49
05	1860	5	82	13	-	42	54	3	24/45
10	1880	5	95	0	40	30	6	0	26/44
Symphoricarpos oreophilus									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	460	35	65	0	20	0	0	0	20/43
00	520	12	88	0	-	0	0	0	12/28
05	1260	6	92	2	-	0	0	0	21/37
10	1860	16	84	0	-	0	0	0	21/35
Tetradymia canescens									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	0	0	0	0	-	0	0	0	13/22
00	40	0	50	50	-	0	0	0	17/24
05	20	0	100	0	-	0	0	0	17/30
10	20	0	100	0	-	0	0	0	-/-

TOLIVER CREEK CHAINING - TREND STUDY NO. 9-10-10

Vegetation Type: Chained, Seeded Pinyon-Juniper

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Stony Loam (Utah Juniper-Pinyon), R034XY247UT

Land Ownership: BLM

Elevation: 5870 ft. (1790 m)

Aspect: North

Slope: 7%

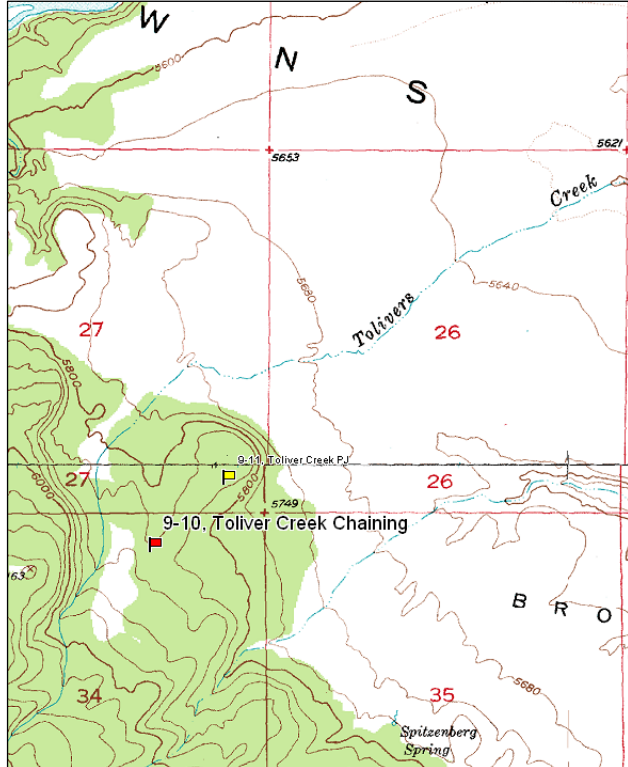
Transect bearing: 189° magnetic

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

Directions:

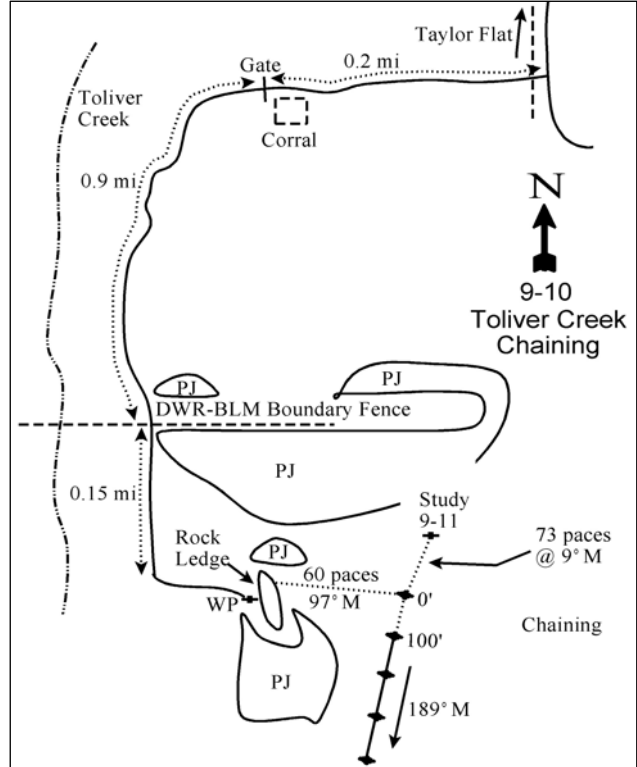
From the north side of the Green River at the Taylor Flat bridge, go south across the river 1.75 miles. Turn right and go through a gate. Go 0.2 miles to a gate by a corral. Continue south and west 0.7 miles to the DWR-BLM boundary fence. Go through the gate and continue 0.15 miles to the end of the road. There is a Pinyon and Juiper covered, rocky ledge about 75 feet east. From the ledge, walk 60 paces at 97°M into the chaining to a short green fencepost tagged #909 which marks the start of the frequency baseline.

Map Name: Warren Draw



Township: 2N Range: 24E Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 652548 E 4526066 N

TOLIVER CREEK CHAINING - TREND STUDY NO. 9-10

Site Information

Site Description: The study is located in the foothills above Taylor Flat in the Browns Park area. The study monitor's a large pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining completed during the fall of 1986. The area was two-way chained and seeded with grasses, forbs, and shrubs. The area was treated again by a lop and scatter that was completed in August of 2005, following the reading that year, as part of the Taylor Flat P/J Removal ([WRI Project #10](#)), which removed many of the small pinyon and juniper that had begun to reestablish on the site. This area is managed by the Bureau of Land Management as part of the Taylor Flat allotment. Pellet group transect data has estimated moderate use by deer since 2000. Estimated use by elk has fluctuated with light use in 2000, heavy use in 2005 and moderate use in 2010. Estimated use by cattle has been mostly light since 2000 (Table - Pellet Group Data).

Browse: Due to the shallow, rocky nature of the site, the control of pinyon and juniper by the chaining was close to 100%. Few seedlings were observed and none were sampled in the density plots of 1988. A few small pinyon and juniper trees had begun to reestablish on the site, but most of these were removed in the treatment between 2005 and 2010 (Table - Point-Quarter Tree Data). In general, browse species are not abundant on the site. The combined average cover for all browse species has been less than 5% in all sample years (Table - Browse Trends). Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), fourwing saltbush (*Atriplex canescens*) and rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) are found in low densities over the site, but provide limited forage. All three of these species displayed light use, low decadence and good vigor in most of the sample years, but had a marked increase in utilization, decadence and poor vigor in 2010. Recruitment of young mountain big sagebrush plants was very good at the outset of the study, as the population reestablished, and has been good since 2000. Fourwing saltbush also had excellent recruitment early in the study, but has had no new recruitment of young plants since 2000. Other species found include prickly pear cactus (*Opuntia* sp.) and broom snakeweed (*Gutierrezia sarothrae*). Broom snakeweed appeared to be expanding on the site in the initial years of the study, but decreased substantially in 2005 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are dominated by two introduced species, the seeded species crested wheatgrass (*Agropyron cristatum*) and the annual species cheatgrass (*Bromus tectorum*). Crested wheatgrass steadily increased in nested frequency from 1988 to 2000, but has remained stable since that time. Cheatgrass has fluctuated in frequency and cover, but has often been the dominant grass species on the site. There is a good mixture of introduced and native perennial grass species present, but most remain infrequent. These species include intermediate wheatgrass (*Agropyron intermedium*), blue bunch wheatgrass (*A. spicatum*), bottlebrush squirreltail (*Sitanion hystrix*), orchard grass (*Dactylis glomerata*), needle-and-thread (*Stipa comata*) and Sandberg bluegrass (*Poa secunda*). Perennial forbs decreased in 2000 and have been scarce on the site since. The seeded species alfalfa (*Medicago sativa*) was fairly common at the outset of the study, but has not been sampled since 2000 (Table - Herbaceous Trends).

Soil: The soil is a sandy loam with a neutral soil reaction (pH 7.3) (Table - Soil Analysis Data). The site is very rocky with large rocks providing a high amount of cover. Bare ground is moderately low, though it has been higher in years when cheatgrass was not as prevalent (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence and poor vigor remained low in the mountain big sagebrush and fourwing saltbush populations. It appeared, both species

populations began to establish as the density of mature plants increased, but recruitment of young plants remained very high.

- **1995 to 2000 - slightly up (+1):** The density of mountain big sagebrush increased by 37% from 380 plants/acre to 520 plants/acre and cover increased slightly, though cover remained less than 1%. The population was mostly mature, but recruitment of young plants remained good at 12%.
- **2000 to 2005 - slightly down (-1):** There was a 23% decrease in the density of mountain big sagebrush to 400 plants/acre, but cover increased slightly to 2% as the population matures.
- **2005 to 2010 - slightly down (-1):** Density and cover of mountain big sagebrush and fourwing saltbush remained similar, but decadence and poor vigor increased substantially in both species. Decadence increased from 0% to 10% and poor vigor increased from 0% to 43% in sagebrush. Decadence increased from 0% to 60% and poor vigor increased from 0% to 80% in fourwing. Decadence and poor vigor also increased substantially in rubber rabbitbrush.

Grass:

- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 10%. Cheatgrass increased significantly in nested frequency and was the dominant species on the site.
- **1995 to 2000 - up (+2):** The perennial grass sum of nested frequency increased by 42% and cover increased from 6% to 11%. Much of this increase was due to a significant increase in the nested frequency of crested wheatgrass. Cheatgrass decreased significantly in nested frequency and cover decreased from 23% to 5%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased to 17% due to a large increase in the cover of crested wheatgrass. Cheatgrass decreased significantly in nested frequency and cover decreased to less than 1%.
- **2005 to 2010 - down (-2):** There was only a 9% decrease in the sum of nested frequency of perennial grasses and cover decreased to 15%. However, cheatgrass increased significantly in nested frequency and cover increased to 19%. Cheatgrass was again the dominant species on the site.

Forb:

- **1988 to 1995 - up (+2):** There was a two-fold increase in the sum of nested frequency of perennial forbs.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 76% and cover decreased from 3% to less than 1%. No seeded forb species were sampled.
- **2000 to 2005 - stable (0):** Perennial forbs changed little in sum of nested frequency or cover and remained rare on the site.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased and perennial forbs were very rare on the site.

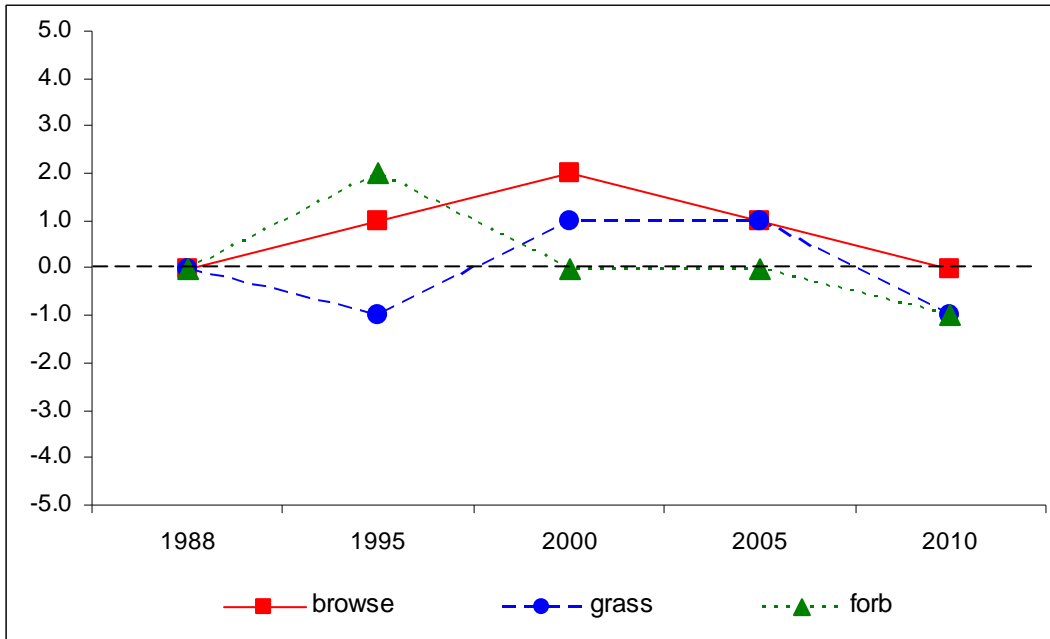
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 9, study no: 10

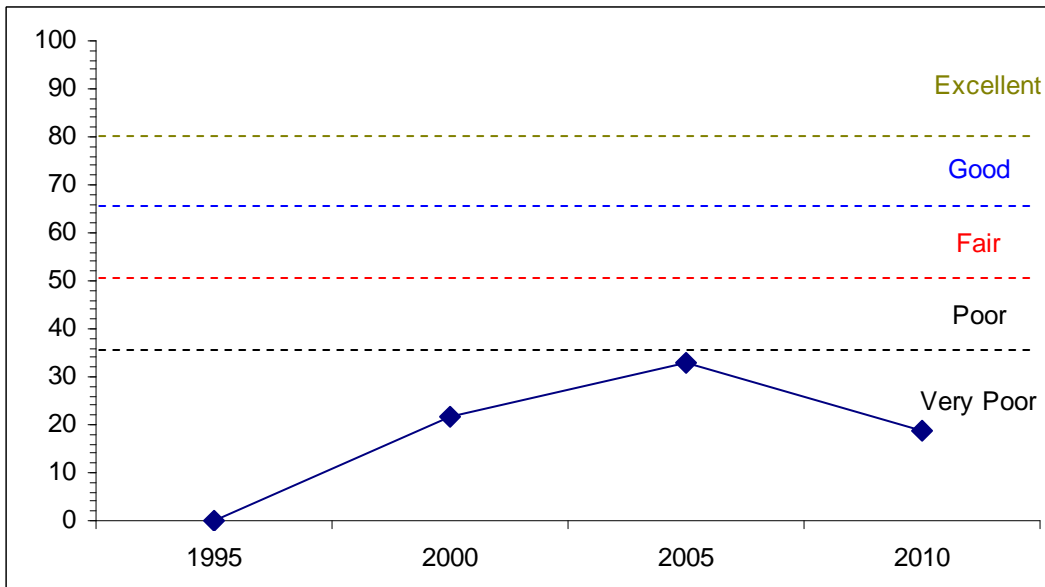
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	0.6	0.0	0.0	11.6	-17.2	5.2	0.0	0.2	Very Poor
00	2.2	0.0	0.0	22.5	-3.6	0.5	0.0	21.6	Very Poor
05	2.5	0.0	0.0	30.0	-0.4	0.7	0.0	32.8	Very Poor
10	2.9	0.0	0.0	30.0	-14.6	0.2	0.0	18.6	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 10



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 9, Study no: 10



HERBACEOUS TRENDS--
Management unit 09, Study no: 10

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	a ₈₄	b ₁₆₅	c ₂₄₈	c ₂₅₇	c ₂₅₃	4.30	9.80	16.05	13.81
G	Agropyron intermedium	3	25	21	15	22	.55	.38	.31	.44
G	Agropyron spicatum	a ⁻	a ₄	b ₂₅	a ⁻	a ₁	.03	.17	-	.15
G	Aristida purpurea	a ⁻	a ⁻	a ⁻	b ₉	ab ₆	.03	-	.12	.33
G	Bromus tectorum (a)	c ₂₁₀	e ₃₆₃	b ₁₄₇	a ₆₂	d ₂₈₆	22.82	4.74	.34	19.27
G	Dactylis glomerata	c ₇₃	ab ₁₆	b ₂₂	a ⁻	a ₂	.16	.71	.00	.03
G	Oryzopsis hymenoides	b ₁₇	a ⁻	a ₂	ab ₆	ab ₅	-	.03	.06	.07
G	Poa secunda	11	1	6	6	3	.00	.01	.01	.00
G	Sitanion hystrix	b ₃₃	a ⁻	a ⁻	b ₂₀	a ⁻	.00	-	.38	-
G	Sporobolus cryptandrus	2	6	1	5	10	.01	.00	.15	.22
G	Stipa comata	a ⁻	b ₂₀	b ₁₁	b ₁₄	a ⁻	.69	.11	.14	-
G	Unknown grass - perennial	b ₃₉	a ⁻	a ⁻	a ⁻	a ⁻	-	-	-	-
G	Vulpia octoflora (a)	-	a ₂₂	a ₄	c ₆₁	b ₁₈	.06	.01	.18	.12
Total for Annual Grasses		210	385	151	123	304	22.89	4.75	0.51	19.40
Total for Perennial Grasses		262	237	336	332	302	5.79	11.23	17.24	15.06
Total for Grasses		472	622	487	455	606	28.68	15.98	17.76	34.46
F	Calochortus nuttallii	-	5	-	-	-	.01	-	-	-
F	Chenopodium album (a)	b ₇	a ⁻	a ⁻	b ₆	a ⁻	-	-	.02	-
F	Chenopodium leptophyllum(a)	b ₂₂	a ⁻	a ⁻	a ₄	a ⁻	-	-	.01	-
F	Collinsia parviflora (a)	-	-	-	2	-	-	-	.01	-
F	Cymopterus longipes	-	3	4	1	-	.01	.01	.01	-
F	Descurainia pinnata (a)	b ₁₉	b ₂₀	a ⁻	b ₁₆	a ⁻	.44	-	.08	-
F	Draba reptans (a)	a ₇	b ₈₃	a ⁻	a ₃	a ⁻	.23	-	.01	-
F	Erodium cicutarium (a)	-	b ₂₆	a ₆	c ₄₆	a ⁻	.41	.01	1.87	-
F	Gilia sp. (a)	-	b ₁₈	a ⁻	b ₁₅	a ⁻	.05	-	.04	-
F	Lactuca serriola	a ⁻	b ₇₀	a ⁻	a ⁻	a ⁻	.30	-	-	-
F	Lappula occidentalis (a)	-	1	-	-	2	.00	-	-	.00
F	Lepidium densiflorum (a)	-	7	-	2	3	.01	-	.03	.00
F	Leucelele ericoides	b ₃₇	b ₄₀	ab ₂₄	a ₂₃	a ₁₄	.73	.18	.06	.07
F	Machaeranthera canescens	-	4	-	3	-	.01	-	.00	-
F	Medicago sativa	b ₂₄	a ₉	a ⁻	a ⁻	a ⁻	.34	-	-	-
F	Melilotus officinalis	-	7	-	-	-	.21	-	-	-
F	Phlox hoodii	-	6	1	-	-	.06	.00	-	-
F	Sanguisorba minor	5	-	-	-	-	-	-	-	-
F	Sisymbrium altissimum (a)	-	b ₅₀	a ₂	a ₂	a ⁻	.48	.00	.02	-
F	Sphaeralcea coccinea	a ⁻	c ₂₃	bc ₁₃	c ₂₆	ab ₃	.71	.05	.28	.03
F	Tragopogon dubius	-	6	-	-	-	.04	-	-	-
F	Unknown forb-annual (a)	7	-	-	-	-	-	-	-	-
F	Unknown forb-perennial	9	3	-	-	-	.15	-	-	-
Total for Annual Forbs		62	205	8	96	5	1.64	0.01	2.10	0.00
Total for Perennial Forbs		75	176	42	53	17	2.59	0.24	0.36	0.11
Total for Forbs		137	381	50	149	22	4.24	0.26	2.46	0.12

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

BROWSE TRENDS--

Management unit 09, Study no: 10

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata vaseyana	6	8	8	8	.33	.98	1.46	1.57
B	Atriplex canescens	5	5	5	5	.15	.66	.51	.78
B	Chrysothamnus depressus	0	3	0	0	-	.15	-	-
B	Chrysothamnus nauseosus hololeucus	3	5	5	3	.41	-	.33	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	0	0	-	-	-	-
B	Echinocereus sp.	0	1	3	2	-	-	.18	.15
B	Gutierrezia sarothrae	35	32	14	3	1.61	.38	.07	.03
B	Juniperus osteosperma	0	5	6	2	.96	.73	1.81	.03
B	Opuntia sp.	21	27	24	27	.57	.25	.27	.43
B	Pinus edulis	0	1	1	0	-	-	-	-
Total for Browse		70	88	66	50	4.03	3.16	4.66	3.00

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 10

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	1.66	1.10
Atriplex canescens	1.10	.46
Chrysothamnus nauseosus hololeucus	1.61	.45
Echinocereus sp.	.18	.20
Gutierrezia sarothrae	.20	-
Juniperus osteosperma	2.65	.21
Opuntia sp.	.55	.78

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 10

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	4.0	1.4
Atriplex canescens	5.2	3.5

POINT-QUARTER TREE DATA--

Management unit 09, Study no: 10

Species	Trees per Acre			
	'95	'00	'05	'10
Juniperus osteosperma	8	38	35	26
Pinus edulis	-	12	-	18

Average diameter (in)			
'95	'00	'05	'10
3.4	2.4	2.1	1.1
-	1.5	-	-

BASIC COVER--

Management unit 09, Study no: 10

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	3.00	38.45	21.76	22.98	38.56
Rock	12.25	22.84	22.35	23.47	22.70
Pavement	1.50	.37	1.22	.59	.41
Litter	54.75	54.20	42.52	34.02	55.84
Cryptogams	0	.09	1.69	.72	1.26
Bare Ground	28.50	5.06	22.23	27.58	11.67

SOIL ANALYSIS DATA --

Management unit 9, Study no: 10, Study Name: Toliver Creek Chaining

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
7.4	7.3	69.4	17.0	13.6	4.5	14.3	288.0	0.9

PELLET GROUP DATA--

Management unit 09, Study no: 10

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	18	35	82	29	-	-	-
Elk	7	23	36	12	7 (17)	68 (167)	39 (96)
Deer	12	13	12	32	26 (65)	42 (103)	33 (81)
Cattle	3	5	3	3	2 (5)	20 (48)	3 (7)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 10

		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 vaseyana										
88	33	100	0	0	-	0	0	0	-/-	
95	380	74	26	0	120	11	0	0	13/16	
00	520	12	85	4	-	0	0	0	14/18	
05	400	15	85	0	-	15	10	0	22/31	
10	420	10	81	10	-	43	43	43	18/27	
Atriplex canescens										
88	133	100	0	0	133	0	0	0	-/-	
95	160	25	75	0	-	0	0	0	27/36	
00	120	0	100	0	-	17	0	0	28/37	
05	100	0	100	0	-	20	0	0	38/47	
10	100	0	40	60	-	40	60	80	32/37	

		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 depressus										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	33	67	-	-	0	0	0	2/8	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Chrysothamnus nauseosus hololeucus										
88	33	0	100	0	-	0	0	0	11/8	
95	60	0	100	0	-	0	0	0	28/31	
00	260	69	23	8	-	0	0	0	34/44	
05	100	20	80	0	-	0	0	0	36/47	
10	60	0	67	33	-	67	0	33	36/42	
Chrysothamnus viscidiflorus viscidiflorus										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Echinocereus sp.										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	2/3	
00	20	100	0	-	-	0	0	0	3/6	
05	80	0	100	-	-	0	0	0	3/6	
10	40	0	100	-	-	0	0	0	5/11	
Gutierrezia sarothrae										
88	199	0	100	0	-	0	0	0	4/6	
95	1920	5	95	0	80	0	0	0	11/17	
00	2120	1	90	9	-	0	0	50	4/7	
05	320	0	94	6	-	0	0	6	7/11	
10	160	63	38	0	-	0	0	0	5/6	
Juniperus osteosperma										
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	120	83	17	0	-	0	0	0	-/-	
05	120	33	67	0	-	0	0	0	-/-	
10	40	50	0	50	-	0	0	50	-/-	
Opuntia sp.										
88	1065	50	34	16	66	0	0	13	4/12	
95	560	4	96	0	-	0	0	0	3/12	
00	720	6	92	3	-	0	0	0	3/8	
05	760	0	100	0	40	0	0	0	3/10	
10	740	11	89	0	20	0	0	8	4/13	

		Age class distribution						Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)		
Pinus edulis											
88	0	0	0	-	-	0	0	0	-/-		
95	0	0	0	-	-	0	0	0	-/-		
00	20	100	0	-	-	0	0	0	-/-		
05	20	100	0	-	-	0	0	0	-/-		
10	0	0	0	-	-	0	0	0	-/-		

JOHN STARR FLAT - TREND STUDY NO. 9-13-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Ute Tribe

Elevation: 7378 ft. (2249 m)

Aspect: East

Slope: 12%

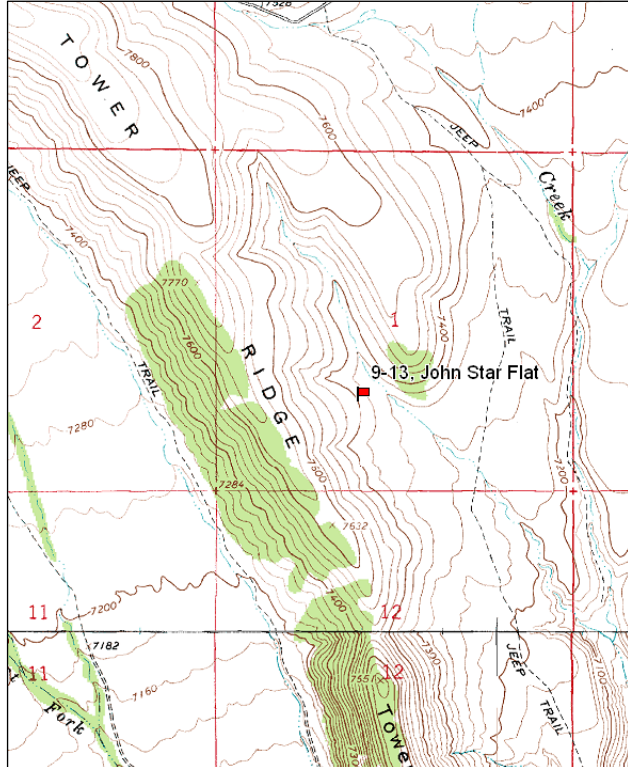
Transect bearing: 0'-100': 355° magnetic, 0'-400': 175° magnetic

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

Directions:

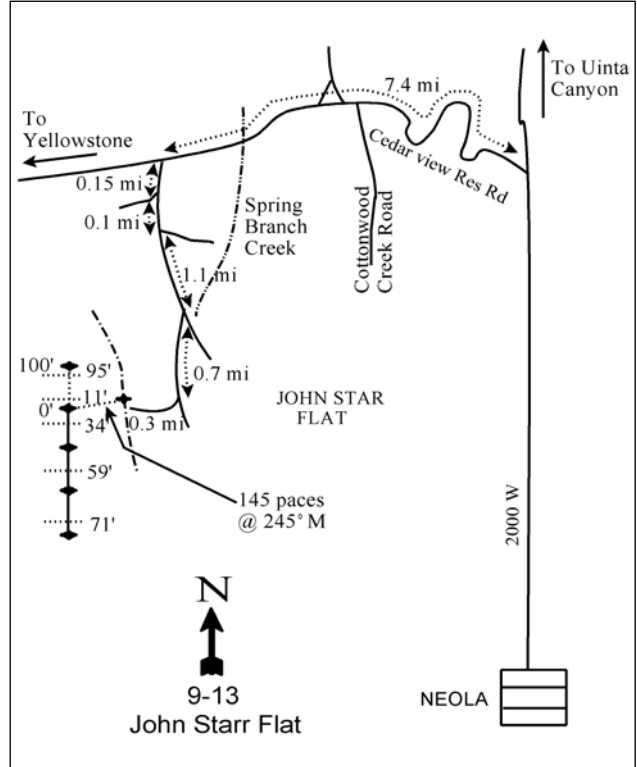
From Neola, drive north to a major fork. Turn left, west, (right fork goes to Uinta Canyon) and travel toward Yellowstone for 7.4 miles on the main road. At this point, turn left (south). Go 0.15 miles to a small fork and stay left. Continue 0.1 miles to another fork and bear right. Proceed 1.1 miles to a major fork and continue on the right fork for 0.7 miles. At the next fork turn right toward the hills to the west. Proceed 0.3 miles to the end of the road near a gully. From the end of the road, the 0-foot baseline stake is located 145 paces away at 245°M. Browse tag #7020 is on the 0-foot baseline stake.

Map Name: Heller Lake



Township: 1N Range: 3W Section: 1

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 569913 E 4484610 N

JOHN STARR FLAT - TREND STUDY NO. 9-13

Site Information

Site Description: This study is located at the northwest edge of John Starr Flat near the base of Tower Ridge. The area is within the Ute Indian Reservation and the study was established with assistance of a tribal biologist. The study is on crucial winter range for both deer and elk with domestic livestock grazing during the remainder of the year. Pellet group transect data estimated moderately heavy use by deer in 2000 with lighter use in 2005 and 2010. Estimated elk use was light in 2000 and 2010 with moderately heavy use in 2005. Cattle use appears to be minimal on this site (Table - Pellet Group Data). A group of elk were observed near the site in the summer of 2005.

Browse: There is a good mixture of a wide variety of preferred browse species on the site. The key browse species is true mountain mahogany (*Cercocarpus montanus*), which provides the highest amount of cover of any browse species (Table - Browse Trends). Other prevalent preferred browse species include Utah serviceberry (*Amelanchier utahensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*A. nova*). A small number of antelope bitterbrush (*Purshia tridentata*) are also scattered over the site. The true mountain mahogany is comprised of a mixture of heavily used young and mature plants with low decadence and good vigor. The plants are typically smaller, averaging just over 2 feet in height. Serviceberry is also comprised of mostly smaller plants with a few large plants scattered over the site. Utilization of serviceberry has been moderate to heavy. Decadence has been mostly low in the serviceberry population, but was high in 2005. Mountain big sagebrush and black sagebrush have moderately dense stands with mostly moderate use. Decadence of black sagebrush has been generally low with high decadence in 1988. Decadence of mountain big sagebrush has been moderately high throughout the course of the study. The small population of bitterbrush has a prostrate growth form that has displayed moderate to very heavy use over the sample years. There is also a moderately dense population of lightly used snowberry (*Symphoricarpos oreophilus*), but most plants are found growing in the shelter of other shrubs. Brittle pricklypear cactus (*Opuntia fragilis*) is abundant, but has fluctuated in density throughout the sample years (Table - Browse Characteristics).

Herbaceous Understory: Grasses are fairly diverse, but are only moderately abundant for this high potential site. Prevalent perennial grass species include needle-and-thread (*Stipa comata*), bluebunch wheatgrass (*Agropyron spicatum*), sedge (*Carex* sp.) and Indian ricegrass (*Oryzopsis hymenoides*). Cheatgrass has fluctuated over the study years, but has also been prevalent on the site at times. Forbs are especially diverse with the dominant perennial species being Hooker balsamorhiza (*Balsamorhiza hookeri*), helianthella (*Helianthella microcephala*) and rock goldenrod (*Petradoria pumila*). Annual forbs have been common in years of high precipitation, but have been rare in other sample years (Table - Herbaceous Trends).

Soil: The soils are a sandy loam with a neutral soil reaction (pH 6.7). Phosphorus may have limited availability for plant growth and development at 4.1 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is low with abundant vegetation and litter cover. Rock and pavement cover is also relatively high on the site (Table - Basic Cover). The soil erosion condition was classified as stable in 2010, but was slight in 2005 because of the formation of pedestals around plants and slight litter and soil movement.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** There was an increase in density of many of the preferred browse species on the site. Density of true mountain mahogany increased substantially due to a large increase in the recruitment of young plants.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Poor vigor of true mountain

mahogany decreased from 20% to 0% and decadence decreased from 8% to 1%. Recruitment of young plants decreased, but was still excellent at 22% of the population.

- **1995 to 2000 - stable (0):** There was little change in the density or cover of true mountain mahogany. Poor vigor increased to 16% and decadence to 6%, but recruitment of young mahogany plants remained very good at 21%.
- **2000 to 2005 - down (-2):** The key browse species, true mountain mahogany, decreased in density by 26% from 3,260 plants/acre to 2,420 plants/acre, with a slight decrease in cover. Decadence increased to 16%, but poor vigor decreased to 6%. Recruitment remained good at 20% of the population.
- **2005 to 2010 - stable (0):** There was a slight increase in the density of true mountain mahogany to 2,640 plants/acre, but cover decreased slightly from 10% to 8%. Decadence decreased to 2% and recruitment of young plants increased to 27% of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial grasses decreased by 53%.
- **1995 to 2000 - up (+2):** The perennial grass sum of nested frequency increased by 27%, but remained well below 1988 levels. Cover of perennial grasses increased from 4% to 15%. Cheatgrass decreased significantly in nested frequency and was rare on the site.
- **2000 to 2005 - slightly down (-1):** There was little change in the sum of nested frequency of perennial grasses, but cover decreased to 11%. Cheatgrass increased significantly in nested frequency and cover increased to nearly 4%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 17%, though cover remained similar. Cheatgrass decreased significantly in nested frequency and cover decreased to less than 1%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 10%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 33% despite an increase in cover from 7% to 10%. Hooker balsamroot decreased significantly in nested frequency.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover increased slightly to 11%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 17% and cover decreased to 7%.

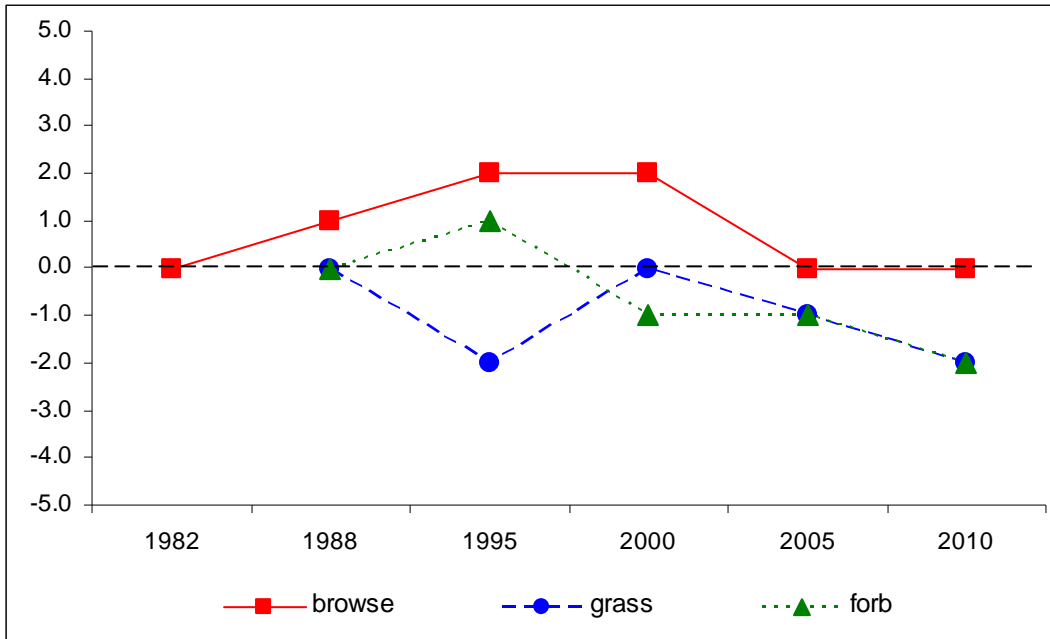
DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

Management unit 9, study no: 13

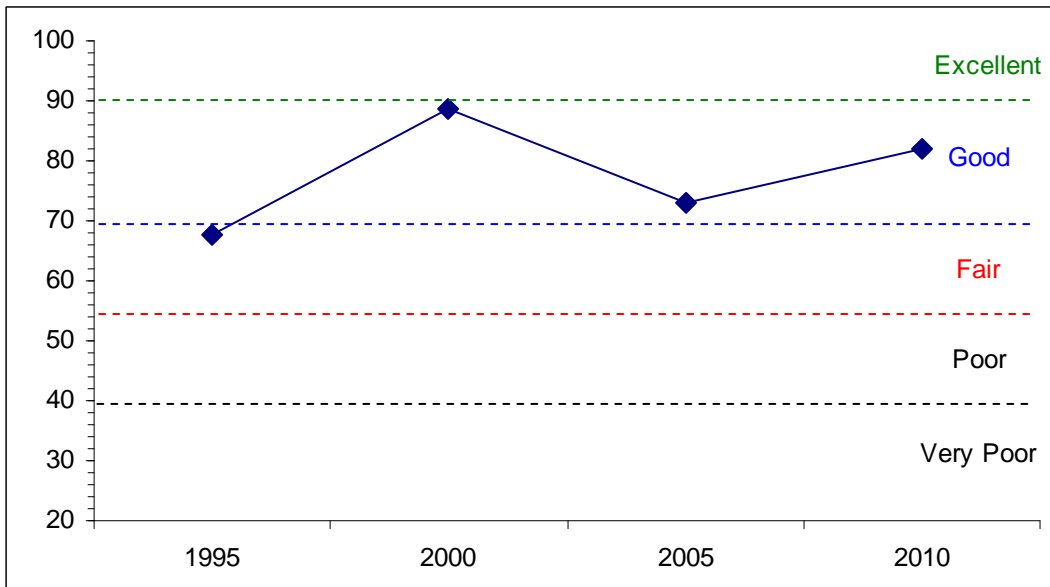
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	27.2	13.1	10.9	7.5	-1.0	10.0	0.0	67.7	Fair
00	30.0	11.3	8.2	29.1	0.0	10.0	0.0	88.6	Good-Excellent
05	28.2	8.2	6.8	22.7	-2.7	10.0	0.0	73.1	Good
10	28.1	13.4	9.6	21.2	-0.3	10.0	0.0	81.9	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 13



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 9, Study no: 13



HERBACEOUS TRENDS--
Management unit 09, Study no: 13

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	-	-	-	6	-	-	-	.03	-
G	Agropyron spicatum	c125	b67	b73	ab50	a33	.66	2.08	1.52	1.81
G	Bouteloua gracilis	12	4	9	11	5	.03	.33	.22	.44
G	Bromus tectorum (a)	-	b61	a14	c145	b57	1.28	.06	3.60	.46
G	Carex sp.	93	110	94	98	70	1.67	3.58	2.66	1.80
G	Koeleria cristata	5	-	5	4	5	-	.30	.20	.30
G	Oryzopsis hymenoides	a7	ab21	ab24	c62	b38	.36	.78	2.17	.90
G	Poa fendleriana	a-	a-	a2	ab5	c16	-	.00	.09	.15
G	Poa secunda	c171	a3	b29	ab9	a6	.00	.51	.04	.01
G	Sitanion hystrix	b59	a22	a17	ab41	ab26	.18	.31	.44	.16
G	Stipa comata	c175	a76	bc132	ab116	bc134	.85	6.64	3.95	5.01
Total for Annual Grasses		0	61	14	145	57	1.28	0.06	3.60	0.46
Total for Perennial Grasses		647	303	385	402	333	3.77	14.57	11.34	10.60
Total for Grasses		647	364	399	547	390	5.05	14.64	14.94	11.07
F	Agoseris glauca	-	-	-	3	6	-	-	.15	.01
F	Allium sp.	-	-	-	2	4	-	-	.02	.01
F	Antennaria rosea	b8	a-	a-	a-	a-	-	-	-	-
F	Arabis sp.	a3	b45	a1	a6	a-	.16	.00	.04	-
F	Arenaria congesta	-	-	1	-	4	-	.00	-	.01
F	Artemisia ludoviciana	6	21	17	2	9	.15	.28	.01	.09
F	Astragalus convallarius	7	6	1	-	-	.04	.01	-	-
F	Astragalus spatulatus	2	1	-	1	-	.03	-	.03	-
F	Balsamorhiza hookeri	b155	b123	b117	a68	a53	1.11	2.79	2.30	.94
F	Balsamorhiza sagittata	-	-	-	1	-	-	-	.03	-
F	Calochortus nuttallii	a6	a3	a	b31	a3	.00	.00	.10	.01
F	Castilleja linariaefolia	a-	b26	a2	a-	a-	.13	.03	-	-
F	Chenopodium leptophyllum(a)	-	b22	a7	a4	a-	.05	.02	.01	-
F	Collinsia parviflora (a)	-	-	-	8	-	-	-	.04	-
F	Collomia linearis (a)	-	d133	a1	c99	b10	.80	.00	.66	.22
F	Comandra pallida	b43	a13	ab34	a15	ab22	.14	.32	.15	.16
F	Crepis acuminata	a-	ab4	a1	b11	a-	.03	.00	.27	-
F	Cryptantha sp.	ab15	c37	a3	bc40	ab19	.27	.03	.29	.16
F	Cymopterus longipes	ab7	ab6	ab9	b21	a3	.02	.09	.22	.01
F	Delphinium nuttallianum	-	-	-	6	-	-	-	.02	-
F	Descurainia pinnata (a)	-	b19	a-	b16	a-	.04	-	.07	-
F	Draba sp. (a)	-	b58	a-	b31	a-	.11	-	.07	-
F	Erigeron flagellaris	b21	ab14	a4	a-	a1	.02	.03	-	.00
F	Erigeron pumilus	ab2	ab12	b17	a1	ab6	.03	.19	.00	.09
F	Eriogonum umbellatum	ab5	b13	ab9	a-	a3	.08	.10	-	.03
F	Gilia sp. (a)	-	-	-	4	-	-	-	.00	-
F	Helianthella microcephala	58	76	76	52	56	1.40	1.12	1.75	1.44
F	Heuchera parvifolia	4	5	-	-	-	.01	-	-	-
F	Hymenoxys acaulis	-	1	-	2	3	.00	-	.03	.00

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Lappula occidentalis</i> (a)	-	_b 104	_a 2	_b 137	_a 6	.51	.00	.54	.01
F	<i>Lepidium densiflorum</i> (a)	-	_c 174	_a -	_b 143	_a 8	1.28	-	.45	.02
F	<i>Linum lewisii</i>	-	5	-	5	-	.01	-	.03	-
F	<i>Lithospermum ruderales</i>	_b 15	_a 3	_a 1	_a 3	_a -	.04	.03	.15	-
F	<i>Lychnis drummondii</i> <i>drummondii</i>	3	3	-	-	-	.03	-	-	-
F	<i>Machaeranthera grindelioides</i>	14	18	24	24	19	.39	.73	.77	.76
F	<i>Orobancha</i> sp.	-	3	-	-	-	.00	-	-	-
F	<i>Penstemon caespitosus</i>	_b 12	_a -	_{ab} 1	_a -	_a -	-	.00	-	-
F	<i>Penstemon humilis</i>	_c 35	_{bc} 14	_a -	_b 13	_b 11	.09	-	.13	.18
F	<i>Penstemon</i> sp.	-	-	-	-	2	-	-	-	.15
F	<i>Petrorhiza pumila</i>	46	60	57	47	45	1.45	3.11	3.10	1.68
F	<i>Phlox longifolia</i>	_c 72	_{bc} 51	_a 30	_b 36	_a 2	.19	.18	.17	.00
F	<i>Polygonum douglasii</i> (a)	-	_c 79	_a 1	_b 46	_a -	.35	.00	.10	-
F	<i>Schoenocrambe linifolia</i>	_a -	_b 57	_a 7	_b 54	_b 74	.43	.01	.36	.83
F	<i>Sedum lanceolatum</i>	_b 55	_a 22	_a 14	_a 9	_a 20	.16	.05	.05	.06
F	<i>Senecio multilobatus</i>	_b 8	_{ab} 3	_{ab} 2	_{ab} 3	_a -	.63	.00	.03	-
F	<i>Sphaeralcea coccinea</i>	12	21	10	16	20	.19	.39	.26	.19
F	<i>Tragopogon dubius</i>	4	-	3	-	-	-	.00	-	-
F	<i>Zigadenus elegans</i>	_a -	_b 12	_b 10	_c 23	_{bc} 26	.02	.05	.22	.21
Total for Annual Forbs		0	589	11	488	24	3.15	0.03	1.96	0.25
Total for Perennial Forbs		618	678	454	495	411	7.33	9.62	10.74	7.07
Total for Forbs		618	1267	465	983	435	10.48	9.66	12.70	7.32

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

BROWSE TRENDS--

Management unit 09, Study no: 13

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	20	35	25	26	1.33	5.81	2.82	4.19
B	Artemisia frigida	0	8	8	10	-	.06	.18	.10
B	Artemisia nova	38	40	35	37	1.24	2.92	2.15	3.07
B	Artemisia tridentata vaseyana	38	41	49	46	5.35	3.95	5.09	4.55
B	Cercocarpus montanus	85	80	77	77	10.75	10.21	9.60	7.96
B	Chrysothamnus depressus	3	2	1	1	.06	.03	.00	-
B	Chrysothamnus nauseosus graveolens	0	1	0	1	-	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	12	12	13	7	.68	.39	.36	.24
B	Eriogonum corymbosum	1	0	2	3	-	.00	.00	.03
B	Gutierrezia sarothrae	12	8	26	35	.56	.40	.55	1.27
B	Juniperus osteosperma	0	2	2	4	.85	1.00	1.68	.63
B	Opuntia fragilis	72	68	75	66	1.28	1.51	1.68	1.31
B	Pediocactus simpsonii	2	9	3	3	-	.00	.00	-
B	Pinus edulis	0	1	1	1	.00	-	.30	.53
B	Purshia tridentata	9	5	4	6	.49	.36	.21	.15
B	Symphoricarpos oreophilus	9	15	16	16	.45	1.88	2.05	1.63
B	Tetradymia canescens	5	2	2	2	-	.03	-	-
Total for Browse		306	329	339	341	23.08	28.61	26.75	25.70

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 13

Species	Percent Cover		
	'00	'05	'10
Amelanchier utahensis	-	3.68	4.61
Artemisia frigida	-	.05	.36
Artemisia nova	-	3.38	2.83
Artemisia tridentata vaseyana	-	5.73	7.51
Cercocarpus montanus	-	14.31	13.71
Chrysothamnus viscidiflorus lanceolatus	-	.55	.05
Eriogonum corymbosum	-	.06	-
Gutierrezia sarothrae	-	1.66	2.56
Juniperus osteosperma	2.00	2.83	3.45
Opuntia fragilis	-	.88	1.23
Pinus edulis	-	.70	.81
Purshia tridentata	-	1.01	.78
Symphoricarpos oreophilus	-	1.96	1.66
Tetradymia canescens	-	.20	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 13

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	2.4	1.4
Cercocarpus montanus	4.5	1.7

BASIC COVER--

Management unit 09, Study no: 13

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	12.50	7.50	41.08	48.65	50.09	44.62
Rock	2.00	4.75	9.96	12.08	12.89	11.55
Pavement	2.50	2.50	1.25	4.17	2.76	4.38
Litter	69.50	68.75	46.87	46.81	37.80	45.27
Cryptogams	.75	.75	.23	.21	.50	.01
Bare Ground	12.75	15.75	13.88	17.58	13.75	12.19

SOIL ANALYSIS DATA --

Management unit 9, Study no: 13, Study Name: John Starr Flat

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
7.6	6.7	67.4	16.0	16.6	3.8	4.1	134.4	0.8

PELLET GROUP DATA--

Management unit 09, Study no: 13

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	8	21	23	2
Elk	10	15	21	11
Cattle	-	-	-	-
Deer	23	19	18	13

Days use per acre (ha)		
'00	'05	'10
-	-	-
20 (50)	47 (116)	18 (45)
-	2 (4)	-
46 (114)	17 (43)	25 (63)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 13

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>Amelanchier utahensis</i>									
82	333	0	100	0	-	100	0	0	24/24
88	532	63	37	0	-	50	13	0	26/25
95	640	28	72	0	-	41	13	0	24/32
00	1060	15	74	11	60	28	45	17	32/37
05	660	6	45	48	-	33	58	12	28/37
10	900	24	76	0	-	38	24	0	25/32
<i>Artemisia frigida</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	220	0	100	-	-	0	0	0	9/11
05	380	0	100	-	20	0	0	0	9/8
10	460	0	100	-	-	48	0	0	12/11
<i>Artemisia nova</i>									
82	2066	16	84	0	66	52	0	0	12/17
88	4131	29	40	31	266	18	2	8	14/15
95	1560	17	79	4	40	51	15	1	9/15
00	2260	4	80	16	260	5	4	8	9/15
05	1640	1	95	4	20	39	13	1	9/15
10	2040	2	96	2	-	34	30	2	9/16
<i>Artemisia tridentata vaseyana</i>									
82	0	0	0	0	-	0	0	0	-/-
88	265	75	0	25	133	0	0	0	-/-
95	1380	22	58	20	300	49	17	13	21/33
00	1520	18	51	30	-	26	5	13	26/29
05	1460	12	58	30	-	14	11	11	17/26
10	1580	13	70	18	-	48	27	6	18/26
<i>Cercocarpus montanus</i>									
82	2865	21	74	5	-	65	7	0	21/27
88	4997	60	32	8	799	43	23	20	30/36
95	3580	22	77	1	180	60	30	0	27/38
00	3260	21	73	6	-	23	64	16	27/39
05	2420	20	64	16	-	19	69	6	29/39
10	2640	27	71	2	40	42	42	.75	25/37

		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 depressus										
82	0	0	0	0	-	0	0	0	-/-	
88	332	0	80	20	-	0	0	0	4/6	
95	60	0	100	0	-	0	0	0	7/13	
00	60	0	100	0	20	0	67	0	7/13	
05	20	0	100	0	-	0	0	0	3/8	
10	20	0	100	0	-	0	0	0	-/-	
Chrysothamnus nauseosus graveolens										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	0	100	-	-	0	100	0	-/-	
05	0	0	0	-	-	0	0	0	21/18	
10	20	0	100	-	-	0	0	0	17/21	
Chrysothamnus viscidiflorus lanceolatus										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	400	5	95	0	-	0	5	0	14/17	
00	320	0	100	0	-	6	0	0	14/21	
05	400	10	85	5	-	0	0	0	14/20	
10	160	0	100	0	-	0	0	0	15/19	
Eriogonum corymbosum										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	80	0	100	-	-	0	0	0	8/10	
10	60	100	0	-	-	0	0	0	9/14	
Gutierrezia sarothrae										
82	66	0	100	0	-	0	0	0	9/9	
88	799	0	92	8	-	0	0	8	8/6	
95	400	0	95	5	60	0	0	0	9/10	
00	880	0	95	5	-	0	0	0	6/8	
05	1660	2	98	0	-	0	0	0	10/11	
10	2000	1	98	1	-	0	0	1	9/10	
Juniperus osteosperma										
82	66	0	100	-	-	0	0	0	47/39	
88	66	0	100	-	-	0	0	0	53/55	
95	0	0	0	-	-	0	0	0	-/-	
00	40	50	50	-	-	0	0	0	-/-	
05	40	100	0	-	-	0	0	0	-/-	
10	80	50	50	-	20	0	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Opuntia fragilis									
82	2333	0	100	0	-	0	0	0	2/7
88	12131	35	49	16	1533	0	0	10	2/6
95	5440	11	89	0	60	0	0	0	3/8
00	6620	4	93	2	200	.30	0	.60	2/6
05	6260	3	97	1	-	0	0	.95	2/7
10	3540	3	97	0	-	0	0	3	2/8
Pediocactus simpsonii									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	0	100	-	-	0	0	0	2/3
00	300	0	100	-	-	0	0	0	2/3
05	120	50	50	-	-	0	0	0	2/3
10	100	40	60	-	-	0	0	0	2/4
Pinus edulis									
82	0	0	0	-	-	0	0	0	-/-
88	66	100	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	100	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	-/-
Purshia tridentata									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	280	14	86	0	-	36	43	0	17/31
00	180	0	100	0	-	22	67	0	17/40
05	80	0	75	25	-	0	100	25	17/39
10	140	14	86	0	-	100	0	0	21/51
Symphoricarpos oreophilus									
82	1398	71	29	0	-	0	0	0	7/4
88	1132	77	23	0	-	0	0	29	9/14
95	320	19	81	0	40	19	13	0	13/26
00	860	14	86	0	-	2	0	0	8/16
05	860	0	98	2	-	0	0	2	10/17
10	1680	17	83	0	-	0	0	0	10/19
Tetradymia canescens									
82	266	0	100	0	-	75	25	25	13/14
88	199	67	33	0	-	33	0	0	7/10
95	160	13	75	13	-	63	25	0	9/13
00	40	0	0	100	-	50	50	0	16/17
05	40	0	100	0	-	50	0	0	6/15
10	40	0	100	0	-	50	0	0	6/11

MUD SPRING DRAW - TREND STUDY NO. 9-15-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Ute Tribe

Elevation: 7906 ft. (2410 m)

Aspect: East

Slope: 18%-30%

Transect bearing: 245° magnetic

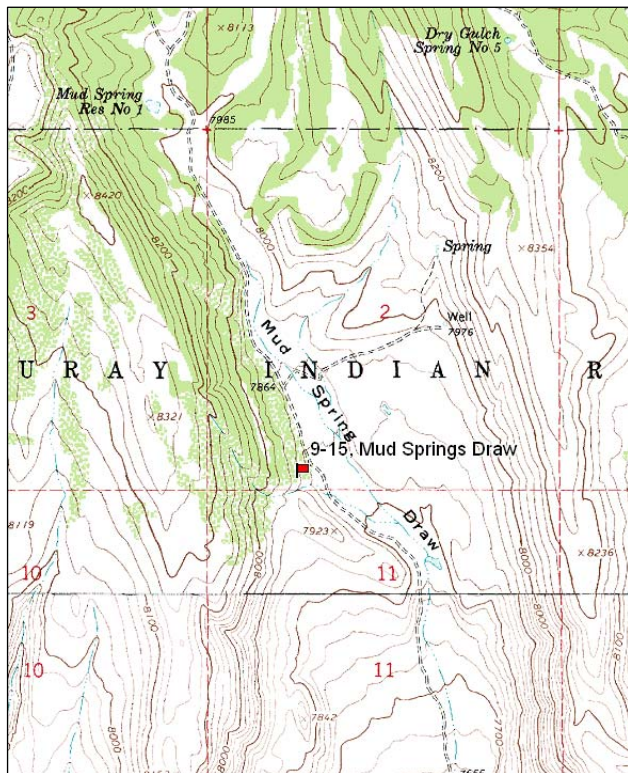
Belt placement: line 1 (7 & 96ft), line 2 (32ft), line 3 (50ft), line 4 (79ft).

Note: Soil sample needs to be collected.

Directions:

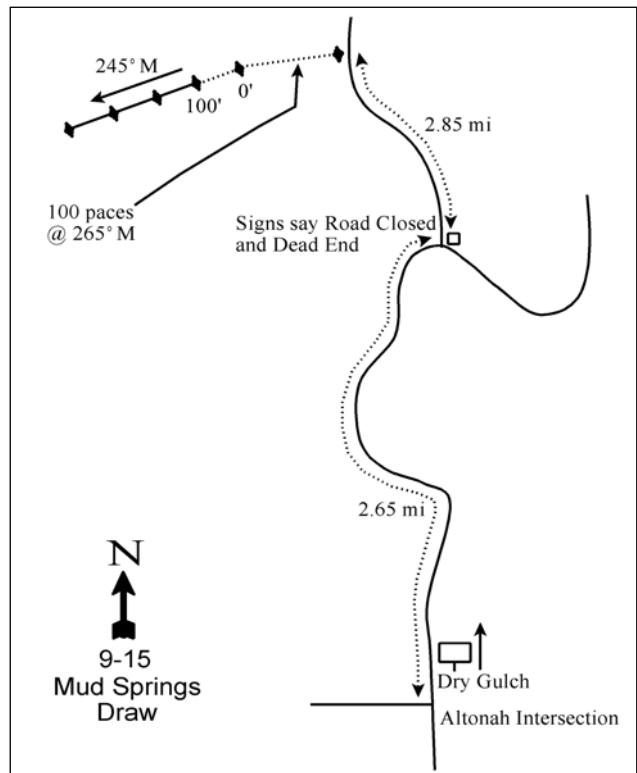
From the town of Altonah, proceed north for 2.0 miles to an intersection. Take the road which runs to the northwest for 2.65 miles until you come to another intersection. Go straight through the intersection and go up Mud Spring Draw for 2.85 miles to a red stake on the left side of the road. From the stake, the 0-foot baseline stake is 100 paces away, up the hill, at a bearing of 265°M. The 0-foot stake has a piece of wire wrapped around it.

Map Name: Burnt Mill Springs



Township: 1N Range: 4W Section: 11

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 558438 E 4483997 N

MUD SPRING DRAW - TREND STUDY NO. 9-15

Site Information

Site Description: This study is located within the Ute Indian Reservation in Mud Spring Draw. The site was not read in 2000 due to a road closure. Pellet group transect data has estimated heavy use by elk since 2005. Estimated use by deer was moderate in 2005, with light use in 2010. Estimated cattle use has been light since 2005. Moose also appear to occasionally use the area (Table - Pellet Group Data).

Browse: The key browse species is true mountain mahogany (*Cercocarpus montanus*), which provides the majority of the browse cover on the site (Table - Browse Trends). The true mountain mahogany population is comprised of mostly mature plants that have displayed moderate to heavy hedging. Health of the population has been good over the course of the study with low decadence, good vigor and good recruitment of young plants. Other browse species include serviceberry (*Amelanchier utahensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*) and snowberry (*Symphoricarpos oreophilus*). Utilization of serviceberry and bitterbrush has been moderate to heavy and use of sagebrush has been mostly moderate. There was heavy use of sagebrush noted in 2010 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and quite abundant. Bluebunch wheatgrass (*Agropyron spicatum*), needle-and-thread (*Stipa comata*) and mutton bluegrass (*Poa fendleriana*) are the most abundant grass species. Cheatgrass (*Bromus tectorum*) was fairly common in 2005, but has been rare in other sample years. Forbs are diverse, but are not particularly abundant. Hooker balsamroot (*Balsamorhiza hookeri*) was the only common perennial forb species. At times, annual forbs have dominated the forb component, but annual forbs were rare in 2010 (Table - Herbaceous Trends).

Soil: Bare ground cover is low on the site. Abundant amounts of vegetation, litter and rock provide good protective ground cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** The density of true mountain mahogany, serviceberry and mountain big sagebrush all increased with an increase in the recruitment of young plants in all three species.
- **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 and poor vigor remained similar in true mountain mahogany, serviceberry and mountain big sagebrush. Recruitment of young plants decreased in mahogany, but remained good at 17%. Recruitment of young serviceberry plants also decreased to poor levels at 7% of the population.
- **1995 to 2005 - slightly down (-1):** The density of true mountain mahogany decreased by 17% from 3,600 plants/acre to 2,980 plants/acre, though cover increased from 15% to 20%. The density of mountain big sagebrush decreased by 76% from 500 plants/acre to 120 plants/acre, and cover decreased from 2% to less than 1%. There was no new recruitment of young sagebrush plants. The density of serviceberry remained similar, but cover increased from 2% to 4%.
- **2005 to 2010 - stable (0):** The density of true mountain mahogany remained similar, but cover decreased to 16%. Serviceberry density increased 45% from 580 plants/acre to 800 plants/acre, but cover remained similar. The density of mountain big sagebrush increased slightly, but cover remained similar.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.

- **1988 to 1995 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 17% with a significant decrease in the nested frequency of mutton bluegrass.
- **1995 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased from 9% to 15%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover increased to 17%.

Forb:

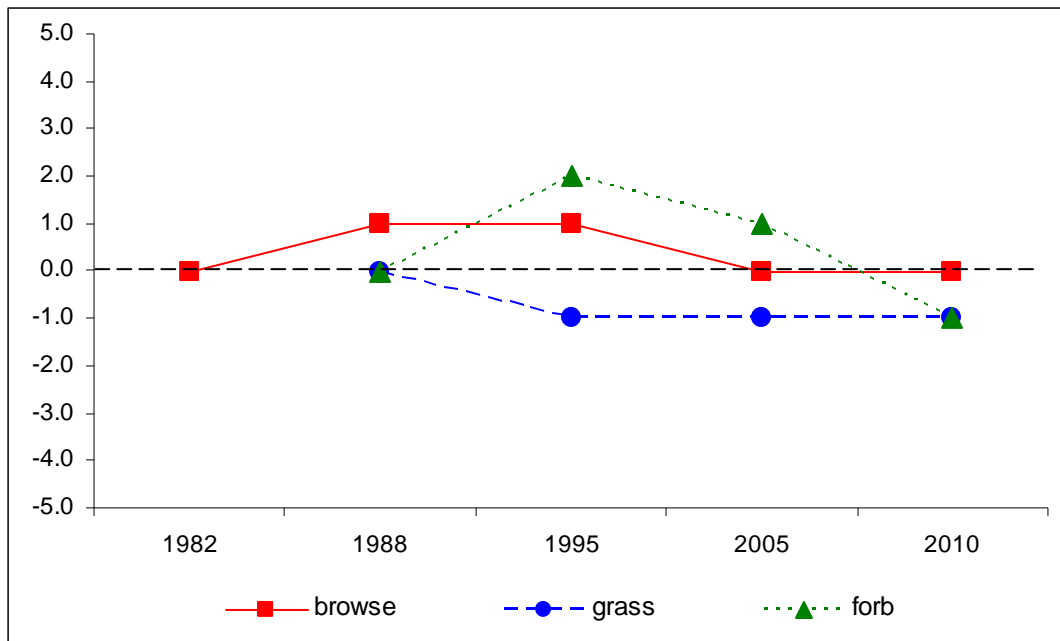
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 41%.
- **1995 to 2005 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 14%, but cover remained similar.
- **2005 to 2010 - down (-2):** There was a 34% decrease in the sum of nested frequency of perennial forbs, though cover remained similar.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
Management unit 9, study no: 15

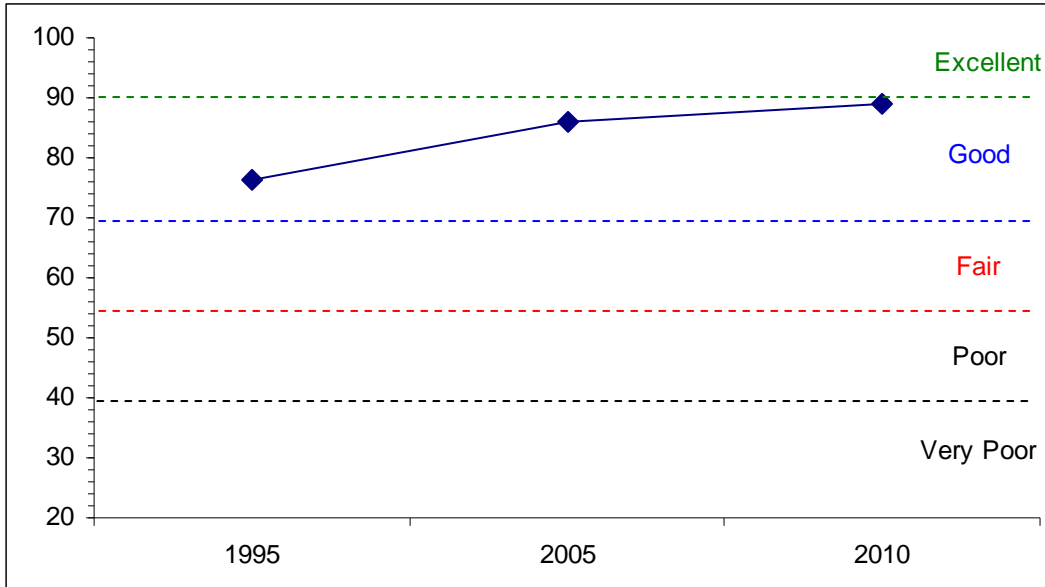
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.0	7.3	18.4	0.0	7.5	0.0	76.2	Good
05	30.0	11.4	9.3	29.0	-1.2	7.4	0.0	86.0	Good
10	30.0	14.5	7.9	30.0	-0.3	6.9	0.0	89.0	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 15



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 9, Study no: 15



HERBACEOUS TRENDS--
 Management unit 09, Study no: 15

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'05	'10	'95	'05	'10
G	<i>Agropyron dasystachyum</i>	a ⁻	b ²⁰	b ²³	c ⁹⁵	.30	.57	1.51
G	<i>Agropyron spicatum</i>	d ²⁶³	c ²³⁹	b ¹⁹⁵	a ¹¹³	4.48	5.93	4.15
G	<i>Bouteloua gracilis</i>	3	-	-	3	-	-	.15
G	<i>Bromus tectorum</i> (a)	-	a ⁻	c ⁵⁷	b ⁹	-	1.55	.34
G	<i>Carex</i> sp.	ab ⁵⁴	b ⁸³	a ³⁴	a ³⁷	1.22	.60	1.23
G	<i>Elymus salina</i>	a ⁻	ab ¹⁰	b ¹⁹	b ¹¹	.07	.11	.13
G	<i>Oryzopsis hymenoides</i>	-	-	10	5	-	.22	.16
G	<i>Poa fendleriana</i>	c ²⁵⁶	a ⁷⁹	ab ¹²⁴	b ¹⁵⁷	1.52	4.09	4.91
G	<i>Poa pratensis</i>	a ⁻	b ³⁶	a ⁻	a ⁻	.53	-	-
G	<i>Poa secunda</i>	b ⁴⁷	a ⁻	a ¹	a ³	-	.03	.03
G	<i>Sitanion hystrix</i>	9	6	8	16	.01	.11	.10
G	<i>Stipa comata</i>	a ⁵⁰	ab ⁹⁵	b ¹²⁰	b ¹¹⁵	1.04	2.82	4.50
Total for Annual Grasses		0	0	57	9	0	1.55	0.34
Total for Perennial Grasses		682	568	534	555	9.19	14.50	16.90
Total for Grasses		682	568	591	564	9.19	16.06	17.25
F	<i>Agoseris glauca</i>	a ⁻	b ¹⁶	b ¹²	a ⁻	.07	.20	-
F	<i>Allium</i> sp.	a ⁻	d ¹⁴⁷	c ¹²¹	b ³⁵	.59	.62	.15
F	<i>Arabis</i> sp.	6	7	1	-	.01	.00	-
F	<i>Artemisia dracunculus</i>	-	-	1	1	-	.00	.15
F	<i>Artemisia ludoviciana</i>	23	13	15	40	.16	.07	.88
F	<i>Astragalus convallarius</i>	4	-	-	-	-	-	-
F	<i>Balsamorhiza hookeri</i>	55	50	41	48	.83	1.89	1.33
F	<i>Calochortus nuttallii</i>	a ⁻	b ²³	c ⁴³	a ²	.11	.14	.00
F	<i>Castilleja chromosa</i>	b ¹¹	a ²	a ⁻	a ⁻	.00	-	-

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'05	'10	'95	'05	'10
F	Chaenactis douglasii	2	-	-	-	-	-	-
F	Collinsia parviflora (a)	-	_b 238	_b 272	_a 57	4.19	4.19	.21
F	Collomia linearis (a)	-	_b 143	_c 124	_a 14	.82	.50	.08
F	Comandra pallida	_b 15	_{ab} 11	_a 1	_a 1	.17	.00	.00
F	Crepis acuminata	-	3	4	1	.00	.18	.15
F	Cryptantha sp.	-	2	7	7	.00	.06	.04
F	Delphinium nuttallianum	-	1	2	-	.00	.03	-
F	Descurainia pinnata (a)	-	_b 156	_a 15	_a -	2.56	.05	-
F	Draba sp. (a)	-	_b 55	_b 30	_a 3	.29	.07	.01
F	Erigeron eatonii	-	-	1	-	-	.00	.03
F	Erigeron flagellaris	-	-	2	2	-	.00	.03
F	Eriogonum umbellatum	_b 19	_{ab} 10	_a 1	_{ab} 8	.25	.03	.04
F	Gilia sp. (a)	-	5	5	-	.04	.01	-
F	Helianthella microcephala	-	-	-	3	-	-	.15
F	Heterotheca villosa	-	4	-	3	.03	-	.00
F	Heuchera parvifolia	-	-	-	1	-	-	.03
F	Lappula occidentalis (a)	-	3	10	4	.00	.03	.01
F	Lepidium densiflorum (a)	-	_{ab} 13	_b 30	_a 3	.08	.18	.00
F	Lepidium sp. (a)	-	-	-	8	-	-	.04
F	Linum lewisii	-	-	-	-	.03	-	-
F	Lithospermum sp.	_b 14	_{ab} 3	_a 3	_a 1	.30	.03	.06
F	Lomatium sp.	-	-	2	-	-	.03	-
F	Lupinus argenteus	_b 25	_b 27	_a -	_a -	.56	-	-
F	Machaeranthera grindelioides	5	2	-	2	.15	.00	.00
F	Microsteris gracilis (a)	-	_a -	_b 79	_a 5	-	.40	.01
F	Penstemon sp.	_b 30	_a 6	_a 2	_a 7	.03	.03	.06
F	Petrorhiza pumila	3	5	2	-	.30	.03	-
F	Phlox longifolia	1	-	-	2	-	-	.00
F	Polygonum douglasii (a)	-	_b 15	_a 1	_{ab} 4	.03	.00	.01
F	Schoenocrambe linifolia	_a -	_a 2	_{ab} 11	_b 32	.01	.11	.27
F	Sedum sp.	_c 35	_b 14	_a -	_a -	.09	-	-
F	Sphaeralcea coccinea	1	-	3	-	-	.03	-
F	Taraxacum officinale	-	2	-	-	.00	-	-
F	Tragopogon dubius	2	2	-	-	.01	.00	-
F	Unknown forb-perennial	-	2	-	-	.01	-	-
F	Zigadenus elegans	_a -	_a -	_b 31	_a -	-	.16	-
F	Zigadenus paniculatus	_a -	_a -	_a -	_b 9	-	-	.06
Total for Annual Forbs		0	628	566	98	8.03	5.45	0.38
Total for Perennial Forbs		251	354	306	205	3.77	3.72	3.49
Total for Forbs		251	982	872	303	11.81	9.17	3.88

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

BROWSE TRENDS--

Management unit 09, Study no: 15

Type	Species	Strip Frequency			Average Cover %		
		'95	'05	'10	'95	'05	'10
B	Amelanchier utahensis	21	23	30	1.86	3.52	3.71
B	Artemisia tridentata vaseyana	19	6	7	1.89	.41	.19
B	Cercocarpus montanus	77	77	80	15.03	20.06	15.48
B	Chrysothamnus viscidiflorus viscidiflorus	26	25	23	1.84	.64	1.63
B	Mahonia repens	76	74	74	4.90	3.90	4.73
B	Opuntia sp.	47	24	23	.46	.27	.37
B	Pediocactus simpsonii	1	2	1	-	-	-
B	Purshia tridentata	23	17	24	2.01	1.12	4.46
B	Symphoricarpos oreophilus	32	22	26	2.25	1.95	1.27
B	Tetradymia canescens	0	0	1	-	-	.15
Total for Browse		322	270	289	30.27	31.89	32.01

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 15

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	4.40	4.73
Artemisia tridentata vaseyana	.61	.46
Cercocarpus montanus	29.48	25.29
Chrysothamnus viscidiflorus viscidiflorus	1.95	.50
Mahonia repens	3.83	4.96
Opuntia sp.	.08	.11
Pediocactus simpsonii	.05	-
Purshia tridentata	4.03	5.11
Symphoricarpos oreophilus	3.54	2.78

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 15

Species	Average leader growth (in)	
	'05	'10
Cecocarpus montanus	3.4	3.6
Purshia tridentata	2.4	2.1

BASIC COVER--

Management unit 09, Study no: 15

Cover Type	Average Cover %				
	'82	'88	'95	'05	'10
Vegetation	6.75	12.25	45.35	49.86	51.27
Rock	3.50	7.50	14.46	17.57	16.00
Pavement	0	.50	.53	1.65	1.79
Litter	73.50	71.50	56.93	42.75	46.56
Cryptogams	3.00	1.00	.43	.08	.58
Bare Ground	13.25	7.25	4.13	11.20	8.55

PELLET GROUP DATA--

Management unit 09, Study no: 15

Type	Quadrat Frequency			Days use per acre (ha)	
	'95	'05	'10	'05	'10
Rabbit	9	20	17	-	-
Moose	-	1	-	1 (2)	-
Elk	15	28	13	56 (137)	62 (152)
Deer	29	19	24	31 (76)	17 (41)
Cattle	-	1	-	2 (4)	1 (2)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 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	
<i>Amelanchier utahensis</i>									
82	466	0	100	0	-	14	29	0	27/25
88	664	60	30	10	-	40	30	30	45/53
95	600	7	90	3	20	53	7	0	30/35
05	580	24	62	14	-	24	28	0	34/42
10	840	26	71	2	-	26	12	2	33/40
<i>Artemisia tridentata vaseyana</i>									
82	265	0	75	25	-	25	0	0	22/29
88	398	50	17	33	-	50	0	0	22/20
95	500	8	56	36	-	68	8	12	23/25
05	120	0	83	17	-	50	0	0	13/20
10	140	14	71	14	-	29	43	14	17/29
<i>Cercocarpus montanus</i>									
82	3132	26	74	0	-	28	0	0	33/24
88	4799	69	28	3	733	63	18	0	43/43
95	3600	17	79	4	60	72	6	2	35/42
05	2980	19	70	11	20	16	59	7	40/48
10	3060	16	82	1	20	30	56	10	42/49
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
82	1599	0	100	0	-	0	0	0	18/13
88	1198	6	44	50	-	0	0	33	10/11
95	680	0	97	3	-	0	0	0	16/21
05	680	3	94	3	-	0	0	3	12/18
10	580	17	83	0	-	0	0	0	15/22
<i>Gutierrezia sarothrae</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	10/6
10	0	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Mahonia repens									
82	3932	0	49	-	-	0	0	0	5/7
88	31065	8	92	-	-	0	0	.85	4/3
95	27720	3	97	-	40	0	0	0	4/6
05	22440	1	99	-	-	0	0	0	4/5
10	29180	42	58	-	560	0	0	0	4/7
Opuntia sp.									
82	999	0	100	0	-	0	0	0	2/5
88	933	100	0	0	733	0	0	0	-/-
95	2120	17	82	1	-	0	0	.94	2/8
05	980	22	78	0	-	0	0	0	3/6
10	900	4	96	0	-	0	0	0	2/9
Pediocactus simpsonii									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	20	0	100	-	-	0	0	0	1/4
05	60	0	100	-	-	0	0	0	1/3
10	20	0	100	-	-	0	0	0	2/5
Purshia tridentata									
82	199	0	100	0	-	33	67	0	17/25
88	133	0	100	0	-	50	0	0	19/25
95	600	10	87	3	-	67	10	0	22/41
05	380	0	79	21	-	47	37	11	21/40
10	560	7	89	4	-	25	50	11	21/42
Symphoricarpos oreophilus									
82	999	33	67	-	-	0	0	0	13/15
88	1199	39	61	-	-	11	0	0	12/16
95	1780	16	84	-	60	1	0	0	14/25
05	1940	31	69	-	-	0	0	0	9/14
10	1300	17	83	-	-	8	0	0	9/16
Tetradymia canescens									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	11/17
05	0	0	0	-	-	0	0	0	11/23
10	20	0	100	-	-	0	100	0	9/19

MOSBY MOUNTAIN - TREND STUDY NO. 9-16-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 7900 ft. (2409 m)

Aspect: South

Slope: 8%-10%

Transect bearing: 155° magnetic

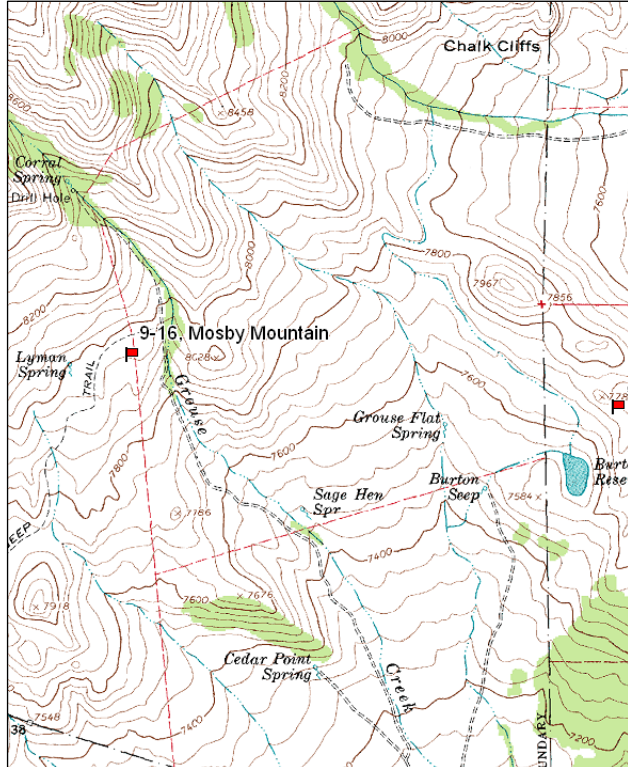
Belt placement: line 1 (11 & 96ft), line 2 (30ft), line 3 (50ft), line 4 (72ft).

Directions:

From the town of Whiterocks, go east on White Rocks Rd (11500 N) approximately 1.75 miles to a "T" in the road. Turn left (north) on White Rocks Loop Rd (5500 E) and go 3.5 miles to an intersection where two roads fork off to the right. Turn right then take the left fork. Head north for approximately 1.9 miles to a two-track on the left (west) side of the road. Turn left and drive 0.1 miles to a fork. Take the right fork and drive 1.85 miles to the Mosby Mountain Exclosure. The 0-foot baseline stake is located 24 paces from the southwest corner of the big game exclosure bearing 210°M.

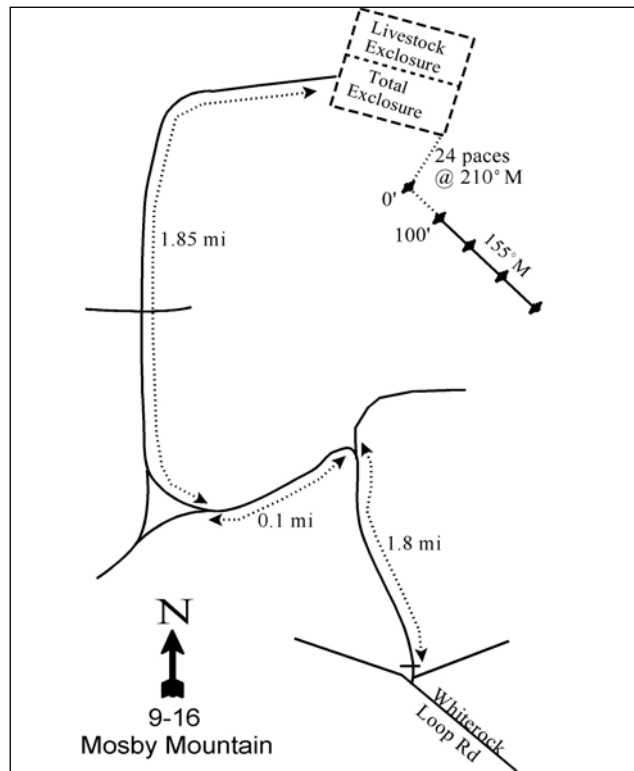
This site may also be accessed from the east by traveling north through Tridell on 8000 E. Go though the reservation then west to Mosby Mountain.

Map Name: Lake Mountain



Township: 3S Range: 18E Section: 14

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 595901 E 4490608 N

MOSBY MOUNTAIN - TREND STUDY NO. 9-16

Site Information

Site Description: The study is adjacent to the Mosby Mountain big game exclosure and pellet group transect, and samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community with scattered serviceberry (*Amelanchier utahensis*) and bitterbrush (*Purshia tridentata*). Lyman springs is about a quarter mile to the west of the site. Soon after the reading of this study in August 1988, the area was burned by a wildfire. During the 1995 reading, it was noted that belts 1 and 5 from the original baseline were not burned while belts 2, 3, and 4 were burned. As a result, most of the shrubs on the burned belts were eliminated. The area is managed by the U.S. Forest Service as part of the Mosby Mountain cattle allotment. Cattle were still on the site during the 1995, 2000 and 2005 readings. Pellet group transect data has indicated light use by deer and elk since 2000 (Table - Pellet Group Data).

Browse: Browse species are scattered partially due to the spotty burn in 1988. The most abundant shrub is mountain big sagebrush which has steadily increased in cover since 1995 and provides the majority of the browse cover on the site (Table - Browse Trends). The sagebrush is comprised of a moderately dense stand of small, mature plants that have displayed light to moderate use. The population has been healthy with low decadence and good vigor, and recruitment of young plants has been generally good. Recruitment of young sagebrush plants was very high in 2010. Secondary browse species consist of serviceberry and bitterbrush, which are found in much lower densities on the site. These species are more highly preferred and utilization has been heavy over the course of the study. Bitterbrush plants have a prostrate growth form and may not be available during deep snow. Other palatable species include Fendler ceanothus (*Ceanothus fendleri*), Wyeth eriogonum (*Eriogonum heracleoides*) and blueberry elder (*Sambucus cerulea*) that occur in low densities across the site. The health of the Fendler ceanothus population decreased substantially with nearly all the population being decadent and displaying poor vigor in 2010 (Table - Browse Characteristics).

Herbaceous Understory: Grasses on the site are diverse and abundant, and are dominated by native perennial species. The dominant grasses include thickspike wheatgrass (*Agropyron dasystachyum*), mutton bluegrass (*Poa fendleriana*), Sandberg bluegrass (*P. secunda*) and needle-and-thread (*Stipa comata*). All grasses had moderate use in 2005, which made identification difficult on some plants. Thickspike wheatgrass has decreased in cover and nested frequency since 1995. Other perennial species include Kentucky bluegrass (*Poa pratensis*), bottlebrush squirreltail (*Sitanion hystrix*) and Letterman needlegrass (*Stipa lettermani*). Cheatgrass (*Bromus tectorum*) is also moderately abundant on the site, but was not sampled in 2000. Forbs are also diverse and abundant on the site. There was a large increase in the cover of perennial forbs from 1995 to 2000. The most common perennial forb species include Hooker balsamroot (*Balsamorhiza hookeri*), trailing fleabane (*Erigeron flagellaris*), silvery lupine (*Lupinus argenteus*) and aster (*Aster sp.*) (Table - Herbaceous Trends).

Soil: The soils are loam to sandy clay loam in texture with a slightly acidic soil reaction (pH 6.4) and fairly high organic matter (4.5%) (Table - Soil Analysis Data). On nearby steeper slopes, noticeable soil movement was reported in 1988. Bare ground cover has been moderately low, but was moderately high in 2005. Abundant herbaceous vegetation, litter, and rock cover have helped to keep erosion at minimal levels (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** The density of mountain big sagebrush and serviceberry increased, but decadence also increased substantially in both species.
- **1988 to 1995 - down (-2):** Differences in density may be related to the larger sample area used in 1995, but it is apparent that the wildfire in 1988 reduced the browse on this site. Though plants are generally smaller, most of the browse appears healthy with low decadence and good vigor.

- **1995 to 2000 - slightly up (+1):** Density of mountain big sagebrush increased 19% from 1,600 plants/acre to 1,900 plants/acre, and cover increased from 3% to 5%. Density of serviceberry remained similar, but cover increased from 2% to 3%. Recruitment of young serviceberry plants increased from 4% to 20% of the population.
- **2000 to 2005 - slightly down (-1):** The density of mountain big sagebrush decreased 19% to 1,540 plants/acre, though cover remained similar. The density and cover of serviceberry remained similar.
- **2005 to 2010 - up (+2):** The density of mountain big sagebrush increased four-fold to 6,220 plants/acre, and cover increased to 9%. Recruitment of young sagebrush plants increased to 34% of the population. However, Fendler ceanothus increased to 93% in decadence and poor vigor, respectively, and cover decreased from 4% to less than 1%. The density of serviceberry increased by 21% to 460 plants/acre and cover increased slightly from 3% to 4%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 15%.
- **1995 to 2000 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 11%, but cover increased from 15% to 23%. One positive aspect of the trend was that no cheatgrass was sampled on the site.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover decreased to 15% again. Cheatgrass increased significantly and was again common on the site.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover increased to 19%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial forbs decreased by 29%.
- **1995 to 2000 - slightly down (-1):** There was an 18% decrease in the sum of nested frequency of perennial forbs despite an increase in cover from 5% to 12%. Annual forbs decreased substantially on the site.
- **2000 to 2005 - up (+2):** The perennial forb sum of nested frequency increased by 49%, though cover remained similar. Annual forbs again increased and were common on the site.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 20%, although they did not decrease to 2000 levels. Cover of perennial forbs remained similar, but annual forbs decreased in cover from 3% to less than 1%.

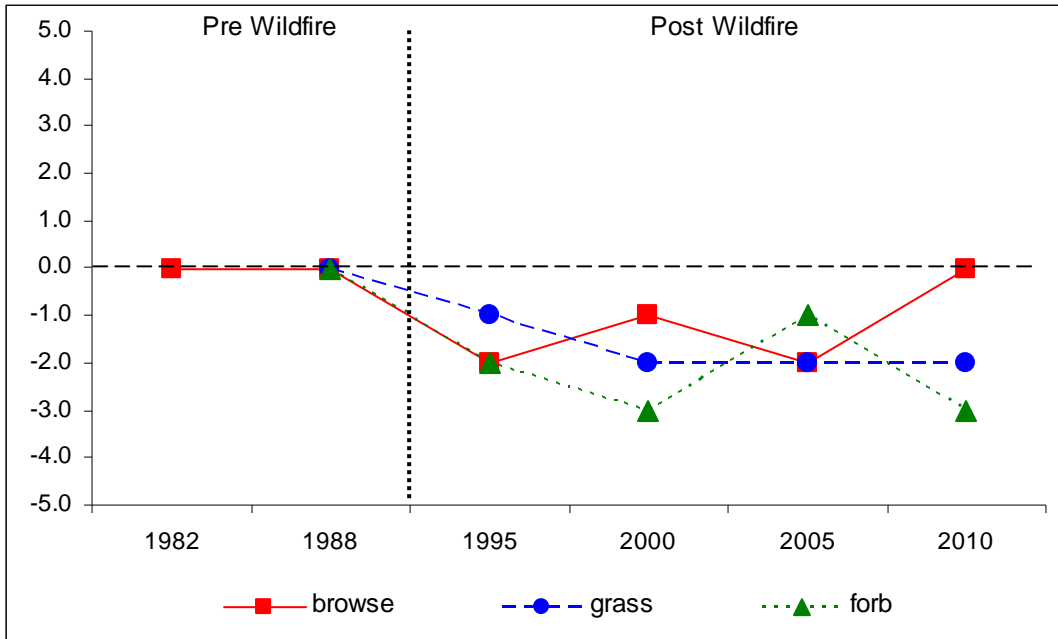
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 9, study no: 16

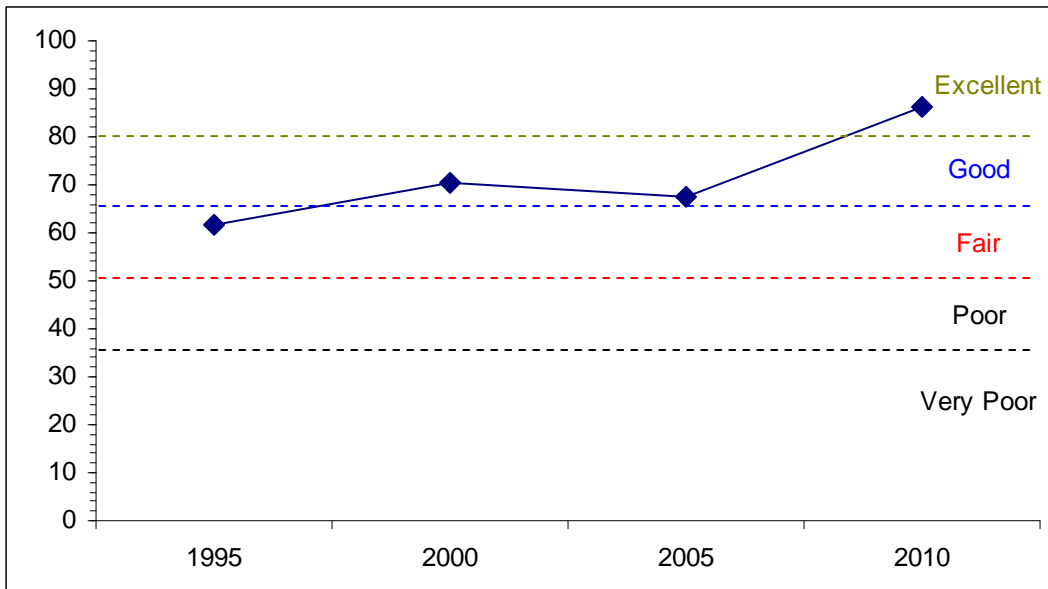
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	7.0	13.0	3.4	30.0	-1.0	9.2	0.0	61.6	Fair
00	11.3	12.7	6.6	30.0	0.0	10.0	0.0	70.6	Good
05	12.2	11.3	5.5	30.0	-1.6	10.0	0.0	67.5	Good
10	21.2	14.8	12.1	30.0	-2.0	10.0	0.0	86.1	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 16



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 9, Study no: 16



HERBACEOUS TRENDS--
Management unit 09, Study no: 16

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	bc260	c266	b211	b224	a156	8.28	11.19	4.03	1.57
G	Bromus tectorum (a)	-	c115	a-	b74	bc84	1.28	-	2.12	2.60
G	Carex sp.	a-	a-	a-	a-	b9	-	-	-	.36
G	Melica bulbosa	-	-	-	-	1	-	-	-	.00
G	Poa fendleriana	c277	a149	b200	ab177	ab205	2.87	4.78	4.42	6.54
G	Poa pratensis	a4	c105	b42	ab23	ab26	1.05	1.29	.29	1.04
G	Poa secunda	c182	a33	a30	ab52	b89	.31	.58	1.10	3.50
G	Sitanion hystrix	a16	a19	b58	a17	a18	.09	1.87	.11	.09
G	Stipa comata	a21	b63	bc70	cd107	d111	1.77	2.75	4.87	5.36
G	Stipa lettermani	cd53	d58	a7	ab11	bc32	.84	.30	.13	.50
Total for Annual Grasses		0	115	0	74	84	1.28	0	2.12	2.60
Total for Perennial Grasses		813	693	618	611	647	15.22	22.78	14.98	19.00
Total for Grasses		813	808	618	685	731	16.51	22.78	17.10	21.60
F	Agoseris glauca	a-	a3	a-	ab10	b11	.00	-	.07	.06
F	Allium sp.	ab3	c60	a-	c76	b18	.15	-	.18	.11
F	Antennaria rosea	c61	ab31	bc56	a17	a24	.93	3.15	.16	.71
F	Arabis sp.	c60	b12	a-	b16	a-	.03	-	.05	-
F	Artemisia ludoviciana	-	-	-	1	7	-	.00	.00	.09
F	Aster sp.	68	65	75	85	80	.95	1.70	2.24	1.97
F	Astragalus purshii	b28	ab7	a-	ab10	a1	.06	-	.13	.00
F	Astragalus sp.	19	2	3	1	5	.00	.01	.00	.01
F	Balsamorhiza hookeri	c157	b104	a60	ab83	b111	1.15	2.28	2.70	5.50
F	Calochortus nuttallii	3	-	-	-	5	-	-	-	.01
F	Camelina microcarpa (a)	-	a7	a-	b23	a-	.02	-	.05	-
F	Cirsium sp.	-	-	-	1	-	-	-	.00	-
F	Collinsia parviflora (a)	-	b60	a9	c113	bc88	.27	.02	.67	.32
F	Collomia linearis (a)	-	c75	a-	ab163	b27	.24	-	.47	.10
F	Comandra pallida	a-	a-	a3	ab12	b18	-	.15	.05	.09
F	Crepis acuminata	a-	b18	a-	a-	a1	.07	-	-	.00
F	Cryptantha sp.	-	1	-	1	1	.00	-	.00	.00
F	Descurainia pinnata (a)	b23	b27	a2	ab17	a-	.10	.00	.44	-
F	Draba sp. (a)	-	a-	a-	b8	ab11	-	-	.05	.02
F	Erigeron divergens	a-	a-	a-	a3	b32	-	-	.07	.26
F	Erigeron flagellaris	a19	a30	a92	b71	b17	.09	2.88	1.43	.05
F	Eriogonum alatum	b122	a3	a11	a-	a2	.01	.24	-	.03
F	Eriogonum racemosum	-	-	-	6	-	-	-	.02	-
F	Eriogonum umbellatum	ab6	ab1	a-	b10	a-	.03	-	.02	-
F	Heterotheca villosa	a-	b13	bc12	ab8	c29	.20	.16	.49	.90
F	Lactuca serriola	-	5	-	-	-	.01	-	-	-
F	Lappula occidentalis (a)	-	1	-	9	-	.00	-	.02	-
F	Lepidium densiflorum (a)	a-	b92	a-	a4	a3	.25	-	.01	.00
F	Lesquerella sp.	-	-	-	-	1	-	-	-	.00
F	Lithospermum ruderales	8	15	7	4	5	.41	.08	.18	.33

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Lomatium sp.	a-	a3	a3	b25	b22	.00	.00	.13	.06
F	Lupinus argenteus	ab17	a3	b23	b28	ab15	.06	.35	2.38	.25
F	Microsteris gracilis (a)	-	a4	a-	b66	a8	.01	-	.37	.01
F	Orobanche sp.	-	-	-	2	-	-	-	.00	-
F	Penstemon sp.	15	8	9	13	9	.01	.10	.15	.06
F	Phlox longifolia	b24	ab16	a2	ab13	a6	.03	.00	.03	.01
F	Polygonum douglasii (a)	-	d177	a4	c135	b84	1.08	.00	.34	.29
F	Potentilla gracilis	-	1	2	2	2	.00	.15	.03	.03
F	Sedum lanceolatum	5	1	-	-	-	.00	-	-	-
F	Senecio multilobatus	-	-	1	-	1	-	.00	-	.15
F	Sphaeralcea coccinea	ab13	b19	a3	ab	ab11	.11	.06	.04	.18
F	Taraxacum officinale	a-	b28	a6	b19	a6	.16	.06	.22	.01
F	Thermopsis montana	-	-	-	3	-	-	-	.06	-
F	Tragopogon dubius	ab10	ab6	ab5	b18	a1	.04	.04	.16	.03
F	Zigadenus paniculatus	-	-	-	9	5	-	-	.05	.04
Total for Annual Forbs		23	443	15	538	221	1.98	0.02	2.45	0.75
Total for Perennial Forbs		638	455	373	554	446	4.59	11.47	11.12	11.02
Total for Forbs		661	898	388	1092	667	6.57	11.50	13.57	11.78

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

BROWSE TRENDS--

Management unit 09, Study no: 16

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	22	19	19	21	1.81	2.75	2.69	4.37
B	Artemisia tridentata vaseyana	41	43	43	77	3.40	4.54	5.44	9.32
B	Ceanothus fendleri	7	7	7	6	1.92	2.12	3.45	.96
B	Chrysothamnus nauseosus graveolens	0	1	0	0	-	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	4	3	3	5	.18	.03	.00	.15
B	Eriogonum heracleoides	12	6	11	13	.56	.30	1.05	.72
B	Gutierrezia sarothrae	3	7	9	11	-	.15	.56	.10
B	Opuntia sp.	6	5	4	7	-	.03	-	.07
B	Purshia tridentata	10	12	12	15	.03	1.00	.93	1.98
B	Symphoricarpos oreophilus	6	6	5	7	.06	.15	.15	.33
Total for Browse		111	109	113	162	7.98	11.09	14.30	18.02

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 16

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	5.58	9.03
Artemisia tridentata vaseyana	7.38	15.88
Ceanothus fendleri	4.71	3.06
Eriogonum heracleoides	.46	1.16
Gutierrezia sarothrae	-	.03
Opuntia sp.	-	.10
Purshia tridentata	2.58	1.48
Symphoricarpos oreophilus	.03	.30

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 16

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	3.6	3.5
Artemisia tridentata vaseyana	2.2	2.1
Purshia tridentata	2.8	3.2

BASIC COVER--

Management unit 09, Study no: 16

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	7.00	13.00	39.93	49.49	47.52	50.22
Rock	.25	2.50	6.85	7.48	5.47	7.29
Pavement	.50	1.00	.23	.60	.35	2.34
Litter	72.00	56.50	49.51	50.47	25.79	41.37
Cryptogams	.75	5.25	.00	.46	.05	.01
Bare Ground	19.50	21.75	14.68	20.87	30.02	18.70

SOIL ANALYSIS DATA --

Management unit 9, Study no: 16, Study Name: Mosby Mountain

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.3	6.4	50.9	28.8	20.3	4.5	27.8	316.8	1.4

PELLET GROUP DATA--

Management unit 09, Study no: 16

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	3	-	17	5	-	-	-
Moose	-	1	-	-	-	-	-
Horse	1	-	-	-	-	-	-
Elk	21	13	17	6	20 (50)	13 (33)	23 (58)
Deer	16	11	15	16	9 (22)	13 (33)	14 (35)
Cattle	24	7	21	8	36 (88)	46 (115)	35 (86)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 16

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>Amelanchier utahensis</i>									
82	1065	25	75	0	-	38	63	6	23/25
88	1265	53	26	21	133	21	32	5	35/37
95	460	4	91	4	40	39	39	0	23/34
00	400	20	80	0	-	50	25	0	31/43
05	380	5	89	5	-	11	84	0	33/47
10	460	9	91	0	180	35	48	0	41/54
<i>Artemisia tridentata vaseyana</i>									
82	2931	14	82	5	-	7	0	0	16/21
88	3598	19	54	28	133	19	0	2	25/29
95	1600	8	85	8	60	61	20	0	14/21
00	1900	12	75	14	-	28	0	4	13/23
05	1540	16	66	18	2820	45	6	14	19/34
10	6220	34	65	1	2760	9	.32	.32	15/25
<i>Ceanothus fendleri</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	260	0	100	0	-	0	0	0	9/54
00	200	0	100	0	-	0	0	0	11/67
05	420	0	100	0	-	0	0	0	9/51
10	600	7	0	93	-	0	0	93	6/11
<i>Chrysothamnus nauseosus graveolens</i>									
82	66	0	100	-	-	0	0	0	19/15
88	66	0	100	-	-	0	0	100	29/9
95	0	0	0	-	-	0	0	0	13/11
00	20	0	100	-	-	0	0	0	15/19
05	0	0	0	-	-	0	0	0	16/15
10	0	0	0	-	-	0	0	0	15/21
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
82	399	33	67	0	-	0	0	0	10/14
88	665	40	60	0	-	0	0	60	7/9
95	80	0	100	0	-	0	25	0	8/13
00	60	0	100	0	-	0	0	0	6/10
05	60	0	100	0	-	0	0	0	11/21
10	100	0	80	20	-	0	0	0	12/19

		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>Eriogonum heracleoides</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	265	25	75	-	-	25	0	0	4/7	
95	540	33	67	-	-	0	0	0	5/16	
00	220	36	64	-	-	0	0	0	4/11	
05	460	4	96	-	-	17	0	0	10/14	
10	660	0	100	-	-	0	0	0	4/12	
<i>Gutierrezia sarothrae</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	120	0	100	-	-	0	0	0	9/12	
00	320	6	94	-	20	0	0	0	7/8	
05	560	0	100	-	-	0	0	0	8/10	
10	540	7	93	-	-	0	0	0	11/10	
<i>Opuntia sp.</i>										
82	133	0	100	0	-	0	0	0	1/12	
88	665	40	60	0	66	0	0	20	4/9	
95	140	0	100	0	-	0	0	29	3/14	
00	200	20	20	60	-	0	0	10	2/12	
05	80	0	100	0	-	0	0	0	2/11	
10	140	57	43	0	-	0	14	0	6/11	
<i>Pediocactus simpsonii</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	3/7	
<i>Purshia tridentata</i>										
82	333	0	100	-	-	60	40	0	7/19	
88	599	44	56	-	66	33	33	0	10/19	
95	240	25	75	-	-	50	17	0	10/32	
00	300	0	100	-	-	60	27	0	12/42	
05	300	0	100	-	-	0	100	0	13/45	
10	380	11	89	-	-	26	47	0	18/46	
<i>Sambucus cerulea</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	47/69	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	

		Age class distribution						Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)		
Symphoricarpos oreophilus											
82	0	0	0	0	-	0	0	0	-/-		
88	66	0	100	0	-	0	0	0	16/14		
95	200	40	60	0	-	10	30	0	11/19		
00	140	0	100	0	-	0	0	0	15/21		
05	140	29	57	14	20	0	14	14	15/32		
10	200	0	100	0	-	0	0	0	14/38		

FARM CREEK - TREND STUDY NO. 9-17-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 7100 ft. (2165 m)

Aspect: South

Slope: 5%-6%

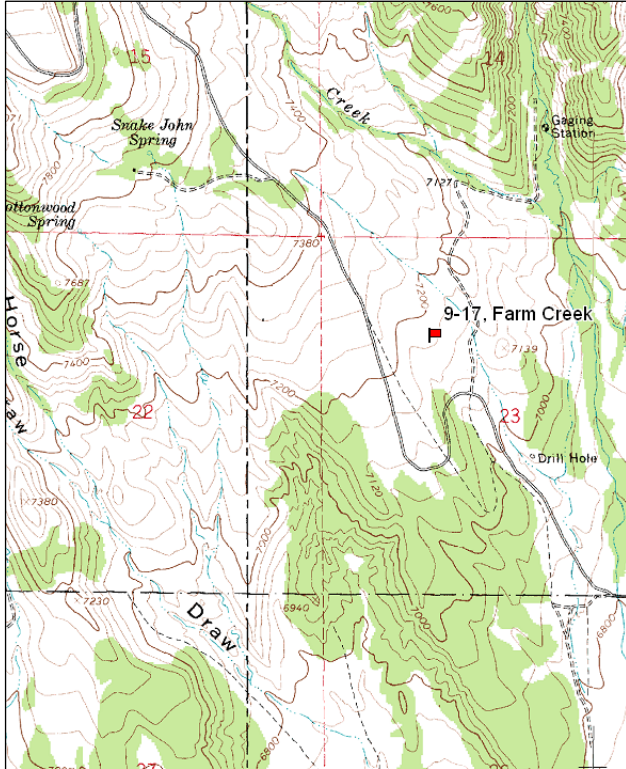
Transect bearing: 322° magnetic

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

Directions:

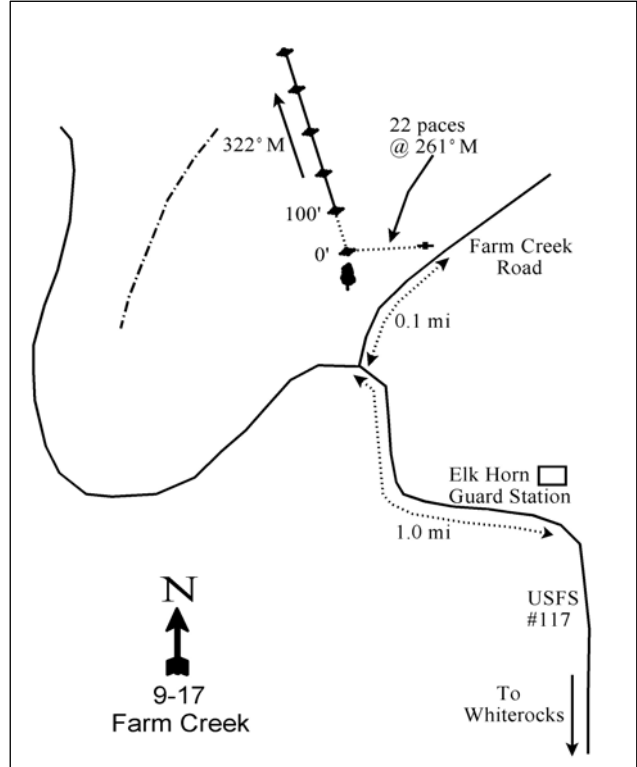
From Whiterocks, drive east on 11500 N (Tridell Hwy) to the junction of 5500 E (Whiterocks Loop Rd). Turn left (north) and drive 7.9 miles to the Elkhorn Guard Station located north of Whiterocks. The main road will bend west. Continue on this Forest Service road (Farm Creek Road) for 1 mile. At the first switchback turn right (north) and travel 0.1 miles to the witness located on the left (west) side of the road. From the witness post walk 22 paces at 261°M to the 0-foot baseline stake.

Map Name: Ice Cave Peak



Township: 2N Range: 1W Section: 23

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 587537 E 4490307 N

FARM CREEK - TREND STUDY NO. 9-17

Site Information

Site Description: The study monitors a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community in the Ashley National Forest. In the summer of 2007, the Neola North wildfire burned 43,806 acres in the area, including the site, effectively removing the browse component from the site. Some of the surrounding area was seeded in a rehabilitation effort following the fire, but the study site was not included in the seeding. The area is managed by the U.S. Forest Service as part of the Farm Creek/Buck Ridge allotment. Pellet group transect data estimated lightly moderate use by deer in 2000 with light use in 2005 and 2010. Estimated use by elk has been minimal since 2000. Cattle use was light in 2000 and moderate in 2005, but there was no cattle sign sampled in 2010 (Table - Pellet Group Data).

Browse: The dominant browse species on the site are mountain big sagebrush and antelope bitterbrush (*Purshia tridentata*), but the fire decreased both species markedly. Prior to the fire, mountain big sagebrush was comprised of a dense stand with a mixture of young, mature and decadent plants. Sagebrush plants were vigorous with light to moderate use. Following the fire, sagebrush was comprised of a small population with a mixture of young and small mature plants. The sagebrush plants displayed more moderate use, but decadence decreased. The more preferred antelope bitterbrush displayed heavy use prior to the fire, but more moderate use following the fire. The fire also reduced the density of bitterbrush substantially, but the small surviving population appears healthy with low decadence and good vigor. Other browse species include pricklypear cactus (*Opuntia* sp.), mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*) and broom snakeweed (*Gutierrezia sarothrae*). Pricklypear and broom snakeweed have decreased in density since the fire, but low rabbitbrush increased slightly in density (Table - Browse Characteristics).

Herbaceous Understory: Crested wheatgrass (*Agropyron cristatum*) dominates the herbaceous understory. The fire appeared to have little effect on the crested wheatgrass component. Bulbous bluegrass (*Poa bulbosa*) has fluctuated on the site, but has been abundant at times. Cheatgrass (*Bromus tectorum*) is also present, but in low numbers. Both bulbous bluegrass and cheatgrass should be watched closely for increases in abundance. Forbs are diverse, but prior to the fire provided little cover. Following the fire, cover and frequency of forbs increased substantially, primarily due to a large increase in scarlet globemallow (*Sphaeralcea coccinea*) (Table - Herbaceous Trends).

Soil: Soils are sandy loam in texture with a neutral soil reaction (pH 6.8). Bare ground had steadily increased from 1995 to 2005, but remained fairly low even after the fire. Vegetation and litter are abundant providing good protective cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1995 to 2000 - slightly up (+1):** There was little change in the density of bitterbrush, but cover increased from 7% to 11%. The density of mountain big sagebrush increased by 24% from 2,860 plants/acre to 3,560 plants/acre, and cover increased from 13% to 15%. However, decadence of sagebrush also increased from 1% to 29%.
- **2000 to 2005 - slightly down (-1):** The density of mountain big sagebrush decreased by 13% to 3,100 plants/acre, but cover remained similar. Decadence remained the same at 29%, but poor vigor increased from 1% to 15%. Bitterbrush density remained similar, but cover decreased to 8%.
- **2005 to 2010 - down (-2):** The fire removed much of the browse from the site.

Grass:

- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased from 21% to 28%.

- **2000 to 2005 - stable (0):** The sum of nested frequency of perennial grasses increased by 13%, but much of that was due to a significant increase in the nested frequency of bulbous bluegrass. Cover of perennial grasses decreased slightly to 23%.
- **2005 to 2010 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 26% and cover decreased to 17%. Again, much of the decrease was due to a significant decrease in the nested frequency of bulbous bluegrass as well as crested wheatgrass, with a subsequent decrease in cover.

Forb:

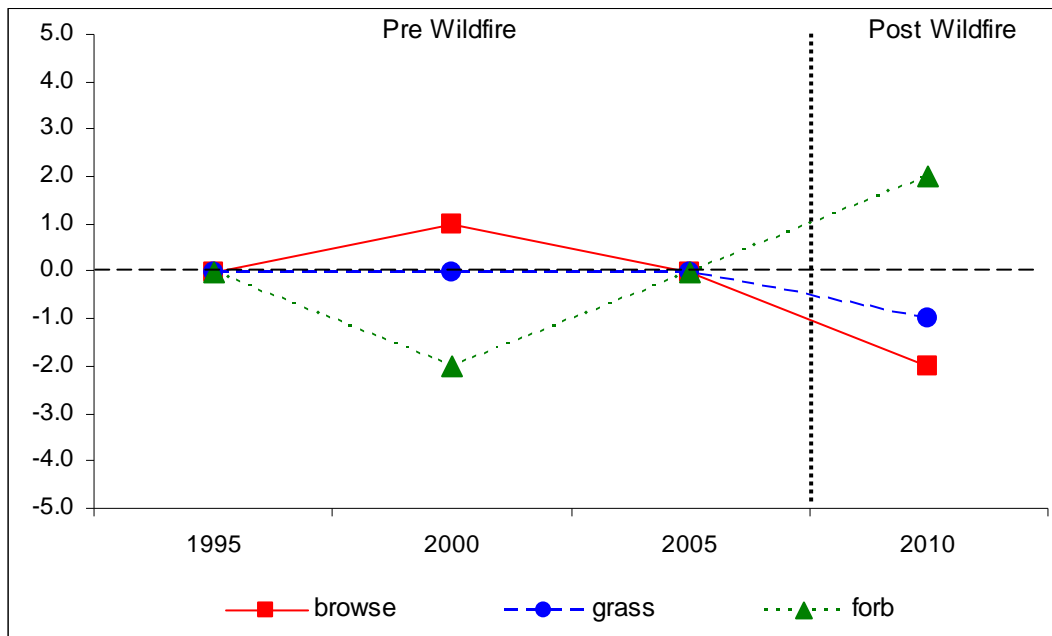
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 57%, but cover remained similar. Forbs were rare on the site.
- **2000 to 2005 - up (+2):** The perennial forb sum of nested frequency increased two-fold, though again, cover remained similar.
- **2005 to 2010 - up (+2):** There was a 97% increase in the sum of nested frequency of perennial forbs and cover increased from 2% to 8%. Much of the increase was due to a significant increase in the nested frequency of scarlet globemallow.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 9, study no: 17

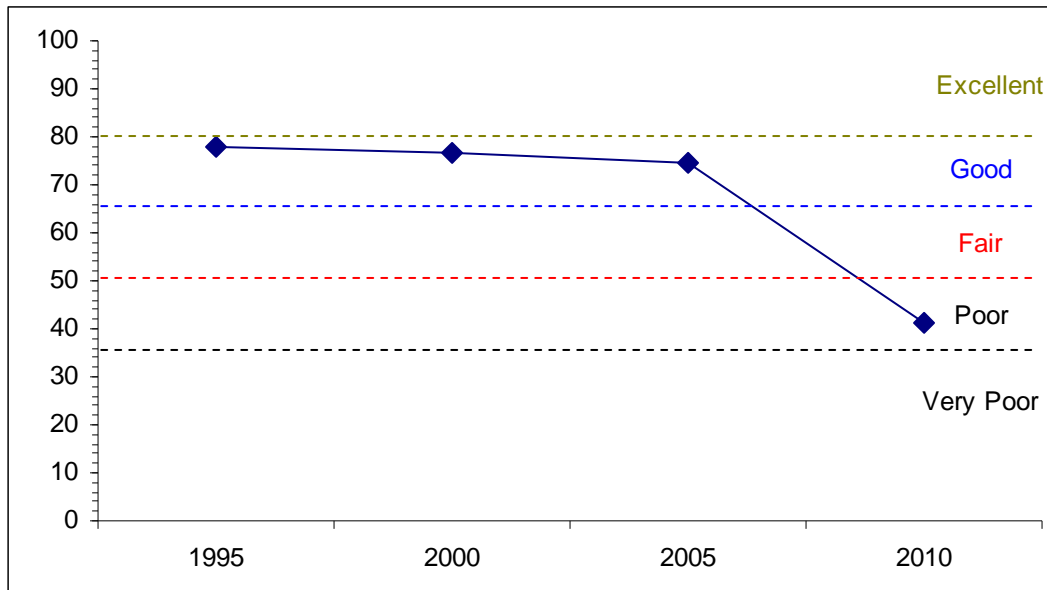
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	26.4	13.5	5.4	30.0	0.0	2.6	0.0	77.8	Good
00	30.0	8.5	5.1	30.0	0.0	3.0	0.0	76.6	Good
05	30.0	8.4	3.3	30.0	-0.6	3.2	0.0	74.4	Good
10	1.8	0.0	0.0	30.0	-0.7	10.0	0.0	41.1	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 17



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 9, Study no: 17



HERBACEOUS TRENDS--
 Management unit 09, Study no: 17

Type	Species	Nested Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron cristatum</i>	bc387	c405	ab367	a319	17.89	26.90	17.95	16.35
G	<i>Agropyron dasystachyum</i>	a3	ab8	ab13	b18	.00	.05	.07	.11
G	<i>Bromus tectorum</i> (a)	b17	a-	c43	c67	.05	-	.77	.87
G	<i>Festuca ovina</i>	-	-	2	-	-	-	.03	-
G	<i>Poa bulbosa</i>	b85	ab51	c137	a49	2.67	.85	5.15	.72
G	<i>Poa fendleriana</i>	5	8	7	4	.06	.04	.06	.15
G	<i>Poa pratensis</i>	5	-	-	-	.03	-	-	-
G	<i>Poa secunda</i>	2	-	6	6	.00	-	.04	.04
Total for Annual Grasses		17	0	43	67	0.05	0	0.76	0.87
Total for Perennial Grasses		487	472	532	396	20.67	27.85	23.32	17.38
Total for Grasses		504	472	575	463	20.72	27.85	24.09	18.26
F	<i>Agoseris glauca</i>	-	-	3	3	-	-	.03	.03
F	<i>Allium</i> sp.	b20	a-	b25	b15	.06	-	.14	.11
F	<i>Antennaria rosea</i>	-	4	1	2	-	.38	.03	.03
F	<i>Arabis</i> sp.	b14	a3	ab11	a1	.06	.00	.03	.00
F	<i>Artemisia ludoviciana</i>	b27	a7	ab20	b33	.18	.18	.09	.62
F	<i>Astragalus convallarius</i>	7	2	6	8	.21	.03	.12	.14
F	<i>Balsamorhiza hookeri</i>	4	3	5	-	.01	.06	.21	-
F	<i>Calochortus nuttallii</i>	-	-	2	-	-	-	.00	-
F	<i>Castilleja linariaefolia</i>	1	-	-	-	.00	-	.00	-
F	<i>Chenopodium leptophyllum</i> (a)	-	-	-	1	-	-	-	.00
F	<i>Collinsia parviflora</i> (a)	-	4	-	-	-	.00	-	-
F	<i>Collomia linearis</i> (a)	c48	a-	b5	a-	.16	-	.03	-
F	<i>Conyza canadensis</i> (a)	6	-	-	-	.01	-	-	-

Type	Species	Nested Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
F	Cryptantha sp.	5	-	-	6	.01	-	-	.02
F	Delphinium nuttallianum	-	-	1	-	-	-	.03	-
F	Descurainia pinnata (a)	a ⁻	a ⁻	a ²	b ²³	-	-	.00	.31
F	Draba reptans (a)	b ⁶⁴	a ¹	b ³⁷	a ⁻	.11	.00	.10	-
F	Erigeron eatonii	a ⁻	ab ⁶	ab ³	b ¹¹	-	.01	.03	.50
F	Erigeron flagellaris	a ⁴	b ¹³	a ⁻	a ⁻	.00	.22	-	-
F	Eriogonum racemosum	10	4	9	14	.14	.07	.15	.49
F	Grindelia squarrosa	-	-	-	12	-	-	-	.19
F	Heterotheca villosa	12	5	5	14	.33	.18	.01	.23
F	Lactuca serriola	a ²	a ⁻	a ⁻	b ²⁹	.00	-	-	.19
F	Lappula occidentalis (a)	a ⁹	a ⁻	a ⁵	b ⁵⁵	.02	-	.01	.43
F	Lepidium densiflorum (a)	c ⁵⁵	a ⁻	c ⁶⁶	b ¹⁹	.17	-	.24	.11
F	Lithospermum ruderales	-	4	3	13	.03	.18	.15	.53
F	Lomatium sp.	3	-	2	2	.01	-	.01	.00
F	Lupinus argenteus	-	4	3	3	-	.04	.03	.03
F	Microsteris gracilis (a)	1	-	-	5	.00	-	-	.01
F	Orobancha sp.	2	-	-	-	.00	-	-	-
F	Penstemon sp.	-	-	3	-	-	-	.00	-
F	Phlox longifolia	14	-	6	-	.02	-	.01	-
F	Polygonum douglasii (a)	c ⁴⁹	a ⁻	a ⁵	b ³⁵	.12	-	.01	.22
F	Schoenocrambe linifolia	a ⁹	a ⁻	a ⁷	b ³³	.01	-	.01	.63
F	Sphaeralcea coccinea	a ²¹	a ¹¹	a ¹⁸	b ⁹²	.10	.12	.29	3.75
F	Tragopogon dubius	ab ¹	a ⁻	a ⁻	b ¹⁴	.00	-	-	.12
F	Trifolium gymnocarpon	ab ⁹	a ³	b ²⁰	a ²	.05	.03	.13	.00
F	Zigadenus paniculatus	1	2	3	-	.00	.00	.03	-
Total for Annual Forbs		232	5	120	138	0.60	0.00	0.40	1.10
Total for Perennial Forbs		166	71	156	307	1.30	1.51	1.58	7.67
Total for Forbs		398	76	276	445	1.90	1.52	1.99	8.77

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

BROWSE TRENDS--

Management unit 09, Study no: 17

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	1	1	1	1	-	-	-	-
B	Artemisia tridentata vaseyana	66	77	76	5	13.01	15.14	14.89	.00
B	Chrysothamnus viscidiflorus lanceolatus	2	0	0	7	-	-	-	.03
B	Gutierrezia sarothrae	14	26	22	22	.04	.88	.09	.62
B	Opuntia sp.	21	18	19	9	.39	.16	.13	.00
B	Pediocactus simpsonii	2	1	2	0	-	-	.00	-
B	Purshia tridentata	51	54	53	10	6.77	11.37	8.26	1.17
Total for Browse		51	105	107	63	20.23	27.55	23.39	1.84

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 17

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	.11	-
Artemisia tridentata vaseyana	21.06	.78
Chrysothamnus viscidiflorus lanceolatus	-	1.38
Gutierrezia sarothrae	.30	1.43
Opuntia sp.	.11	.31
Purshia tridentata	7.51	.10

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 17

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	2.2	-
Purshia tridentata	3.8	2.8

BASIC COVER--

Management unit 09, Study no: 17

Cover Type	Average Cover %			
	'95	'00	'05	'10
Vegetation	45.22	52.87	48.65	31.39
Rock	10.75	10.65	10.05	13.55
Pavement	.50	.92	.28	.91
Litter	56.27	58.82	38.82	50.70
Cryptogams	.39	1.21	.23	.01
Bare Ground	7.24	11.98	16.14	15.78

SOIL ANALYSIS DATA --

Management unit 9, Study no: 17, Study Name: Farm Creek

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.6	6.8	58.9	22.8	18.3	3.7	19.2	211.2	1.0

PELLET GROUP DATA--

Management unit 09, Study no: 17

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	10	16	10	2
Elk	4	2	2	2
Deer	9	2	7	5
Cattle	22	11	16	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
8 (20)	1 (3)	-
27 (66)	17 (41)	14 (35)
15 (36)	38 (93)	-

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 17

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>Amelanchier utahensis</i>									
95	20	0	100	-	-	0	100	100	8/22
00	20	0	100	-	-	0	0	0	22/27
05	20	0	100	-	-	0	100	0	23/36
10	20	0	100	-	-	100	0	0	19/28
<i>Artemisia tridentata vaseyana</i>									
95	2860	8	91	1	60	23	.69	0	24/41
00	3560	11	61	29	60	19	0	1	28/39
05	3100	7	64	29	480	21	0	15	29/40
10	120	33	67	0	-	50	0	0	10/12
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
95	140	14	86	-	-	0	0	0	14/23
00	0	0	0	-	-	0	0	0	15/28
05	0	0	0	-	-	0	0	0	17/28
10	180	11	89	-	60	0	0	0	12/16
<i>Gutierrezia sarothrae</i>									
95	500	0	100	0	20	0	0	0	9/12
00	2280	2	96	2	-	0	0	0	7/8
05	940	2	98	0	-	0	0	0	9/9
10	660	18	82	0	-	0	0	0	13/19
<i>Opuntia sp.</i>									
95	1060	0	100	0	20	0	0	0	5/9
00	680	9	82	9	-	0	0	3	2/9
05	680	6	88	6	-	0	0	3	3/8
10	300	20	80	0	-	0	0	0	3/11
<i>Pediocactus simpsonii</i>									
95	40	0	100	-	-	0	0	0	2/3
00	20	0	100	-	-	0	0	0	2/3
05	100	20	80	-	-	0	0	0	2/3
10	0	0	0	-	-	0	0	0	2/4
<i>Purshia tridentata</i>									
95	2100	16	70	13	-	43	41	.95	13/37
00	2080	9	80	12	40	58	21	2	19/42
05	1980	6	85	9	-	11	86	2	18/34
10	300	7	93	0	-	47	0	0	14/29

GOOSEBERRY SPRING - TREND STUDY NO. 9-18-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 8157 ft. (2487 m)

Aspect: Southwest

Slope: 12%

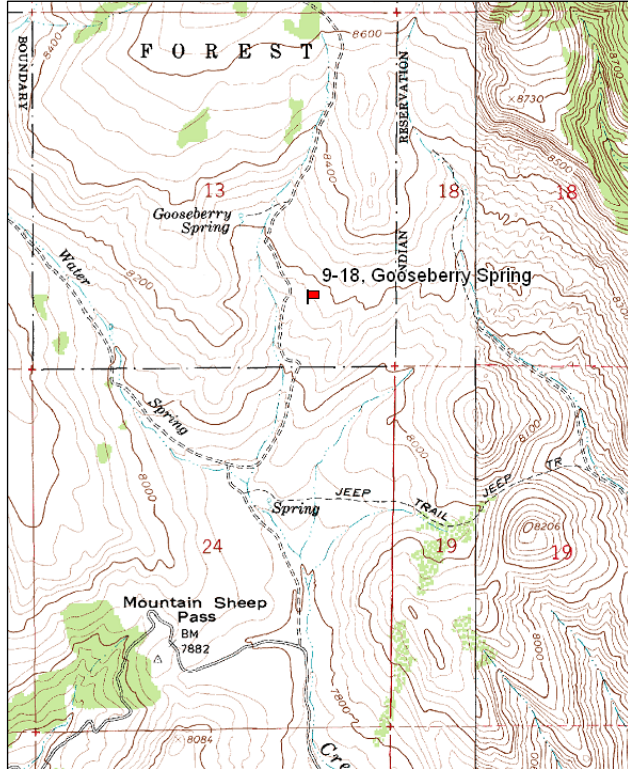
Transect bearing: 47° magnetic

Belt placement: line 1 (16 & 92ft), line 2 (30ft), line 3 (47ft), line 4 (66ft).

Directions:

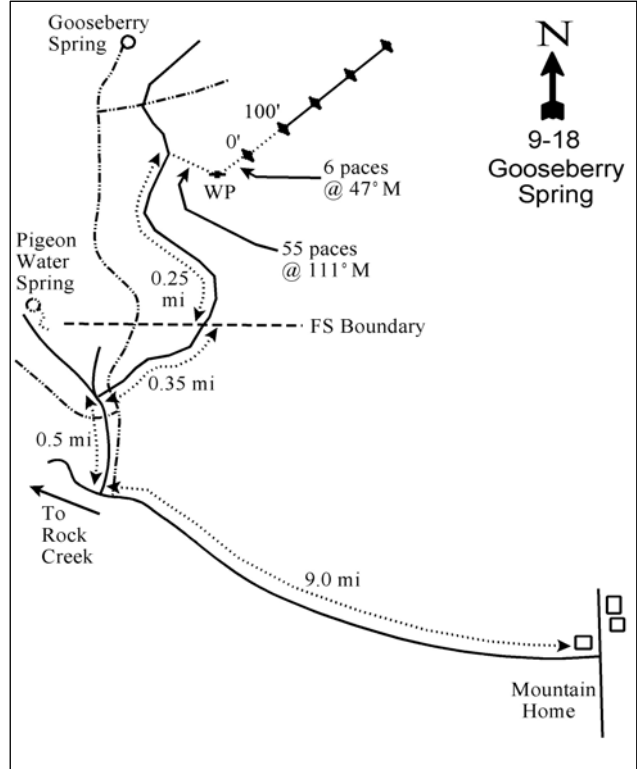
From the town of Mountain Home, travel in a northwest direction toward Rock Creek. Approximately 9.0 miles from Mountain Home, you will come to a dirt road to the right (north). Before the road, there is a sign which points to Pigeon Water Spring. Take the dirt road to the north for 0.5 miles to a three-way fork. Take the right fork for 0.35 miles to the forest boundary. From the fence, continue 0.25 miles to a bend in the road in a small drainage. From the road, the 0-foot baseline stake is approximately 55 paces up the drainage @ 111°M. The 0-foot baseline stake is marked with browse tag, #7196.

Map Name: Dry Mountain



Township: 1N Range: 6W Section: 13

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 541570 E 4480881 N

GOOSEBERRY SPRING - TREND STUDY NO. 9-18

Site Information

Site Description: This study is located on high winter range near Gooseberry Spring on the Ashley National Forest within a mixed mountain brush community with a strong black sagebrush (*Artemisia nova*) component. The baseline runs up a small draw which contains a large number of serviceberry (*Amelanchier utahensis*), snowberry (*Symphoricarpos oreophilus*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). The side hills are drier and dominated by nearly pure stands of black sagebrush. Grazing in the area is managed by the U.S. Forest Service as part of the Pigeon Water allotment. The area is on the border of crucial winter and crucial summer range for both deer and elk, and is likely used during both seasons. Intense animal use from deer, elk, cattle and possibly domestic sheep was reported in 1982. Pellet group transect data estimated moderately heavy use by elk in 2000 and 2005, but light use in 2010. Estimated use by deer was light in 2000 and 2010, with moderately heavy use in 2005. Estimated cattle use has been light since 2000 (Table - Pellet Group Data). The area is also covered by a very active ant population that infests many of the plants across the site.

Browse: The browse composition is diverse and has provided over half the total vegetation cover since 1995. Preferred key species include serviceberry, mountain big sagebrush, black sagebrush and bitterbrush. Snowberry is also abundant and provides more cover than any other species (Table - Browse Trends). Serviceberry consists of a fairly dense population of moderately large plants, with some plants partially unavailable to animals for browsing due to height or width. Health of the population is generally good with low decadence, good vigor and good recruitment of young plants. Utilization of serviceberry has been moderate to heavy over the course of the study. Mountain big sagebrush is comprised of a moderately dense stand of moderately used plants. The population has had high decadence and poor vigor at times, but both were relatively low in 2010. Recruitment of young mountain big sagebrush plants has been excellent throughout the years. Black sagebrush has a fairly dense population of moderately used plants. The population has generally been a mixture of mature and young plants with low decadence and good vigor. Bitterbrush has a small population of heavily used plants. Despite the heavy use, health of bitterbrush has been good with little decadence and excellent vigor throughout the study years (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and abundant on the site, and are comprised primarily of native perennial species. Dominant grasses on the site are mutton bluegrass (*Poa fendleriana*) and thickspike wheatgrass (*Agropyron dasystachyum*). Kentucky bluegrass (*Poa pratensis*), Sandberg bluegrass (*P. secunda*), sedge (*Carex* sp.) and prairie junegrass (*Koeleria cristata*) are also common. Many forb species are present on the site and combined forb cover is quite high, yet no one species is particularly abundant. Low growing or increaser species are prominent which include rose pussytoes (*Antennaria rosea*), desert phlox (*Phlox austromontana*), Eaton fleabane (*Erigeron eatonii*), aster (*Aster* sp.) and dandelion (*Taraxacum officinale*) (Table - Herbaceous Trends). The forb composition appears to be indicative of many years of heavy grazing.

Soil: Soils have a clay texture and neutral soil reaction (pH 7.0). Phosphorus may have limited availability for plant growth and development at 4.8 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Vegetation and litter cover have been abundant and bare ground has been moderately low throughout the sample years. Rock and pavement cover have also been moderately high, providing good protective ground cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010, but pedestals and rills are present on the steeper slopes.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** There was a large increase in the density of serviceberry plants due to a large increase in the recruitment of young plants. Other preferred browse species remained similar.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of mountain big sagebrush, black sagebrush and serviceberry decreased. Recruitment of young plants also decreased in the three species, but remained good in the serviceberry and black sagebrush population.
- **1995 to 2000 - slightly down (-1):** The density of serviceberry and mountain big sagebrush remained similar, but density of black sagebrush decreased by 33% due to a substantial decrease in the recruitment of young plants. Recruitment of young mountain big sagebrush plants increased from 6% to 13%, but poor vigor increased from 9% to 24% of the population.
- **2000 to 2005 - slightly down (-1):** Mountain big sagebrush density decreased by 31% and decadence increased from 10% to 40%. Poor vigor of big sagebrush increased slightly to 26%. Black sagebrush increased in density and recruitment of young plants increased from 1% to 15% of the population. There was little change in the serviceberry or bitterbrush populations.
- **2005 to 2010 - up (+2):** There was a large increase in the densities of serviceberry, black sagebrush and mountain big sagebrush due in large part to a substantial increase in the recruitment of young plants in all three species. Decadence and poor vigor decreased in all three species, as well. Mountain big sagebrush decadence decreased to 11% and poor vigor decreased to 7%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** The perennial grass sum of nested frequency changed little.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 20% despite an increase in cover from 10% to 14%.
- **2000 to 2005 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 18% and cover increased to 17%.
- **2005 to 2010 - slightly down (-1):** There was a 14% decrease in the sum of nested frequency of perennial grasses and cover decreased to 13%.

Forb:

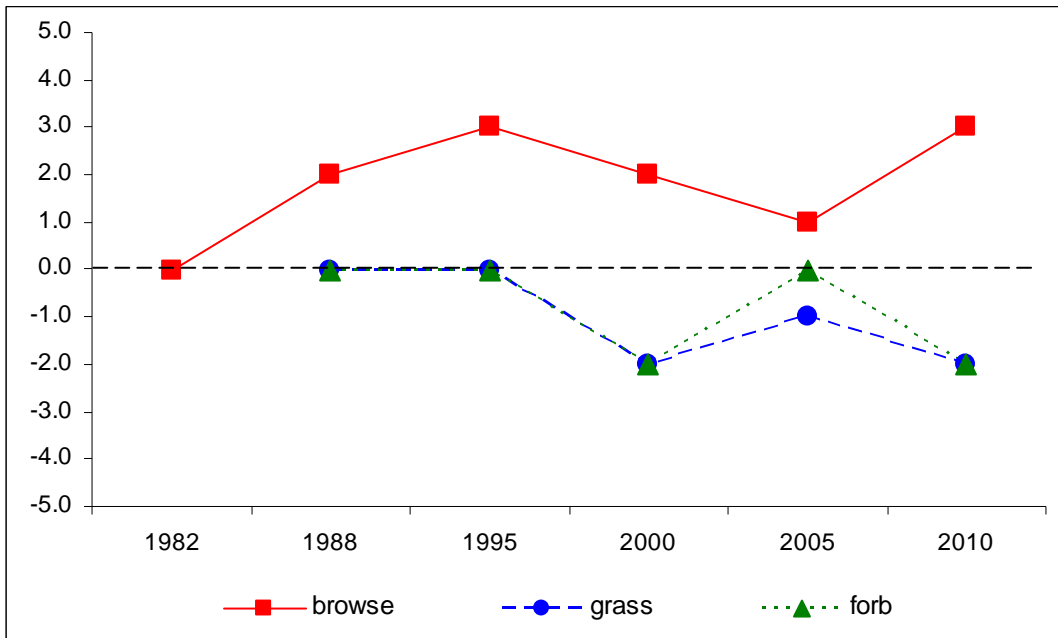
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** The sum of nested frequency of perennial forbs remained similar.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 54% and cover decreased slightly from 9% to 8%.
- **2000 to 2005 - up (+2):** The sum of nested frequency increased by 95%, though it is still below 1995 values. Cover of perennial forbs increased to 17%.
- **2005 to 2010 - down (-2):** There was a 34% decrease in the sum of nested frequency and cover decreased to 7%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
 Management unit 9, study no: 18

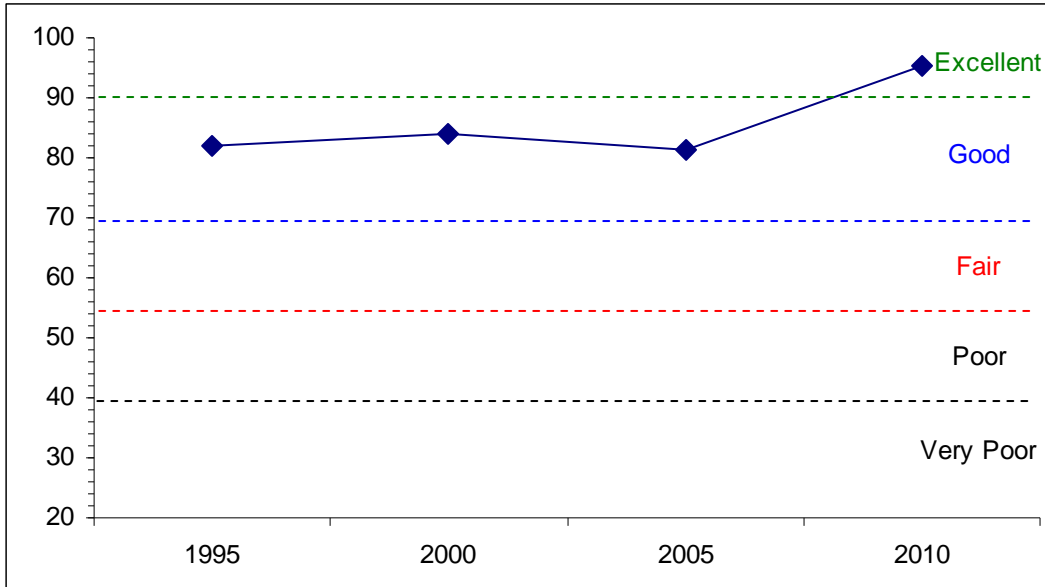
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.4	8.2	20.3	0.0	10.0	0.0	81.9	Good
00	27.2	12.5	6.2	28.0	0.0	10.0	0.0	84.0	Good
05	26.2	9.3	6.0	30.0	0.0	10.0	0.0	81.5	Good
10	30.0	14.0	15.0	26.5	0.0	10.0	0.0	95.5	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 18



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 9, Study no: 18



HERBACEOUS TRENDS--
 Management unit 09, Study no: 18

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	b237	ab200	ab195	b212	a148	2.40	3.74	4.42	3.15
G	<i>Agropyron spicatum</i>	a-	ab2	a-	ab5	b12	.03	-	.21	.19
G	<i>Bouteloua gracilis</i>	b13	a-	a-	ab8	b18	-	-	.44	.28
G	<i>Bromus anomalus</i>	3	-	4	3	4	-	.01	.03	.03
G	<i>Carex sp.</i>	c99	bc93	a41	a45	ab59	.35	.65	.32	.90
G	<i>Koeleria cristata</i>	a19	a18	a39	b68	ab46	.15	1.14	1.37	.79
G	<i>Oryzopsis hymenoides</i>	-	-	-	3	-	-	-	.03	-
G	<i>Poa fendleriana</i>	a-	bc192	c205	bc190	b171	4.03	6.61	6.17	5.31
G	<i>Poa pratensis</i>	c113	b76	a20	a30	a32	1.81	.75	1.31	.84
G	<i>Poa secunda</i>	b264	a67	a46	a60	a64	.92	.76	1.33	1.39
G	<i>Sitanion hystrix</i>	-	1	-	5	-	.00	-	.04	.00
G	<i>Stipa comata</i>	a2	c27	ab8	bc24	ab7	.29	.18	.52	.09
G	<i>Stipa lettermani</i>	c20	bc25	a2	ab8	ab5	.11	.15	.22	.21
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		770	701	560	661	566	10.13	14.01	16.45	13.23
Total for Grasses		770	701	560	661	566	10.13	14.01	16.45	13.23
F	<i>Agoseris glauca</i>	ab3	b13	a-	b8	ab6	.03	-	.03	.06
F	<i>Allium cernuum</i>	b24	b17	a-	a-	a-	.07	-	-	-
F	<i>Alyssum alyssoides (a)</i>	-	-	-	4	3	-	-	.01	.00
F	<i>Androsace septentrionalis (a)</i>	-	-	-	1	-	-	-	.00	-
F	<i>Antennaria rosea</i>	a1	b22	b34	ab27	ab19	.22	1.04	1.07	.84
F	<i>Arabis sp.</i>	ab4	a2	ab9	b14	a3	.00	.07	.06	.00
F	<i>Aster sp.</i>	39	47	40	46	23	.35	.25	.64	.32
F	<i>Astragalus convallarius</i>	b61	ab34	a16	b59	a19	.42	.32	1.29	.12

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Astragalus sp.	7	-	-	-	-	-	-	-	-
F	Astragalus spatulatus	a10	a-	ab11	b13	c39	-	.71	.14	.40
F	Astragalus tenellus	c71	b29	a6	ab11	ab19	.56	.06	.31	.40
F	Balsamorhiza hookeri	b23	ab30	a7	b25	ab19	.40	.07	.46	.18
F	Balsamorhiza sagittata	-	-	-	2	6	-	-	.15	.06
F	Calochortus nuttallii	a-	b39	a1	b24	a5	.49	.00	.10	.02
F	Castilleja chromosa	bc13	c20	a-	b-	a5	.26	-	.01	.06
F	Castilleja linariaefolia	ab4	b22	a5	ab10	ab17	.18	.03	.07	.14
F	Chaenactis douglasii	1	3	3	2	-	.03	.03	.00	-
F	Cirsium undulatum	b14	ab9	ab7	a2	a1	.07	.09	.18	.03
F	Collinsia parviflora (a)	-	b35	ab9	a17	a8	.29	.07	.04	.01
F	Collomia linearis (a)	-	b27	a-	b22	b12	.16	-	.08	.05
F	Comandra pallida	53	50	27	39	27	.21	.36	.41	.23
F	Cordylanthus ramosus (a)	-	-	-	9	5	-	-	.02	.06
F	Crepis acuminata	a14	bc43	a9	c61	ab18	.32	.07	1.29	.14
F	Cryptantha sp.	-	-	-	2	-	-	-	.00	-
F	Cymopterus sp.	a2	b57	a-	b50	a6	.16	-	.75	.02
F	Cynoglossum officinale	-	2	-	7	-	.00	-	.04	-
F	Erigeron eatonii	c97	b55	a13	b37	a14	.53	.10	.63	.10
F	Eriogonum alatum	7	28	9	10	22	.10	.07	.13	.16
F	Eriogonum racemosum	-	-	-	-	4	-	-	-	.01
F	Eriogonum umbellatum	5	14	9	11	16	.27	.09	.33	.20
F	Euphorbia brachycera	1	-	-	-	-	-	-	-	-
F	Geranium richardsonii	-	1	-	-	1	.03	-	.00	.03
F	Hedysarum boreale	-	-	-	1	3	-	-	.03	.06
F	Hymenoxys acaulis	b24	ab4	a1	ab8	ab6	.06	.03	.04	.01
F	Lappula occidentalis (a)	-	-	-	-	2	-	-	-	.00
F	Lesquerella sp.	3	-	-	-	-	-	-	-	-
F	Leucelene ericoides	-	-	-	6	2	-	-	.04	.06
F	Linum lewisii	3	-	-	2	-	-	-	.00	-
F	Lithospermum sp.	b14	ab8	a5	a1	a2	.01	.03	.00	.03
F	Lupinus argenteus	b77	ab54	ab56	ab69	a50	.98	.89	4.28	1.25
F	Lychnis drummondii	a-	ab5	a3	b11	a-	.01	.03	.10	-
F	Lygodesmia grandiflora	-	1	-	-	-	.01	-	-	-
F	Machaeranthera canescens	-	-	4	-	2	-	.00	-	.00
F	Microsteris gracilis (a)	-	-	-	3	3	-	-	.00	.00
F	Orthocarpus tolmiei (a)	ab11	b19	a-	ab13	a1	.16	-	.03	.00
F	Penstemon caespitosus	a10	a10	a7	ab17	b31	.10	.09	.28	.35
F	Penstemon dolius	8	7	-	-	-	.21	-	-	-
F	Penstemon fremontii	-	-	-	6	-	-	-	.16	-
F	Penstemon humilis	a-	a-	a-	b17	a6	-	-	.22	.01
F	Penstemon pachyphyllus	-	1	8	-	-	.01	.21	-	-
F	Penstemon sp.	b23	b28	a-	a-	a-	.16	-	-	-
F	Penstemon watsonii	-	-	-	4	4	-	-	.18	.03
F	Petradoria pumila	b59	a24	a33	a32	a17	.72	.70	1.02	.20
F	Phlox austromontana	c93	bc71	a34	ab48	ab51	.94	1.39	.60	.92

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Phlox longifolia	bc53	c63	a9	ab27	a11	.22	.09	.16	.02
F	Physaria sp.	-	3	-	-	-	.00	-	-	-
F	Polygonum douglasii (a)	-	c16	a-	bc7	ab3	.03	-	.02	.00
F	Potentilla gracilis	18	17	7	16	19	.13	.04	.29	.31
F	Schoenocrambe linifolia	-	3	-	1	-	.00	-	.00	-
F	Senecio multilobatus	b70	a6	a5	a4	a6	.01	.01	.04	.01
F	Sphaeralcea coccinea	31	20	19	26	14	.10	.41	.30	.17
F	Taraxacum officinale	b16	b16	b10	b14	a-	.05	.07	.15	-
F	Townsendia sp.	-	-	-	-	1	-	-	-	.00
F	Tragopogon dubius	a-	a-	a-	b15	a-	-	-	.28	-
F	Trifolium gymnocarpon	-	-	3	5	6	-	.03	.01	.03
F	Viguiera multiflora	3	-	-	-	-	-	-	-	-
F	Zigadenus elegans	a-	ab3	a-	c11	bc11	.00	-	.06	.07
Total for Annual Forbs		11	97	9	76	37	0.66	0.07	0.23	0.15
Total for Perennial Forbs		959	881	410	801	531	8.54	7.45	16.47	7.16
Total for Forbs		970	978	419	877	568	9.20	7.52	16.70	7.32

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

BROWSE TRENDS--

Management unit 09, Study no: 18

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	48	51	53	57	6.88	6.53	6.52	9.64
B	Artemisia frigida	0	0	1	1	-	-	-	-
B	Artemisia nova	43	35	38	49	4.39	3.34	4.17	4.92
B	Artemisia tridentata vaseyana	64	67	58	61	8.00	6.43	5.02	3.44
B	Chrysothamnus depressus	4	5	3	1	.06	.16	.18	.03
B	Chrysothamnus viscidiflorus lanceolatus	57	44	46	46	2.43	1.68	2.28	1.75
B	Echinocereus sp.	2	1	0	0	.01	.03	-	-
B	Eriogonum corymbosum	1	0	1	4	.15	-	.03	.06
B	Gutierrezia sarothrae	17	17	25	30	.18	.16	1.27	.61
B	Mahonia repens	1	1	2	2	.18	-	.18	-
B	Pediocactus simpsonii	0	0	4	5	-	-	.04	.03
B	Purshia tridentata	19	16	17	19	2.84	3.32	2.61	4.80
B	Quercus gambelii	0	1	0	0	-	-	-	-
B	Ribes cereum cereum	1	0	1	1	.03	-	.63	.38
B	Symphoricarpos oreophilus	63	70	70	72	11.79	10.39	12.44	11.19
B	Tetradymia canescens	5	3	5	4	.03	.00	.06	.01
Total for Browse		325	311	324	352	36.99	32.08	35.47	36.91

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 18

Species	Percent Cover	
	'05	'10
<i>Amelanchier utahensis</i>	10.48	14.13
<i>Artemisia frigida</i>	.01	-
<i>Artemisia nova</i>	4.80	6.01
<i>Artemisia tridentata vaseyana</i>	5.44	3.98
<i>Chrysothamnus depressus</i>	-	.18
<i>Chrysothamnus viscidiflorus lanceolatus</i>	3.45	2.59
<i>Eriogonum corymbosum</i>	.05	-
<i>Gutierrezia sarothrae</i>	1.63	1.36
<i>Purshia tridentata</i>	4.30	4.50
<i>Ribes cereum cereum</i>	.36	.45
<i>Symphoricarpos oreophilus</i>	20.91	19.56
<i>Tetradymia canescens</i>	-	.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 18

Species	Average leader growth (in)	
	'05	'10
<i>Amelanchier utahensis</i>	2.2	4.1
<i>Artemisia tridentata vaseyana</i>	1.9	1.5
<i>Purshia tridentata</i>	1.6	2.1

BASIC COVER--

Management unit 09, Study no: 18

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.50	13.00	50.28	48.70	62.87	53.17
Rock	6.50	9.00	11.72	12.62	9.74	11.42
Pavement	2.25	4.50	.95	2.19	1.36	3.96
Litter	54.75	57.00	48.87	47.49	28.22	40.89
Cryptogams	1.75	0	.01	.16	.10	.32
Bare Ground	25.50	16.50	7.05	14.61	12.23	13.14

SOIL ANALYSIS DATA --

Management unit 9, Study no: 18, Study Name: Gooseberry Spring

Effective rooting depth (in)	pH	caly			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.6	7.0	37.9	20.8	41.3	2.2	4.8	240.0	0.8

PELLET GROUP DATA--

Management unit 09, Study no: 18

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	2	-	7	-
Elk	20	10	17	2
Deer	12	7	18	21
Cattle	4	1	3	5

Days use per acre (ha)		
'00	'05	'10
-	-	-
48 (117)	44 (107)	19 (46)
17 (41)	43 (106)	17 (43)
7 (18)	10 (25)	15 (36)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 18

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier utahensis									
82	2131	19	72	9	133	31	56	3	45/18
88	3265	69	22	8	1666	31	18	8	47/31
95	1240	26	73	2	40	27	21	0	35/41
00	1380	19	71	10	80	26	35	6	33/34
05	1380	17	68	14	20	16	74	9	43/43
10	1940	35	64	1	-	32	15	4	41/45
Artemisia frigida									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	40	0	100	-	-	0	0	0	7/9
10	40	0	100	-	-	0	0	0	7/17
Artemisia nova									
82	1931	41	48	10	-	45	7	10	12/15
88	1798	48	37	15	66	30	0	11	9/14
95	4360	28	67	6	200	47	6	5	10/21
00	2900	1	89	10	200	3	.68	3	12/20
05	4700	15	72	12	1520	2	0	8	10/17
10	6260	43	51	6	440	3	5	3	8/15
Artemisia tridentata vaseyana									
82	3531	15	62	23	-	38	13	26	18/16
88	3064	13	61	26	-	22	2	9	18/14
95	2420	6	86	8	-	60	8	9	21/29
00	2360	13	77	10	60	18	4	24	21/27
05	1640	11	49	40	220	39	15	26	21/32
10	2640	36	53	11	260	9	26	7	20/30

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Chrysothamnus depressus									
82	533	0	100	-	-	0	100	38	2/6
88	532	88	12	-	-	0	0	0	4/5
95	100	60	40	-	-	0	0	0	6/12
00	180	11	89	-	-	0	0	0	4/9
05	220	0	100	-	-	18	0	0	3/7
10	100	40	60	-	-	0	0	0	-/-
Chrysothamnus viscidiflorus lanceolatus									
82	4265	11	89	0	-	22	61	22	8/12
88	6798	69	30	1	66	.98	0	.98	10/12
95	3220	17	83	0	-	1	0	0	12/13
00	2160	30	67	4	-	5	6	0	9/10
05	2240	8	90	2	-	0	0	.89	11/14
10	2160	1	97	2	20	0	.92	2	11/13
Echinocereus sp.									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	50	50	-	-	0	0	0	2/4
00	20	100	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
Eriogonum corymbosum									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	0	100	-	-	0	0	0	7/12
00	0	0	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	7/6
10	120	17	83	-	-	0	17	0	9/14
Gutierrezia sarothrae									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	580	24	76	-	-	0	0	0	8/10
00	1040	4	96	-	-	0	0	0	4/5
05	3060	11	89	-	-	0	0	0	7/9
10	2620	2	98	-	-	0	0	0	6/8
Mahonia repens									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	0	100	-	-	0	0	0	5/6
00	60	0	100	-	-	0	0	0	-/-
05	200	0	100	-	-	0	0	0	4/5
10	120	0	100	-	-	0	0	0	2/4

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Pediocactus simpsonii</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	160	0	100	-	-	0	0	0	1/2	
10	160	13	88	-	-	0	0	0	1/3	
<i>Purshia tridentata</i>										
82	333	0	100	0	-	0	100	0	13/19	
88	399	33	67	0	-	33	67	0	17/23	
95	520	4	92	4	-	62	4	0	16/38	
00	420	10	90	0	-	24	24	0	19/41	
05	520	0	92	8	-	4	96	0	22/51	
10	620	13	87	0	-	35	48	0	21/53	
<i>Quercus gambelii</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	80	0	100	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
<i>Ribes cereum cereum</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	29/52	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	39/47	
10	20	0	100	-	-	100	0	0	56/57	
<i>Symphoricarpos oreophilus</i>										
82	14131	28	71	1	399	30	4	3	19/23	
88	14065	66	33	1	2266	5	.47	3	18/17	
95	4400	42	58	0	20	20	5	0	16/28	
00	4240	18	82	0	220	.94	0	0	15/32	
05	5340	15	84	1	-	0	0	1	15/28	
10	6940	14	86	0	20	2	5	0	14/24	
<i>Tetradymia canescens</i>										
82	66	100	0	0	-	0	100	0	-/-	
88	665	70	30	0	-	10	0	0	4/3	
95	240	42	58	0	-	0	0	0	9/8	
00	60	67	33	0	-	0	33	0	6/6	
05	140	71	29	0	-	14	0	0	8/10	
10	100	60	20	20	-	0	0	20	7/10	

MOSBY MOUNTAIN SOUTH - TREND STUDY NO. 9-19-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Upland Stony Loam \(Mountain big sagebrush\), R047XC336UT](#)

Land Ownership: BLM

Elevation: 8000 ft. (2439 m)

Aspect: Southeast

Slope: 2%-3%

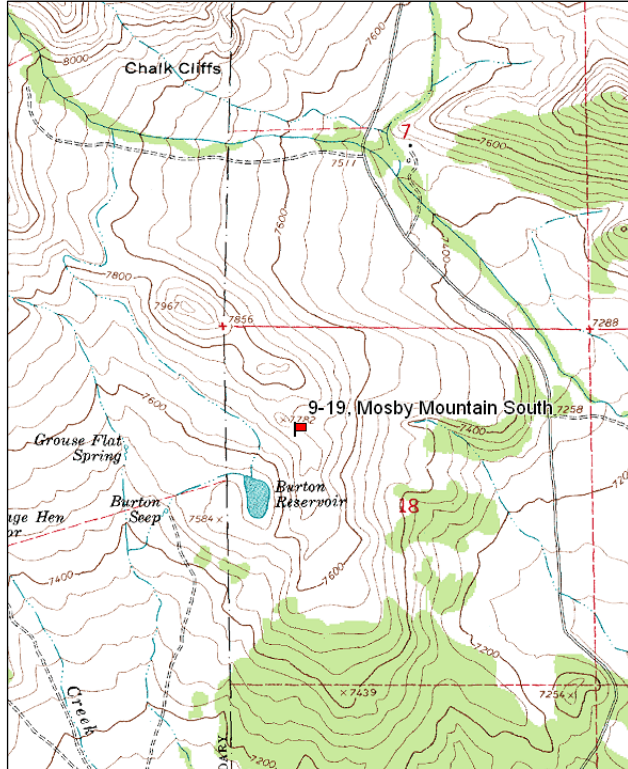
Transect bearing: 167° magnetic

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

Directions:

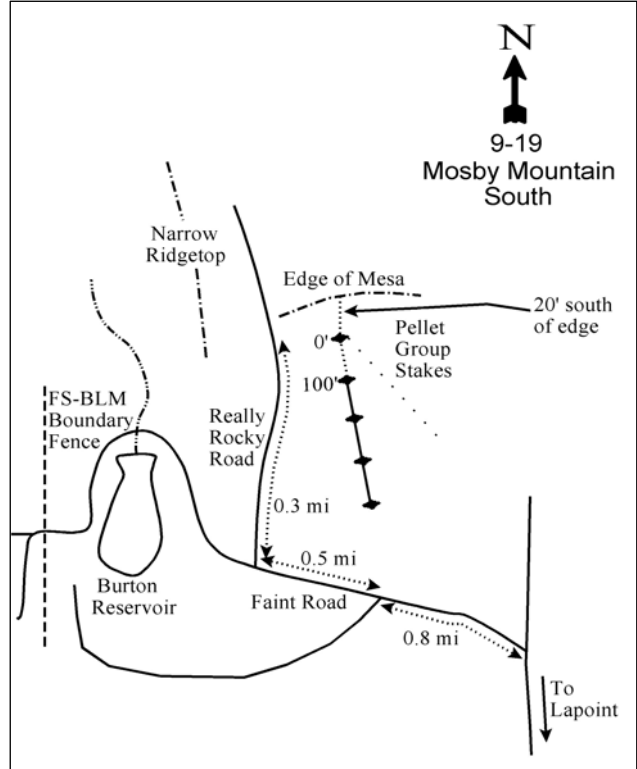
Just east of Lapoint, turn north onto Paradise Park Rd from highway 121. Go 6.9 miles to a fork, keep left toward Mosby Mountain. Proceed 4.8 miles and turn left onto a dirt road heading west. Go 0.15 miles to a 3-way intersection, bear left on the main road. Continue 0.45 miles to a fork, stay left. Go 0.2 miles to another fork, stay to the right. Go 0.5 miles to an intersection on the ridge above Burton Reservoir. Drive 0.25 miles north on a very rocky road to the study site. A tall, bent, and twisted fencepost is the 0-foot baseline stake. It is marked by browse tag #7870.

Map Name: Lake Mountain



Township: 3S Range: 19E Section: 18

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 598210 E 4490354 N

MOSBY MOUNTAIN SOUTH - TREND STUDY NO. 9-19

Site Information

Site Description: The study is located on a narrow ridge top which drops off sharply to Burton Reservoir on the west. To the east is a sagebrush (*Artemisia spp.*), pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) filled valley. A large fire burned the entire area after the initial reading in 1988 and the majority of the sagebrush was eradicated. Springs are common in the area and most have been developed for cattle. According to U.S. Forest Service personnel, the area is an important wintering range for several hundred elk. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Mosby allotment. Cattle were present on the site in 2000, however it was noted that most of the cattle were distributed close to the reservoir about a half mile away. Pellet group transect data has estimated light to moderately light use by elk, deer and cattle since 2000. Grouse use appears to be common with increasing numbers of pellets sampled since 2000 (Table - Pellet Group Data).

Browse: Mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) is the dominant browse species on the site and was comprised of a very dense stand at the outset of the study in 1988. The fire removed much of the mountain big sagebrush from the site and the population has stabilized at a low density from 1995 to 2005. Density of mountain big sagebrush increased substantially in 2010 with a large increase in the recruitment of young plants. Utilization of sagebrush has been mostly moderate over the course of the study, but heavy use was noted in 2010 (Table - Browse Characteristics). Cover of mountain big sagebrush has steadily increased since 1995 (Table - Browse Trends). Black sagebrush was also fairly abundant in 1988, prior to the fire, but has maintained a very small population since then. Utilization of black sagebrush has been mostly light, but all of the black sagebrush plants displayed heavy use in 2010. Bitterbrush (*Purshia tridentata*) and serviceberry (*Amelanchier utahensis*) plants are scattered throughout the area in relatively low densities. Bitterbrush is slightly more abundant than serviceberry, but both species have displayed heavy use over the course of the study (Table - Browse Characteristics).

Herbaceous Understory: Grasses are fairly diverse, but are dominated by three species: crested wheatgrass (*Agropyron cristatum*), needle-and-thread (*Stipa comata*) and the annual species cheatgrass (*Bromus tectorum*). Crested wheatgrass has increased steadily in nested frequency and cover on the site since 1995. Cheatgrass has fluctuated on the site, but was prevalent in 1995 and 2005. Other perennial species found in limited abundance on the site include thickspike wheatgrass (*Agropyron dasystachyum*), intermediate wheatgrass (*A. intermedium*), bluebunch wheatgrass (*A. spicatum*), mutton bluegrass (*Poa fendleriana*) and bottlebrush squirreltail (*Sitanion hystrix*). Perennial forbs are moderately diverse, but only hairy goldaster (*Heterotheca villosa*) and silvery lupine (*Lupinus argenteus*) are common. These two species provide the majority of the forb cover (Table - Herbaceous Trends).

Soil: The soil is very rocky and has a sandy loam texture with a neutral soil reaction (pH of 6.6) (Table - Soil Analysis Data). Rocks of all sizes are distributed continuously over the surface. They are cobble type rocks from alluvial deposits from the Uinta Mountains. Rock cover on the site is high leaving little bare ground cover. There was a considerable amount of litter in 1988, but litter cover declined after the fire and has remained moderately low (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1988 to 1995 - down (-2):** A wildfire removed much of the browse from the site.
- **1995 to 2000 - stable (0):** There was little change in the density of any of the preferred browse species. Decadence of mountain big sagebrush decreased from 30% to 5%, but there was no new recruitment of young plants. Cover of mountain big sagebrush increased slightly from 2% to 3%.

- **2000 to 2005 - stable (0):** The density of preferred browse species remained similar, though cover of mountain big sagebrush increased to 6%. Recruitment of young mountain big sagebrush plants also increased to 11%, but decadence also increased to 14%.
- **2005 to 2010 - up (+2):** The density of mountain big sagebrush increased three-fold from 1,320 plants/acre to 4,440 plants/acre and cover increased to 8%. Much of the increase in density was due to a large increase in the recruitment of young plants to 42% of the population. Decadence of mountain big sagebrush decreased to 5%.

Grass:

- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial grasses increased by 39%.
- **1995 to 2000 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 17% despite an increase in cover from 13% to 19%.
- **2000 to 2005 - up (+2):** There was a 44% increase in the sum of nested frequency of perennial grasses and cover increased to 23%.
- **2005 to 2010 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 16% and cover decreased to 16%.

Forb:

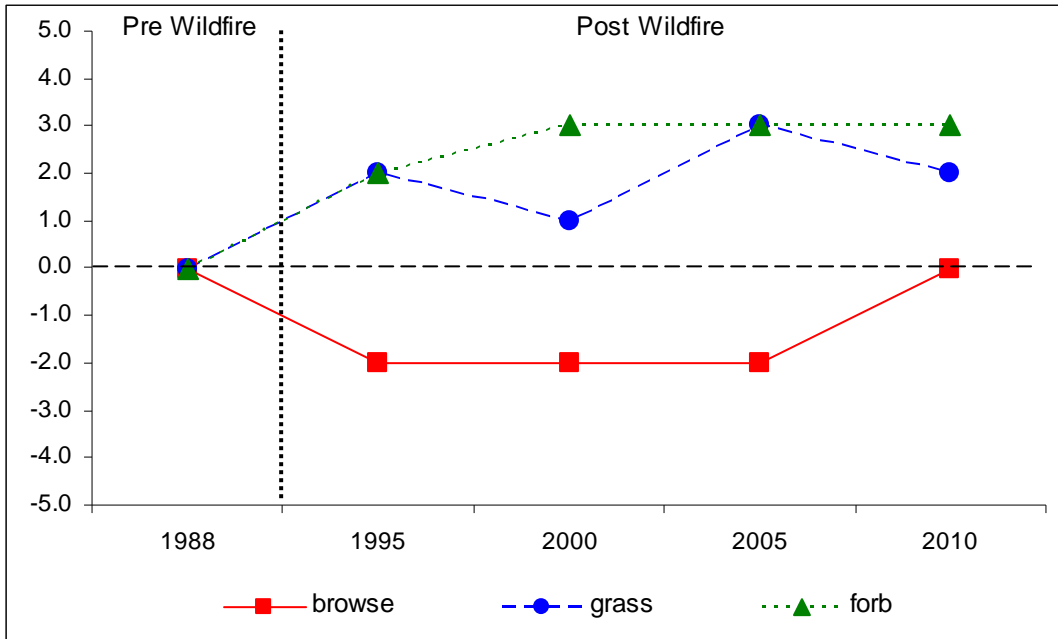
- **1988 to 1995 - up (+2):** The perennial forb sum of nested frequency increased two-fold.
- **1995 to 2000 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 14% and cover increased from 7% to 10%.
- **2000 to 2005 - stable (0):** The sum of nested frequency of perennial forbs remained similar, though cover increased slightly to 12%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial forbs despite a large decrease in cover to 5%. The decrease in cover was due to a substantial decrease in the cover of hairy goldaster and silvery lupine.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 9, study no: 19

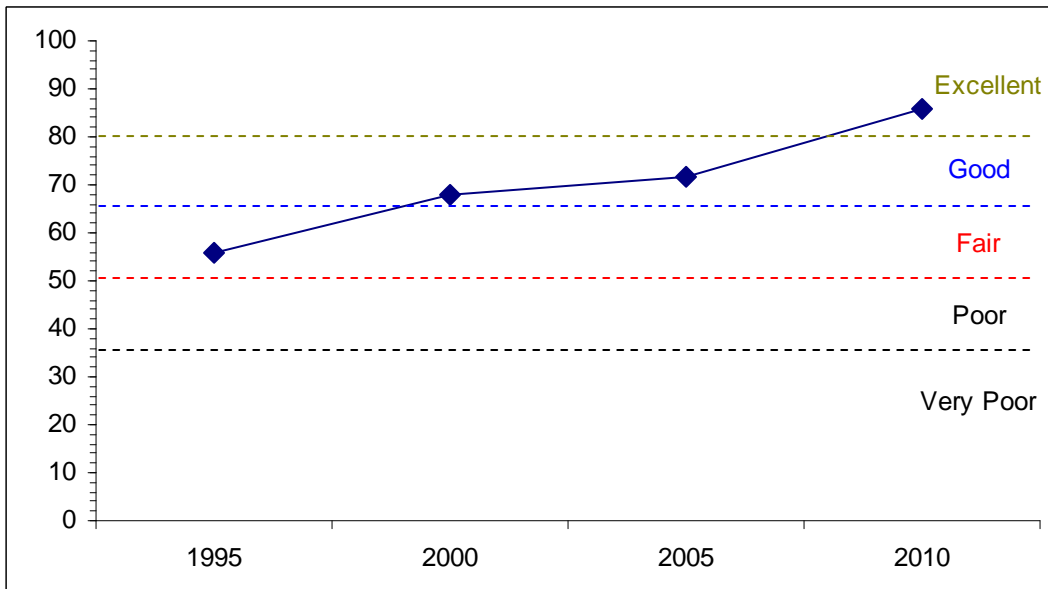
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	7.7	11.3	2.9	26.5	-2.7	10.0	0.0	55.8	Fair
00	10.8	14.4	2.8	30.0	0.0	10.0	0.0	68.0	Good
05	16.8	12.8	4.5	30.0	-2.5	10.0	0.0	71.5	Good
10	20.8	14.3	12.2	30.0	-0.5	9.3	0.0	86.0	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 19



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 9, Study no: 19



HERBACEOUS TRENDS--
Management unit 09, Study no: 19

T y p e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	a-	b144	b159	b175	c225	3.26	5.83	6.80	8.48
G	Agropyron dasystachyum	a-	c74	ab4	c48	b14	1.99	.04	.56	.03
G	Agropyron intermedium	a-	bc32	a2	ab13	c34	.32	.00	.31	.43
G	Agropyron spicatum	d93	bc31	b16	c56	a-	.61	.36	2.08	-
G	Bouteloua gracilis	b27	a3	a-	a-	a6	.03	-	-	.18
G	Bromus japonicus (a)	-	-	-	2	3	-	-	.00	.00
G	Bromus tectorum (a)	-	d298	a5	c239	b141	3.60	.03	3.37	.70
G	Carex sp.	7	9	11	7	10	.02	.10	.06	.02
G	Festuca ovina	-	-	-	3	-	-	-	.03	-
G	Koeleria cristata	-	-	-	7	5	-	-	.36	.06
G	Oryzopsis hymenoides	-	-	-	-	-	-	-	.00	-
G	Poa fendleriana	a-	ab4	b22	c43	c40	.03	.30	1.29	.71
G	Poa pratensis	ab25	b40	a5	a5	a8	.88	.18	.06	.18
G	Poa secunda	b66	a2	a18	a5	a11	.00	.30	.04	.12
G	Sitanion hystrix	c155	a40	a18	b98	a38	.31	.51	2.39	.50
G	Sporobolus cryptandrus	-	2	7	-	-	.00	.04	-	-
G	Stipa comata	a31	b181	b205	b211	b174	5.77	11.26	8.69	5.10
Total for Annual Grasses		0	298	5	241	144	3.60	0.03	3.38	0.71
Total for Perennial Grasses		404	562	467	671	565	13.25	18.95	22.70	15.85
Total for Grasses		404	860	472	912	709	16.86	18.99	26.08	16.56
F	Agoseris glauca	-	-	-	6	2	-	-	.03	.00
F	Allium sp.	a-	a5	a-	b19	ab8	.01	-	.07	.02
F	Arabis sp.	ab7	a3	a2	b13	a-	.00	.03	.08	-
F	Artemisia ludoviciana	-	-	3	-	-	-	.15	-	-
F	Aster sp.	a-	ab4	b10	a-	a-	.01	.10	-	-
F	Astragalus purshii	8	-	-	-	-	-	-	-	-
F	Balsamorhiza hookeri	-	3	-	1	4	.04	-	.15	.03
F	Calochortus nuttallii	-	-	-	-	2	-	-	-	.00
F	Castilleja linariaefolia	-	-	-	2	5	-	-	.03	.06
F	Chenopodium leptophyllum(a)	-	b14	a-	a-	a-	.02	-	-	-
F	Collinsia parviflora (a)	-	a8	a2	b30	a8	.01	.00	.13	.01
F	Collomia linearis (a)	-	c29	a-	b9	a-	.07	-	.02	-
F	Comandra pallida	3	-	1	4	9	-	.03	.03	.04
F	Cryptantha sp.	-	1	-	-	4	.00	-	-	.01
F	Cymopterus sp.	-	-	-	3	-	-	-	.03	-
F	Descurainia pinnata (a)	-	8	-	-	-	.01	-	-	-
F	Draba sp. (a)	-	1	-	6	-	.03	-	.01	-
F	Erigeron divergens	-	-	-	7	5	-	-	.12	.06
F	Erigeron eatonii	-	-	-	1	-	-	-	.00	-
F	Erigeron flagellaris	-	1	2	2	-	.03	.03	.03	-
F	Eriogonum racemosum	25	6	3	9	14	.16	.06	.10	.25
F	Heterotheca villosa	a18	b142	b171	b143	b146	4.69	6.92	7.59	3.15
F	Hymenoxys acaulis	2	1	-	-	-	.00	-	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Lappula occidentalis (a)	-	3	-	1	-	.01	-	.00	-
F	Lepidium densiflorum (a)	-	_b 44	_a 2	_a 7	_a -	.15	.03	.02	-
F	Lithospermum sp.	-	-	4	-	-	-	.01	-	-
F	Lomatium sp.	-	-	-	6	3	-	-	.09	.00
F	Lupinus argenteus	_a 13	_b 41	_c 72	_{ab} 37	_b 37	1.75	2.72	3.26	.73
F	Machaeranthera grindelioides	-	-	-	1	2	-	-	.03	.03
F	Oenothera pallida	1	-	-	-	-	-	-	-	-
F	Penstemon sp.	5	5	-	4	5	.04	-	.06	.06
F	Petradoria pumila	8	3	-	4	1	.15	-	.06	.03
F	Phlox longifolia	9	-	-	-	-	-	-	-	-
F	Polygonum douglasii (a)	-	_c 29	_a -	_b 10	_a 2	.07	-	.02	.01
F	Sedum lanceolatum	1	-	-	-	-	-	-	-	-
F	Senecio multilobatus	1	4	8	3	3	.01	.06	.06	.03
F	Sphaeralcea coccinea	5	11	2	11	11	.09	.01	.08	.10
F	Taraxacum officinale	-	3	-	3	-	.01	-	.03	-
F	Tragopogon dubius	_a -	_b 10	_a -	_a 1	_a 2	.06	-	.01	.00
Total for Annual Forbs		0	136	4	63	10	0.39	0.03	0.22	0.02
Total for Perennial Forbs		106	243	278	280	263	7.09	10.14	12.00	4.67
Total for Forbs		106	379	282	343	273	7.49	10.18	12.23	4.69

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

BROWSE TRENDS--

Management unit 09, Study no: 19

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	10	11	8	9	1.94	2.63	3.87	4.69
B	Artemisia nova	7	4	5	8	.18	.03	.53	.15
B	Artemisia tridentata vaseyana	33	34	43	71	2.27	3.00	6.06	7.56
B	Ceanothus fendleri	0	0	1	0	-	-	-	-
B	Chrysothamnus nauseosus graveolens	0	0	0	1	-	.03	-	.53
B	Chrysothamnus viscidiflorus lanceolatus	3	0	2	1	.15	-	-	-
B	Eriogonum heracleoides	3	6	4	5	.66	.41	.38	.18
B	Gutierrezia sarothrae	12	23	32	31	.31	.63	.76	1.09
B	Opuntia sp.	19	24	38	44	.41	.41	.49	.84
B	Pediocactus simpsonii	6	3	1	9	.45	.03	.03	.03
B	Purshia tridentata	14	19	18	18	1.16	2.05	1.81	2.75
Total for Browse		107	124	152	197	7.55	9.25	13.94	17.85

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 19

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	4.46	5.28
Artemisia nova	.26	.81
Artemisia tridentata vaseyana	7.01	11.89
Chrysothamnus nauseosus graveolens	-	.15
Eriogonum heracleoides	.13	.13
Gutierrezia sarothrae	1.31	.75
Opuntia sp.	.43	1.31
Pediocactus simpsonii	-	.06
Purshia tridentata	2.41	3.36

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 19

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	3.5	2.5
Artemisia tridentata vaseyana	1.9	1.7
Purshia tridentata	2.7	2.4

BASIC COVER--

Management unit 09, Study no: 19

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	7.50	40.06	42.06	50.70	39.57
Rock	16.50	26.87	26.17	30.12	25.98
Pavement	1.00	2.96	5.90	3.72	5.55
Litter	67.00	46.25	37.31	20.71	38.86
Cryptogams	0	.12	.15	.01	.07
Bare Ground	8.00	3.95	10.04	7.76	10.04

SOIL ANALYSIS DATA --

Management unit 9, Study no: 19, Study Name: Mosby Mountain South

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
6.8	6.6	72.0	13.4	14.6	8.0	19.6	208.0	0.6

PELLET GROUP DATA--

Management unit 09, Study no: 19

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	3	13	42	6
Grouse	-	1	4	2
Elk	30	12	10	3
Deer	19	6	16	16
Cattle	1	7	10	9

Days use per acre (ha)		
'00	'05	'10
-	-	-
35/acre	53/acre	78/acre
15 (37)	4 (10)	6 (15)
7 (17)	22 (55)	29 (71)
9 (22)	22 (54)	8 (20)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 19

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>Amelanchier utahensis</i>									
88	599	100	0	-	-	22	67	44	-/-
95	220	0	100	-	-	64	18	9	25/34
00	220	0	100	-	-	45	18	0	27/47
05	180	11	89	-	-	44	44	0	31/57
10	180	11	89	-	20	11	89	0	34/54
<i>Artemisia nova</i>									
88	2864	35	9	56	199	47	5	5	12/20
95	240	17	67	17	-	67	33	0	7/18
00	120	0	100	0	-	17	33	0	18/28
05	180	0	89	11	-	11	0	11	11/21
10	280	0	100	0	-	0	100	0	9/22
<i>Artemisia tridentata vaseyana</i>									
88	7531	32	35	34	199	47	4	2	14/21
95	1380	10	59	30	-	72	3	1	10/16
00	1280	0	95	5	60	36	5	2	14/23
05	1320	11	76	14	440	29	3	6	18/32
10	4440	42	53	5	20	17	23	3	16/29
<i>Ceanothus fendleri</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	9/31
00	0	0	0	-	-	0	0	0	10/41
05	20	0	100	-	-	0	0	0	6/10
10	0	0	0	-	-	0	0	0	7/22
<i>Chrysothamnus nauseosus graveolens</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	24/24
00	0	0	0	-	-	0	0	0	27/41
05	0	0	0	-	-	0	0	0	26/36
10	20	0	100	-	-	0	0	0	30/42
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
88	0	0	0	0	-	0	0	0	-/-
95	60	0	100	0	-	0	0	0	12/17
00	0	0	0	0	-	0	0	0	7/17
05	40	0	50	50	-	0	0	0	10/13
10	20	0	100	0	-	0	100	0	6/12

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>Eriogonum heracleoides</i>									
88	0	0	0	-	-	0	0	0	-/-
95	140	0	100	-	-	0	0	0	5/22
00	180	0	100	-	-	11	0	0	3/17
05	100	0	100	-	-	0	0	0	3/22
10	180	0	100	-	20	0	0	0	3/8
<i>Gutierrezia sarothrae</i>									
88	1999	0	97	3	-	0	0	0	6/6
95	440	5	95	0	40	0	0	0	7/9
00	1980	0	100	0	-	0	0	0	6/8
05	2260	1	96	3	-	.88	0	.88	8/9
10	1620	17	81	1	-	0	0	1	7/10
<i>Opuntia sp.</i>									
88	1732	96	4	0	599	0	0	8	2/10
95	580	24	76	0	-	0	0	0	3/10
00	800	8	90	3	-	0	0	0	2/10
05	1220	30	64	7	-	0	0	3	2/9
10	1420	7	93	0	-	0	0	0	2/11
<i>Pediocactus simpsonii</i>									
88	0	0	0	-	-	0	0	0	-/-
95	120	33	67	-	-	0	0	0	2/3
00	60	0	100	-	-	0	0	0	1/3
05	20	0	100	-	-	0	0	0	2/2
10	240	0	100	-	-	0	0	0	1/4
<i>Purshia tridentata</i>									
88	466	29	71	-	-	0	86	0	12/43
95	320	6	94	-	20	44	44	0	7/26
00	380	21	79	-	-	11	84	0	7/33
05	420	0	100	-	-	5	95	0	9/39
10	420	0	100	-	-	0	95	5	8/41
<i>Symphoricarpos oreophilus</i>									
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	3/11

SEEP HOLLOW - TREND STUDY NO. 9-20-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Ute Tribe

Elevation: 7947 ft. (2423 m)

Aspect: East

Slope: 28%

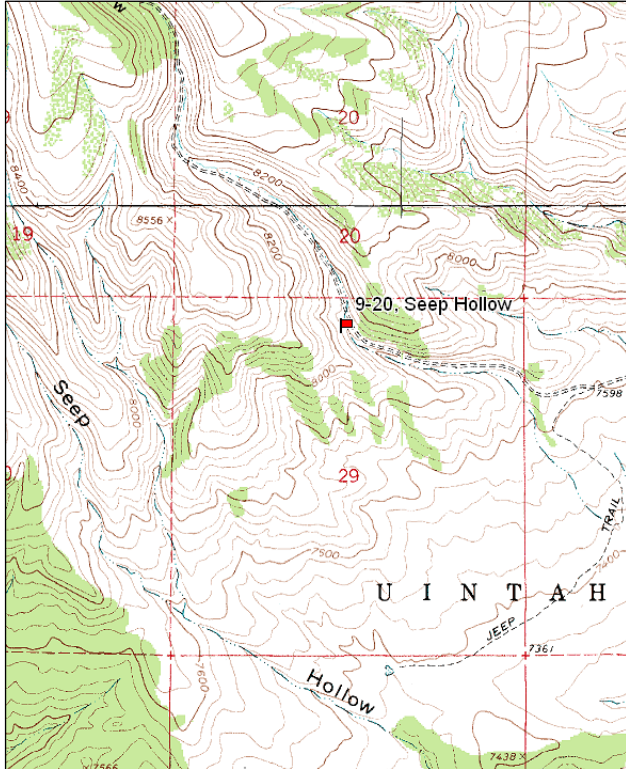
Transect bearing: 0'-100': 329° magnetic, 100'-200': 311° magnetic, 200'-400': 330° magnetic

Belt placement: line 1 (7 & 86ft), line 2 (25ft) (line is 34ft long), line 3 (59ft), line 4 (39ft) (line is 42ft long).
No rebar marking belt placement.

Directions:

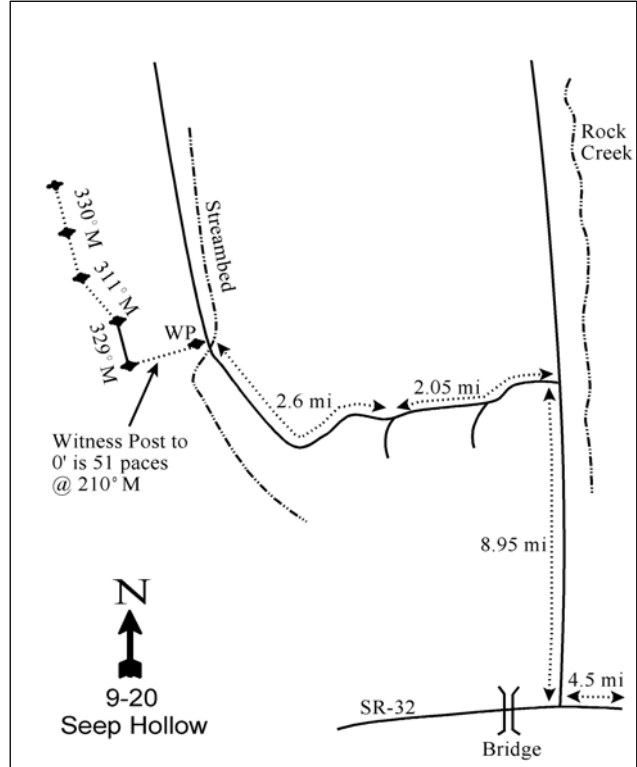
From highway SR 87, turn west onto highway SR 32 and travel 3.4 miles to Rock Creek Road, which is just east of mile marker 59 and the bridge over the Duchesne River. Turn right (north) onto Rock Creek Road and go north for 8.95 miles to a road on the left. Turn and travel west 2.05 miles to a fork. Bear right and proceed 2.6 miles to a streambed. From the intersection of the road and the streambed, the 0-foot baseline stake is 51 paces away at the heading of 210°M.

Map Name: Blacktail Mountain



Township: 1S Range: 6W Section: 29

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 535043 E 4468886 N

SEEP HOLLOW - TREND STUDY NO. 9-20

Site Information

Site Description: The study samples a mountain brush community on Ute Indian Tribal land in the Seep Hollow-Dry Mountain Hollow area. The site may not be accessible to wildlife during severe winters. Pellet group transect data estimated moderate use by deer in 2000 and 2010 with very heavy use in 2005. Estimated elk use was light in 2000 and 2010 with heavy use in 2005 (Table - Pellet Group Data).

Browse: Browse species are diverse and dominate the site, providing over half of the total vegetation cover since 1995. Key species include serviceberry (*Amelanchier utahensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), true mountain mahogany (*Cercocarpus montanus*) and bitterbrush (*Purshia tridentata*). Serviceberry provides the highest cover of any of the browse species on the site (Table - Browse Trends). Serviceberry is comprised of a fairly dense population of moderately large plants that has increased since 1995. A small portion of the mature serviceberry plants are classified as unavailable to deer due to height. The serviceberry population is a mixture of young and mature plants that have displayed mostly light use throughout the study years. Mountain big sagebrush is comprised of a mostly mature population with light to moderate use. Decadence of sagebrush has fluctuated throughout the study, but was generally high. Poor vigor was also high in 2000 and 2005, but has been low in all other sample years. Recruitment of young sagebrush plants has been poor over the course of the study. True mountain mahogany has a small population of mostly mature plants, though recruitment of young plants has been generally good. Utilization of mahogany was moderate at the outset of the study, but has been heavy since 2000. Bitterbrush has steadily increased in density since the outset of the study in 1982. The population is predominately mature with only a few young or decadent plants. Utilization is moderate to heavy with good vigor. Most bitterbrush plants display a prostrate growth form (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory is dominated by native perennial grasses. Bluebunch wheatgrass (*Agropyron spicatum*), needle-and-thread (*Stipa comata*) and mutton bluegrass (*Poa fendleriana*) are the most common species. Other species that occur less frequently include thickspike wheatgrass (*Agropyron dasystachyum*), sedge (*Carex* sp.), Sandberg bluegrass (*Poa secunda*) and bottlebrush squirreltail (*Sitanion hystrix*). Cheatgrass (*Bromus tectorum*) was sampled on the site, but remains fairly uncommon. Forbs are fairly diverse, but are not particularly abundant. The only marginally common perennial forb species were desert parsley (*Lomatium* sp.) and tapertip hawksbeard (*Crepis acuminata*). Annual forbs were abundant in 1995 and 2005, but have been rare in other sample years (Table - Herbaceous Trends).

Soil: Soils are sandy loam in texture with a neutral soil reaction (pH 6.7) (Table - Soil Analysis Data). The soil surface is very rocky with rocks ranging in size from a few inches to more than a foot in diameter. Excluding rock cover, litter and vegetation cover are excellent and considering steepness of the slope, erosion is minimal. Bare ground is quite low with the abundant vegetation, litter and rock cover (Table - Basic Cover). Several inactive gullies are located on, and around the site. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** There was a slight decrease in the densities of serviceberry and true mountain mahogany, but a slight increase in the densities of mountain big sagebrush and bitterbrush. Decadence of mountain big sagebrush increased from 15% to 32%, but poor vigor of mahogany decreased from 25% to 0%.
- **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 mountain big sagebrush decreased to 14%, but recruitment of young plants decreased from 15% to just 1% of the population.

- **1995 to 2000 - stable (0):** The density of serviceberry increased by 52% from 920 plants/acre to 1,400 plants/acre and cover increased from 9% to 13%. However, decadence of mountain big sagebrush increased to 26% and poor vigor increased from 6% to 28%.
- **2000 to 2005 - stable (0):** The density of serviceberry increased by 50% to 2,100 plants/acre, though cover remained similar with much of the increase coming from an increase in the recruitment of young plants. Density of mountain big sagebrush decreased by 32% from 2,340 plants/acre to 1,600 plants/acre and cover decreased from 7% to 5%. Decadence of sagebrush increased to 45% and poor vigor increased to 33%.
- **2005 to 2010 - slightly up (+1):** Serviceberry density decreased slightly, but cover increased slightly and mountain big sagebrush density increased slightly. Decadence of mountain big sagebrush decreased to 12% and poor vigor decreased to 10%. Recruitment of young sagebrush plants increased from 4% to 11%. Density and cover of bitterbrush have also steadily increased over the course of the study.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The perennial grass sum of nested frequency increased by 16%.
- **1995 to 2000 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 15%, though cover increased from 12% to 16%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 11% despite an increase in cover to 17%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** There was a two-fold increase in the sum of nested frequency of perennial forbs.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 32%, though it did not decrease to 1988 levels. Perennial forb cover decreased from 4% to 3%.
- **2000 to 2005 - up (+2):** The perennial forb sum of nested frequency returned to 1995 levels, and cover increased to 7%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 16% and cover decreased to 4%.

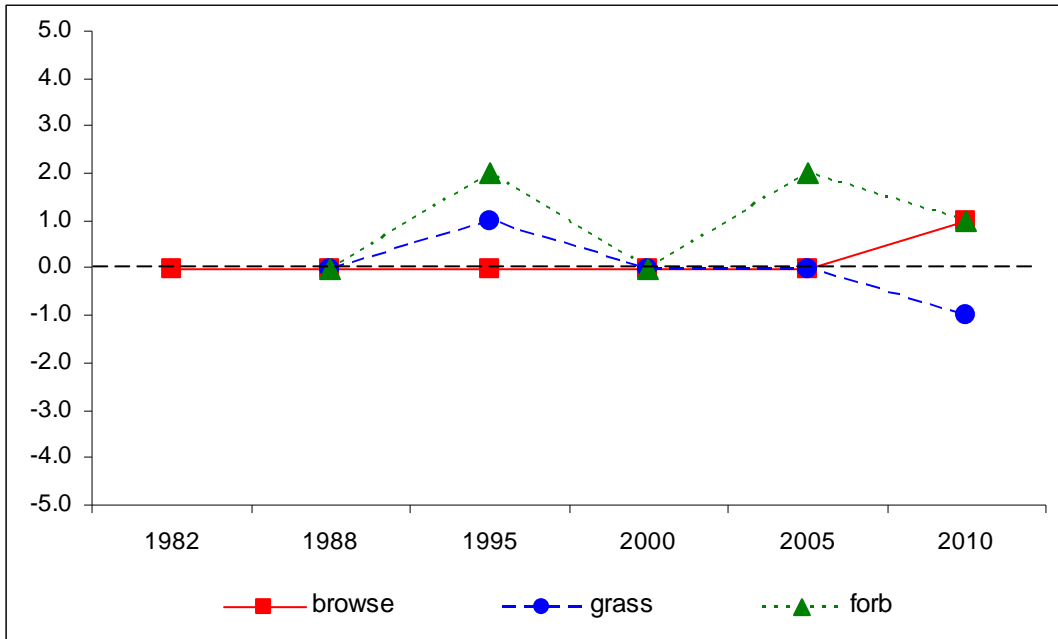
DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

Management unit 9, study no: 20

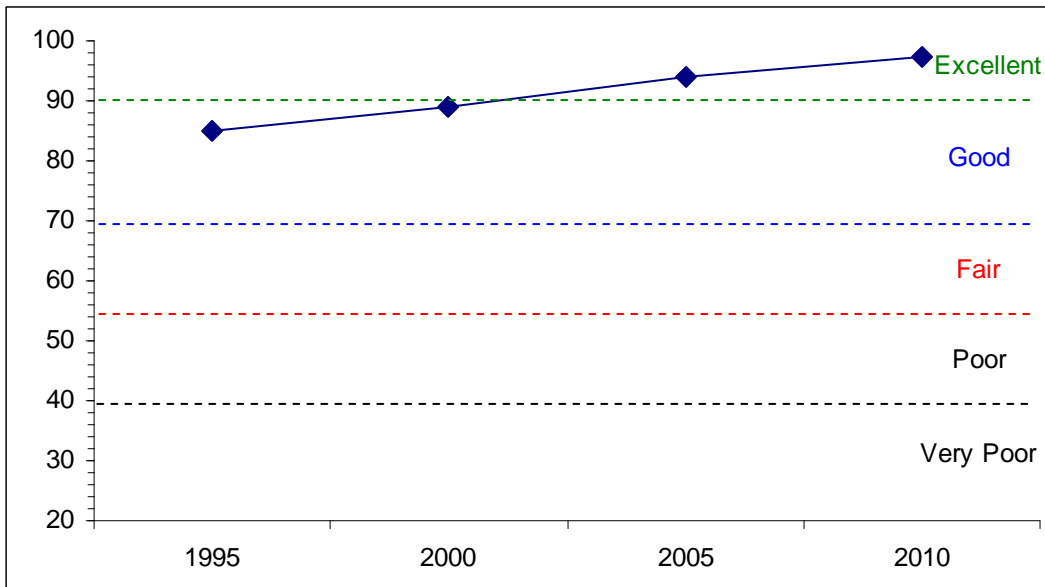
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.6	8.6	24.0	-0.1	8.7	0.0	84.9	Good
00	30.0	12.9	9.8	30.0	0.0	6.3	0.0	89.0	Good-Excellent
05	30.0	10.3	13.9	30.0	-0.3	10.0	0.0	94.0	Excellent
10	30.0	14.4	15.0	30.0	-0.1	7.9	0.0	97.3	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 20



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 9, Study no: 20



HERBACEOUS TRENDS--
Management unit 09, Study no: 20

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	b82	b66	a22	a20	b63	.93	.19	.14	1.68
G	<i>Agropyron spicatum</i>	bc157	bc160	b122	c202	a71	2.94	4.10	6.57	2.78
G	<i>Bromus tectorum</i> (a)	-	ab14	a2	b38	b24	.08	.00	.36	.07
G	<i>Carex</i> sp.	a21	b58	a32	a28	a21	1.12	.96	.41	.78
G	<i>Koeleria cristata</i>	9	2	9	2	3	.04	.36	.03	.03
G	<i>Oryzopsis hymenoides</i>	b13	ab1	ab1	a-	a-	.03	.03	-	-
G	<i>Poa fendleriana</i>	b122	b124	b142	a72	a59	2.27	4.82	2.38	1.87
G	<i>Poa secunda</i>	a15	ab23	ab35	b52	ab41	.48	.51	.96	.34
G	<i>Sitanion hystrix</i>	a-	ab11	ab5	ab5	b9	.08	.03	.19	.31
G	<i>Stipa comata</i>	a68	a119	a109	a116	b178	4.09	5.21	4.32	9.44
Total for Annual Grasses		0	14	2	38	24	0.07	0.00	0.36	0.07
Total for Perennial Grasses		487	564	477	497	445	12.01	16.23	15.02	17.26
Total for Grasses		487	578	479	535	469	12.09	16.24	15.38	17.34
F	<i>Allium</i> sp.	-	3	-	3	3	.00	-	.01	.03
F	<i>Antennaria rosea</i>	-	11	4	7	-	.07	.06	.04	-
F	<i>Arabis</i> sp.	ab2	a-	a-	b10	a-	-	-	.07	-
F	<i>Artemisia ludoviciana</i>	-	4	3	3	3	.18	.15	.15	.03
F	<i>Astragalus</i> sp.	-	5	1	3	8	.01	.00	.00	.06
F	<i>Balsamorhiza sagittata</i>	-	1	2	2	2	.15	.03	.53	.18
F	<i>Calochortus nuttallii</i>	a-	ab13	a-	b18	a1	.04	-	.05	.00
F	<i>Castilleja linariaefolia</i>	b17	ab5	b13	a-	a-	.06	.52	-	-
F	<i>Chenopodium leptophyllum</i> (a)	-	2	-	-	-	.01	-	-	-
F	<i>Cirsium</i> sp.	7	7	2	3	-	.21	.15	.01	.00
F	<i>Collinsia parviflora</i> (a)	-	b244	a12	b227	a7	1.53	.04	1.94	.01
F	<i>Collomia linearis</i> (a)	-	c119	a-	c119	b17	.62	-	.40	.07
F	<i>Comandra pallida</i>	34	29	28	22	33	.21	.26	.13	.22
F	<i>Crepis acuminata</i>	a-	ab19	a7	b25	ab15	.21	.07	.80	.26
F	<i>Cryptantha</i> sp.	7	-	-	1	11	-	-	.00	.16
F	<i>Descurainia pinnata</i> (a)	-	b11	a-	ab3	a-	.05	-	.03	-
F	<i>Draba</i> sp. (a)	-	b67	a-	a6	a-	.20	-	.03	-
F	<i>Erigeron eatonii</i>	-	1	-	2	6	.00	-	.15	.03
F	<i>Erigeron flagellaris</i>	a4	a4	a4	a6	b29	.04	.18	.53	.34
F	<i>Eriogonum racemosum</i>	-	7	3	2	3	.04	.03	.03	.06
F	<i>Eriogonum umbellatum</i>	-	-	7	-	4	-	.15	-	.03
F	<i>Gayophytum ramosissimum</i> (a)	-	5	-	3	1	.01	-	.00	.00
F	<i>Hackelia patens</i>	-	-	-	1	-	-	-	.00	-
F	<i>Heterotheca villosa</i>	-	-	8	-	3	-	.16	-	.03
F	<i>Heuchera parvifolia</i>	a-	b41	b24	b36	b40	.93	.37	.60	.33
F	<i>Lappula occidentalis</i> (a)	-	3	-	2	-	.01	-	.00	-
F	<i>Lithospermum ruderales</i>	-	5	4	6	4	.21	.06	.33	.04
F	<i>Lomatium</i> sp.	a20	b83	ab49	c87	a24	1.55	.39	2.46	.64
F	<i>Lupinus argenteus</i>	-	-	3	1	8	-	.03	.41	.33
F	<i>Penstemon procerus</i>	a-	b11	b8	a-	a-	.12	.36	-	-

T y p e	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Penstemon sp.	ab11	ab3	a-	b14	b14	.15	-	.42	.62
F	Petradoria pumila	-	3	1	-	-	.03	.03	-	-
F	Phlox longifolia	-	-	-	2	1	-	-	.06	.00
F	Polygonum douglasii (a)	-	b20	a-	b15	b10	.05	-	.03	.10
F	Schoenocrambe linifolia	-	-	-	5	5	-	.03	.03	.06
F	Sedum lanceolatum	-	4	-	-	2	.01	-	-	.00
F	Senecio integerrimus	b13	b12	b12	b17	a-	.05	.05	.44	-
F	Senecio multilobatus	a-	a-	ab3	ab1	b10	-	.00	.00	.10
F	Sphaeralcea coccinea	-	2	2	3	3	.03	.00	.03	.15
F	Stellaria jamesiana	-	4	-	-	-	.01	-	-	-
F	Taraxacum officinale	-	-	-	-	1	-	-	-	.15
F	Tragopogon dubius	-	-	-	-	1	-	-	-	.03
Total for Annual Forbs		0	471	12	375	35	2.48	0.04	2.45	0.19
Total for Perennial Forbs		115	277	188	280	234	4.36	3.15	7.35	3.96
Total for Forbs		115	748	200	655	269	6.84	3.19	9.80	4.15

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

BROWSE TRENDS--

Management unit 09, Study no: 20

T y p e	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	30	37	36	39	9.44	12.58	10.85	13.33
B	Artemisia tridentata vaseyana	76	72	48	55	8.63	6.60	4.52	4.73
B	Cercocarpus montanus	24	19	27	26	5.23	5.76	3.91	4.80
B	Chrysothamnus viscidiflorus lanceolatus	37	28	40	44	.88	1.20	1.43	2.79
B	Eriogonum heracleoides	51	50	53	49	2.42	2.65	2.00	2.52
B	Mahonia repens	2	6	4	7	.00	.22	.30	.24
B	Opuntia sp.	24	18	25	23	.37	.25	.58	.65
B	Pediocactus simpsonii	3	0	2	1	.03	-	.03	-
B	Pinus edulis	0	4	7	4	1.04	.56	.78	.78
B	Prunus virginiana	0	0	1	1	.03	-	-	.15
B	Purshia tridentata	20	28	25	29	2.42	4.71	3.28	5.02
B	Symphoricarpos oreophilus	46	42	46	47	3.95	4.66	4.33	3.62
B	Tetradymia canescens	0	0	1	0	-	-	-	-
Total for Browse		313	304	315	325	34.46	39.23	32.05	38.68

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 20

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	21.43	20.35
Artemisia tridentata vaseyana	5.83	7.98
Cercocarpus montanus	6.30	7.26
Chrysothamnus viscidiflorus lanceolatus	2.91	3.45
Eriogonum heracleoides	2.21	2.59
Mahonia repens	.05	.11
Opuntia sp.	.18	.31
Pinus edulis	1.86	1.63
Purshia tridentata	5.91	8.19
Symphoricarpos oreophilus	10.58	8.18

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 20

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	4.1	3.4
Artemisia tridentata vaseyana	1.9	2.2
Cercocarpus montanus	4.6	4.3
Purshia tridentata	2.6	2.6

BASIC COVER--

Management unit 09, Study no: 20

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.50	7.50	43.34	58.95	48.67	60.59
Rock	10.50	14.00	14.42	14.38	14.96	13.56
Pavement	0	0	.07	1.13	.59	.14
Litter	64.25	64.25	60.95	66.43	51.56	48.68
Cryptogams	1.25	0	.33	1.05	.45	.42
Bare Ground	15.50	14.25	4.36	9.90	8.44	5.97

SOIL ANALYSIS DATA --

Management unit 9, Study no: 20, Study Name: Seep Hollow

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
8.4	6.7	73.3	16.2	10.6	4.7	9.6	102.4	0.7

PELLET GROUP DATA--

Management unit 09, Study no: 20

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	5	3	8	1	-	-	-
Elk	9	9	14	7	15 (37)	54 (134)	17 (41)
Deer	27	15	28	11	44 (107)	92 (227)	38 (93)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 20

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>Amelanchier utahensis</i>									
82	799	58	42	0	-	17	0	0	16/14
88	465	86	14	0	-	14	0	0	56/32
95	920	30	70	0	40	35	2	0	58/75
00	1400	40	59	1	-	24	3	0	52/63
05	2100	49	50	2	60	17	6	.95	47/49
10	1500	49	51	0	-	12	3	0	46/52
<i>Artemisia tridentata vaseyana</i>									
82	2665	0	85	15	-	18	5	13	19/24
88	2731	15	54	32	-	49	2	5	17/22
95	2440	1	85	14	-	51	2	6	21/31
00	2340	3	71	26	20	11	3	28	22/28
05	1600	4	51	45	120	26	9	33	23/33
10	1840	11	77	12	60	28	29	10	21/32
<i>Cercocarpus montanus</i>									
82	533	0	100	0	-	38	0	25	33/21
88	466	29	71	0	66	100	0	0	28/39
95	680	24	76	0	-	59	9	0	44/47
00	500	8	88	4	40	28	48	4	36/38
05	700	14	60	26	20	3	83	3	44/48
10	760	18	82	0	400	16	34	0	47/50
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
82	733	0	100	0	-	0	0	0	11/9
88	1331	20	60	20	-	10	0	0	11/11
95	1060	2	98	0	-	0	0	0	15/16
00	860	0	95	5	-	0	0	5	14/13
05	1260	6	92	2	-	0	0	0	15/19
10	1340	1	97	1	-	0	0	0	18/21
<i>Eriogonum heracleoides</i>									
82	1933	0	100	0	-	0	0	0	13/10
88	3065	59	41	0	-	0	0	30	5/7
95	2720	14	86	0	-	0	0	0	8/15
00	2660	2	95	2	-	0	0	2	6/9
05	2440	2	98	0	-	.81	0	0	6/13
10	2340	0	100	0	60	5	.85	.85	7/13

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Mahonia repens										
82	1066	0	100	-	-	0	0	0	4/6	
88	2866	88	12	-	133	0	0	7	3/5	
95	280	0	100	-	-	0	0	0	5/7	
00	340	6	94	-	-	0	0	0	4/5	
05	320	0	100	-	-	0	0	0	3/5	
10	820	78	22	-	-	0	0	0	4/4	
Opuntia sp.										
82	1332	35	65	0	-	0	0	0	4/8	
88	2465	59	41	0	66	0	0	14	4/9	
95	960	4	92	4	20	0	0	0	3/8	
00	620	13	87	0	-	0	0	0	2/5	
05	1040	6	94	0	-	0	0	2	4/11	
10	620	6	94	0	-	0	0	0	3/10	
Pediocactus simpsonii										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	60	0	100	-	-	0	0	0	2/4	
00	0	0	0	-	-	0	0	0	-/-	
05	40	0	100	-	-	0	0	0	4/6	
10	20	0	100	-	-	0	0	0	3/4	
Pinus edulis										
82	66	0	100	-	-	0	0	0	69/59	
88	66	0	100	-	-	0	0	0	83/47	
95	0	0	0	-	-	0	0	0	-/-	
00	80	75	25	-	-	0	0	0	-/-	
05	140	71	29	-	-	0	0	0	-/-	
10	80	75	25	-	20	0	0	0	-/-	
Prunus virginiana										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	24/32	
10	20	100	0	-	-	0	0	0	26/29	
Purshia tridentata										
82	333	0	100	0	-	80	0	0	12/16	
88	465	14	72	14	-	57	0	0	24/21	
95	540	11	89	0	-	44	0	0	16/37	
00	720	3	97	0	20	31	22	0	17/44	
05	840	7	86	7	-	31	33	2	17/40	
10	1040	10	90	0	-	25	35	0	18/38	

		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>Symphoricarpos oreophilus</i>										
82	1598	12	79	8	-	4	0	8	16/27	
88	932	71	14	14	-	36	0	0	28/22	
95	2340	17	83	0	40	0	0	0	16/30	
00	2360	14	85	2	20	0	0	0	13/21	
05	3900	19	80	1	-	0	0	0	18/28	
10	3560	16	83	1	20	3	0	0	16/23	
<i>Tetradymia canescens</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	40	0	100	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	12/7	

BROWN'S PARK RIVER CORRIDOR-LIVESTOCK - TREND STUDY NO. 9-21-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Semidesert Gravelly Loam (Wyoming Big Sagebrush), R034XY205UT

Land Ownership: BLM

Elevation: 5600 ft. (1707 m)

Aspect: North

Slope: 3%

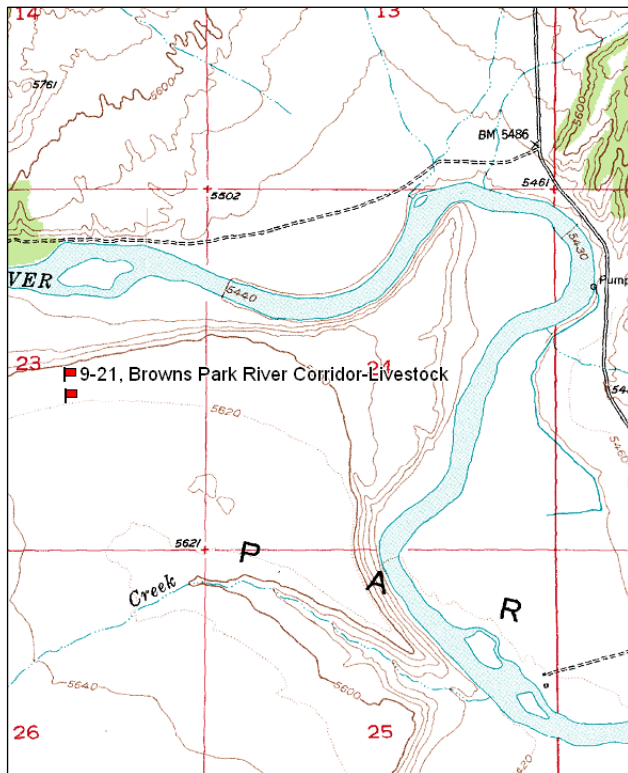
Transect bearing: 69° magnetic

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

Directions:

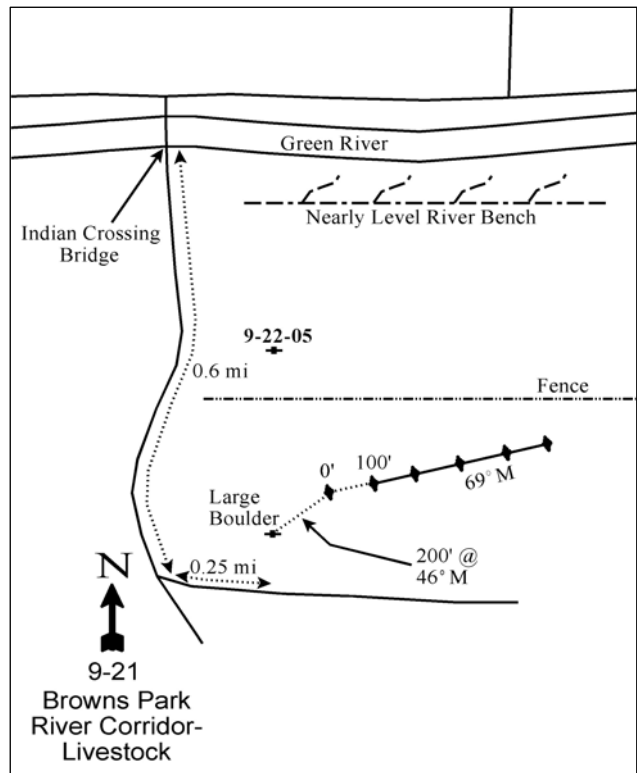
From the Indian Crossing Bridge at Brown's Park travel south for 0.6 miles to a fork. Turn left onto a small road and proceed 0.25 miles. There is a large boulder on the north side of the road. From the boulder the 0-foot baseline stake is 200 feet away at a bearing of 46°M.

Map Name: Clay Basin



Township: 2N Range: 24E Section: 23

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 653970 E 4528561 N

BROWN'S PARK RIVER CORRIDOR-LIVESTOCK - TREND STUDY NO. 9-21

Site Information

Site Description: The study was placed to monitor differences between livestock and wildlife use on two sides of a fence line that was built in 1963. The fence was built to exclude cattle grazing on one side of the fence line, while allowing grazing on the other side. Wildlife is not excluded from either side of the fence line and Brown's Park River Corridor-Wildlife (Study No. 9-22) study samples the other side. This study samples the south side of the fence that is accessible to livestock and wildlife. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Taylor Flat allotment. The study is approximately a half mile south of the Green River at Brown's Park on a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass flat. Pellet group transect data has estimated moderate to heavy use by deer since 2000. Estimated use by elk was minimal in 2000 and 2005, but was more moderate in 2010. Cattle use has been minimal on the site since 2000 (Table - Pellet Group Data).

Browse: Browse cover is fairly low on the site. Wyoming big sagebrush is the dominant browse species (Table - Browse Trends). The sagebrush population is comprised of a moderately dense stand of small, mature plants with high decadence and poor vigor. Recruitment of young sagebrush plants into the population has been poor. Utilization of sagebrush has been moderate to heavy with the heaviest use in 2010. Shadscale (*Atriplex confertifolia*) is also moderately abundant, but has had only moderate use. Decadence and poor vigor are also fairly high in the shadscale population, but recruitment of young plants has been mostly good. Broom snakeweed (*Gutierrezia sarothrae*) was prevalent at the outset of the study in 2000, but decreased substantially in density in 2005 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant, but are dominated by needle-and-thread (*Stipa comata*). This species provides nearly all of the grass cover on the site and provided the majority of the vegetation cover in 2010. Other, less abundant perennial grasses include squirreltail bottlebrush (*Sitanion hystrix*), sand dropseed (*Sporobolus cryptandrus*), galleta (*Hilaria jamesii*) and Indian ricegrass (*Oryzopsis hymenoides*). Two annual grasses, cheatgrass (*Bromus tectorum*) and sixweeks fescue (*Vulpia octoflora*), have been sampled in low cover on the site. Perennial forbs are extremely rare on the site. Annual forbs were prevalent in 2005, but were rare in the other sample years (Table - Herbaceous Trends).

Soil: Soils are sandy loam in texture with a slightly alkaline soil reaction (pH 7.8). Phosphorus may have limited availability for plant growth and development at 4.1 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Shrub interspaces between sagebrush contain a lot of bare soil and pavement. Bare ground cover is high, despite the high pavement cover, with low amounts of vegetation and litter cover (Table - Basic Cover). Soil erosion would likely be higher if the terrain wasn't so level. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **2000 to 2005 - slightly down (-1):** The density of Wyoming big sagebrush decreased by 9% from 3,740 plants/acre to 3,420 plants/acre, but cover remained similar. Decadence increased slightly from 29% to 33% and poor vigor increased from 12% to 19%. Density of shadscale remained similar, but cover increased from 1% to 3%. Decadence of shadscale decreased from 37% to 7% and poor vigor decreased from 10% to 5%..
- **2005 to 2010 - down (-2):** Wyoming big sagebrush density decreased by 13% to 2,980 plants/acre, but cover decreased from 9% to 5%. Decadence of sagebrush increased to 56% and poor vigor increased to 58%. Shadscale density remained similar but cover decreased to 1%. Decadence of shadscale increased to 52% and poor vigor increased to 38% of the population.

Grass:

- **2000 to 2005 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 12%, although cover increased slightly from 7% to 8%.
- **2005 to 2010 - slightly up (+1):** The perennial grass sum of nested frequency increased by 11% and cover increased to 18%. The increase in cover was due to a substantial increase in the cover of needle-and-thread, though nested frequency remained similar.

Forb:

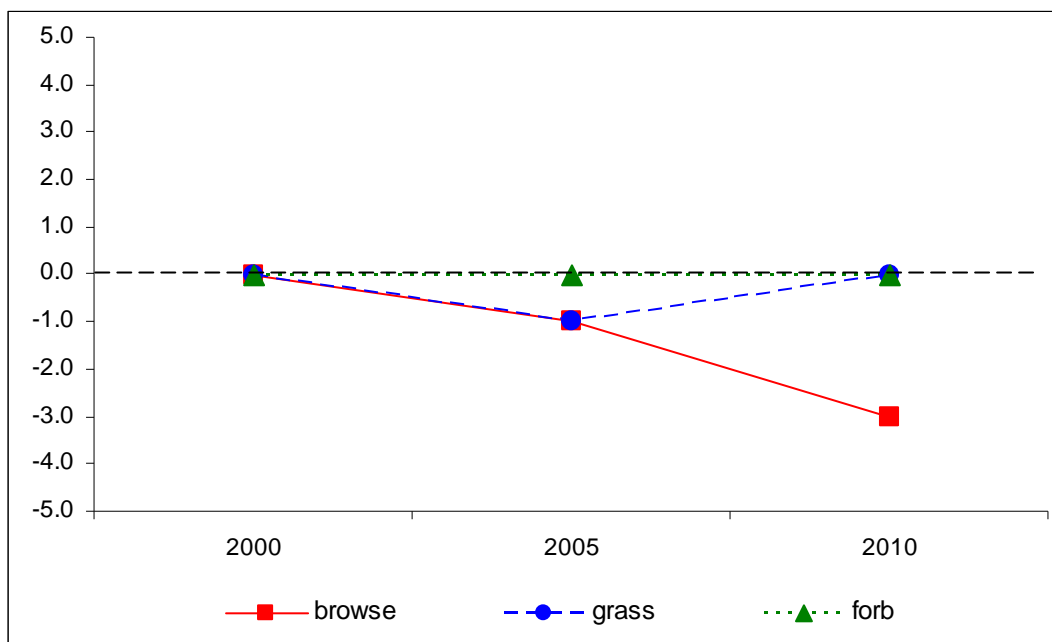
- **2000 to 2005 - stable (0):** Perennial forbs were very rare on the site.
- **2005 to 2010 - stable (0):** Perennial forbs were very rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 9, study no: 21

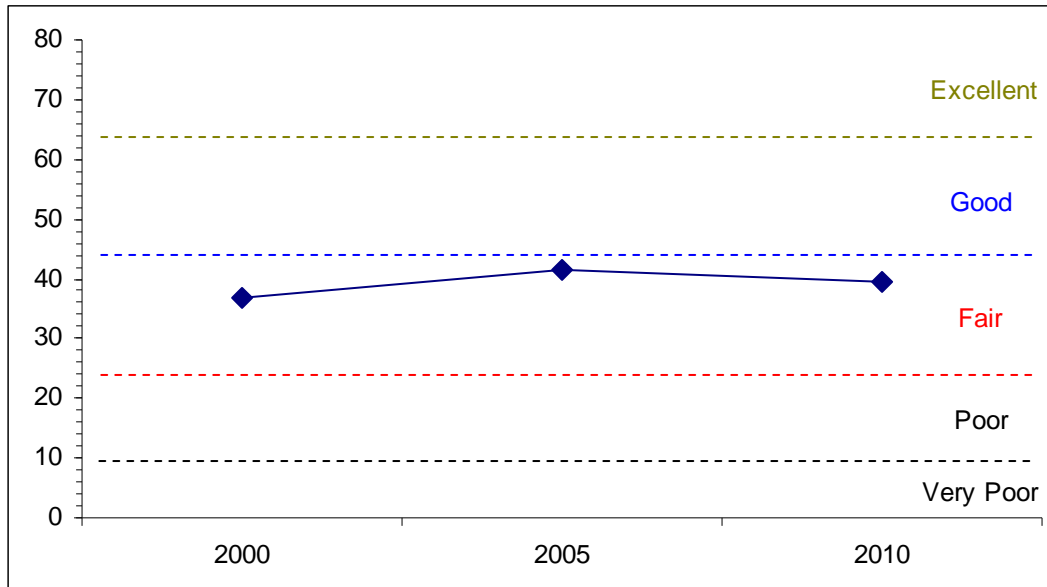
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
00	12.9	6.0	3.4	14.3	0.0	0.1	0.0	36.7	Fair
05	14.0	7.2	3.9	16.6	-0.3	0.2	0.0	41.6	Fair
10	7.8	-1.6	2.6	30.0	0.0	0.5	0.0	39.4	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 21



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 9, Study no: 21



HERBACEOUS TRENDS--
 Management unit 09, Study no: 21

Type	Species	Nested Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
G	Bromus tectorum (a)	b11	a-	a-	.02	-	-
G	Hilaria jamesii	a-	a-	b18	-	-	1.10
G	Oryzopsis hymenoides	a-	b5	ab4	-	.05	.24
G	Poa fendleriana	a-	a-	b22	-	-	.07
G	Sitanion hystrix	a21	b50	ab31	.18	1.83	.47
G	Sporobolus cryptandrus	20	3	4	.36	.00	.03
G	Stipa comata	b300	a242	a254	6.61	6.39	16.14
G	Vulpia octoflora (a)	a3	b195	a9	.00	.40	.02
Total for Annual Grasses		14	195	9	0.03	0.40	0.02
Total for Perennial Grasses		341	300	333	7.16	8.28	18.06
Total for Grasses		355	495	342	7.19	8.68	18.09
F	Descurainia pinnata (a)	-	6	-	-	.01	-
F	Lappula occidentalis (a)	a-	b60	a4	-	.32	.01
F	Lepidium sp. (a)	a-	b54	a2	-	.33	.00
F	Navarretia intertexta (a)	a-	b118	a2	-	.58	.00
F	Salsola iberica (a)	a-	b30	a3	-	.07	.00
F	Sphaeralcea coccinea	8	17	15	.01	.10	.27
F	Townsendia incana	ab7	b10	a-	.01	.02	-
Total for Annual Forbs		0	268	11	0	1.32	0.02
Total for Perennial Forbs		15	27	15	0.03	0.12	0.27
Total for Forbs		15	295	26	0.03	1.45	0.30

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

BROWSE TRENDS--

Management unit 09, Study no: 21

Type	Species	Strip Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
B	Artemisia tridentata wyomingensis	76	80	71	9.28	8.72	5.26
B	Atriplex confertifolia	56	52	54	1.25	3.11	1.26
B	Gutierrezia sarothrae	99	40	43	7.10	.43	.32
B	Opuntia sp.	7	10	8	.18	.21	.48
Total for Browse		238	182	176	17.84	12.48	7.34

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 21

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	9.80	4.09
Atriplex confertifolia	4.58	1.66
Gutierrezia sarothrae	1.78	.36
Opuntia sp.	.38	.16

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 21

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	4.2	1.1

BASIC COVER--

Management unit 09, Study no: 21

Cover Type	Average Cover %		
	'00	'05	'10
Vegetation	25.92	20.60	24.47
Rock	.28	.09	.01
Pavement	31.00	17.22	13.12
Litter	12.51	14.71	25.18
Cryptogams	1.50	.41	1.46
Bare Ground	54.47	56.34	49.87

SOIL ANALYSIS DATA --

Management unit 9, Study no: 21, Study Name: River Corridor Cattle

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.9	7.8	63.6	18.1	18.2	0.8	4.1	131.2	0.5

PELLET GROUP DATA--

Management unit 09, Study no: 21

Type	Quadrat Frequency		
	'00	'05	'10
Rabbit	5	44	9
Elk	-	4	2
Deer	28	37	40
Cattle	7	3	3

Days use per acre (ha)		
'00	'05	'10
-	-	-
-	5 (12)	29 (71)
31 (76)	58 (144)	71 (175)
-	7 (16)	9 (23)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 21

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata wyomingensis</i>									
00	3740	7	64	29	-	51	10	12	11/25
05	3420	6	60	33	40	26	28	19	15/29
10	2980	3	41	56	-	9	66	58	9/22
<i>Atriplex confertifolia</i>									
00	1720	6	57	37	20	9	3	10	7/12
05	1740	13	80	7	120	0	0	5	13/23
10	1680	14	33	52	-	13	0	38	10/20
<i>Ceratoides lanata</i>									
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	2/3
<i>Gutierrezia sarothrae</i>									
00	39460	2	92	5	160	0	0	12	4/6
05	1360	0	100	0	100	0	0	0	9/12
10	1440	26	74	0	-	0	0	0	6/7
<i>Opuntia sp.</i>									
00	160	0	88	13	-	0	0	0	3/12
05	220	0	91	9	-	0	0	0	4/16
10	180	0	100	0	-	0	0	0	5/15

BROWN'S PARK RIVER CORRIDOR-WILDLIFE - TREND STUDY NO. 9-22-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Semidesert Gravelly Loam (Wyoming Big Sagebrush), R034XY205UT

Land Ownership: BLM

Elevation: 5600 ft. (1707 m)

Aspect: North

Slope: 2%

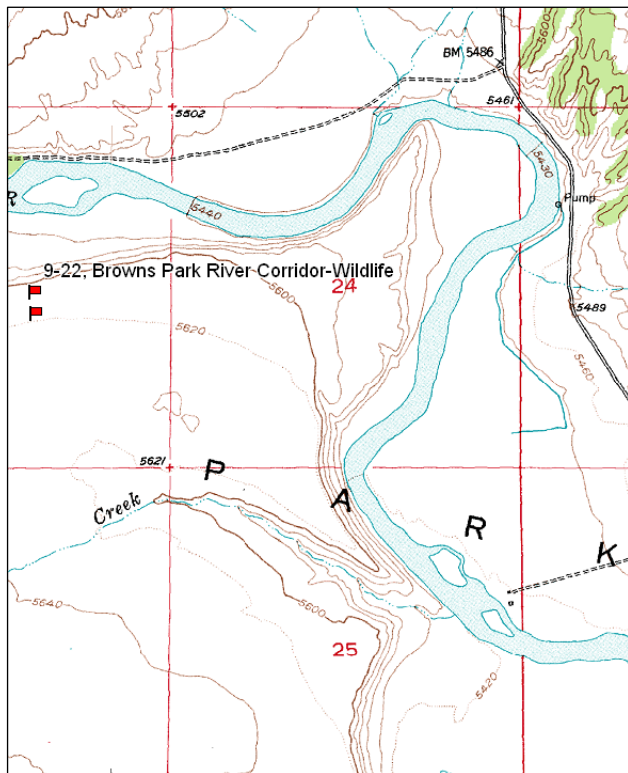
Transect bearing: 68° magnetic

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

Directions:

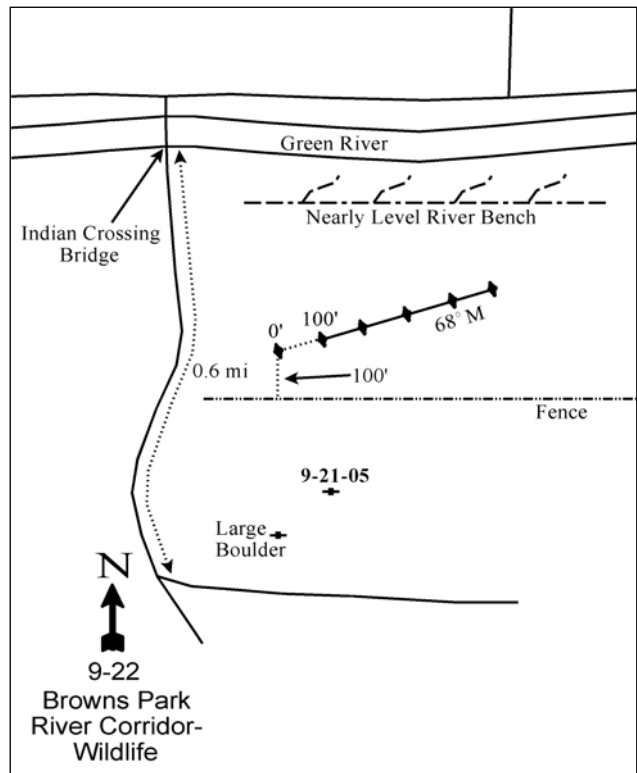
From the Indian Crossing Bridge at Brown's Park travel south for 0.6 miles to a fork. Turn left onto a small road and proceed 0.25 miles. There is a large boulder on the north side of the road. From the boulder walk north to the fence at a bearing of 0°M. From the fence the 0-foot baseline stake is another 100 feet away. The 0-foot baseline stake is marked by browse tag #9146.

Map Name: Clay Basin



Township: 2N Range: 24E Section: 23

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 653953 E 4528650 N

BROWN'S PARK RIVER CORRIDOR-WILDLIFE - TREND STUDY NO. 9-22

Site Information

Site Description: The study was placed to monitor differences between livestock-wildlife use and wildlife use on two sides of a fence line that was built in 1963. The fence was built to exclude cattle grazing on one side of the fence line while allowing grazing on the other side. Wildlife is not excluded from either side of the fence line and Brown's Park River Corridor-Livestock (Study 9-21) monitors the livestock side. This study samples the north side of the fence that is not accessible to livestock. The area is approximately a half mile south of the Green River at Brown's Park on a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass flat. Pellet group transect data estimated moderate to heavy use by deer since 2000. Estimated use by elk was minimal in 2000 and 2005, with more moderate use in 2010 (Table - Pellet Group Data).

Browse: Browse cover is marginal on this site. Shadscale (*Atriplex confertifolia*) is the dominant key species, providing the majority of the browse cover since 2005 (Table - Browse Trends). The shadscale population has a high amount of decadence and poor vigor. Use of shadscale has been mostly light since 2000, though more moderate use was sampled in 2010. Wyoming big sagebrush is also common on the site, though density is low, and has displayed moderate to heavy use. Sagebrush plants are small and display high decadence and poor vigor. Recruitment of young sagebrush plants has been minimal throughout the study. Other browse species sampled include broom snakeweed (*Gutierrezia sarothrae*) and pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant, but are dominated by needle-and-thread (*Stipa comata*). This species provides nearly all of the grass cover and has provided the majority of the vegetation cover in several sample years. Other perennial grasses include bottlebrush squirreltail (*Sitanion hystrix*), mutton bluegrass (*Poa fendleriana*), sand dropseed (*Sporobolus cryptandrus*) and Indian ricegrass (*Oryzopsis hymenoides*). Two annual grasses, cheatgrass (*Bromus tectorum*) and sixweeks fescue (*Vulpia octoflora*), have been sampled at low cover. There are almost no perennial forbs on the site. Annual forbs were fairly common in 2005, but have been rare in other sample years (Table - Herbaceous Trends).

Soil: Soil is a sandy loam in texture with a moderately alkaline soil reaction (pH 7.9). Phosphorus may have limited availability for plant growth and development at 3.9 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderately high despite the abundant amount of pavement cover. Vegetation and litter cover are relatively low (Table - Basic Cover). Erosion appears to be minimal due to the gentle slope of the terrain. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **2000 to 2005 - slightly down (-1):** The density of Wyoming big sagebrush decreased by 43% from 2,240 plants/acre to 1,280 plants/acre and cover decreased from 3% to 2%. Density of shadscale remained similar, but cover increased from 2% to 10%. Decadence of shadscale decreased from 36% to 9% and poor vigor decreased from 15% to 4%.
- **2005 to 2010 - down (-2):** Density of Wyoming big sagebrush remained similar with high decadence and poor vigor, but cover decreased to 1%. Shadscale density decreased by 16% from 2,260 plants/acre to 1,900 plants/acre and cover decreased to 5%. Decadence of shadscale increased to 51% and poor vigor increased to 56% of the population.

Grass:

- **2000 to 2005 - down (-2):** The sum of nested frequency of perennial grasses decreased by 35% and cover decreased from 20% to 8%.
- **2005 to 2010 - up (+2):** The perennial grass sum of nested frequency increased by 23%, though it remains below 2000 levels. Perennial grass cover increased to 19%.

Forb:

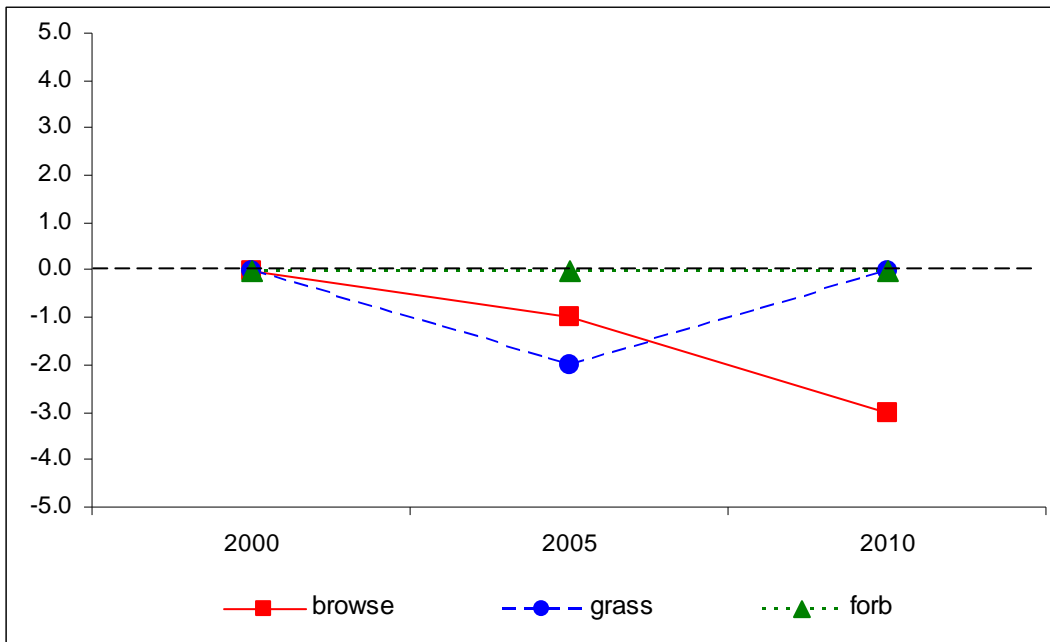
- **2000 to 2005 - stable (0):** There were almost no perennial forbs on the site.
- **2005 to 2010 - stable (0):** There were no perennial forbs sampled on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
 Management unit 9, study no: 22

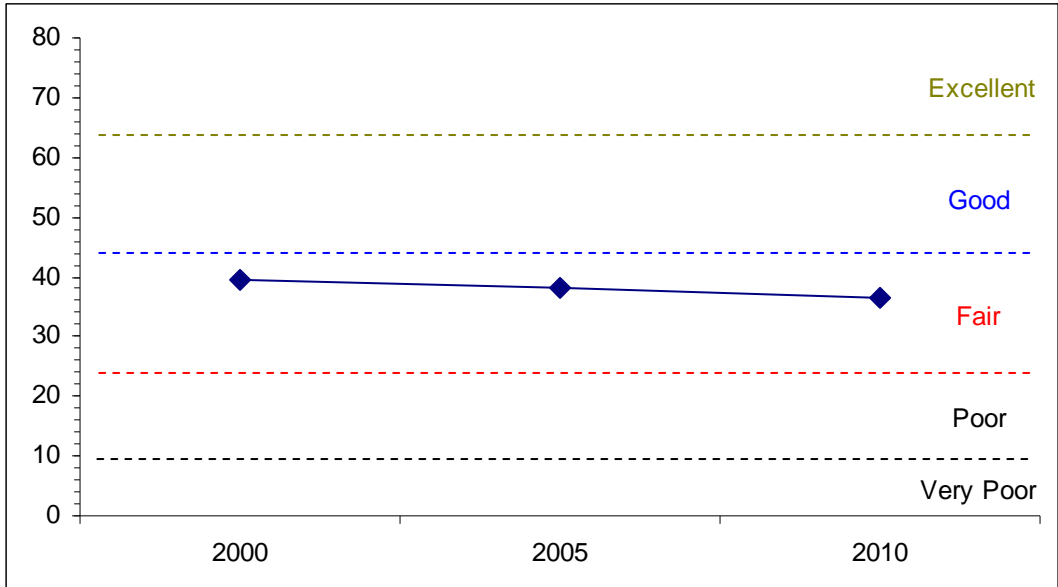
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
00	6.5	2.4	0.7	30.0	-0.1	0.0	0.0	39.5	Fair
05	12.2	9.8	0.4	16.4	-0.4	0.0	0.0	38.3	Fair
10	6.1	-0.8	1.4	30.0	-0.1	0.0	0.0	36.5	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 22



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 9, Study no: 22



HERBACEOUS TRENDS--
 Management unit 09, Study no: 22

Type	Species	Nested Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
G	Bromus tectorum (a)	8	-	7	.04	-	.02
G	Oryzopsis hymenoides	a ⁻	ab ⁴	b ¹⁰	-	.03	.25
G	Poa fendleriana	a ⁻	ab ⁵	b ¹³	-	.03	.05
G	Sitanion hystrix	b ⁴²	a ¹¹	a ¹⁴	.80	.14	.47
G	Sporobolus cryptandrus	-	7	4	-	.01	.03
G	Stipa comata	c ³²⁴	a ²¹⁰	b ²⁵⁰	18.66	7.96	17.70
G	Vulpia octoflora (a)	a ⁴	c ²²⁴	b ⁶⁴	.03	.54	.18
Total for Annual Grasses		12	224	71	0.07	0.54	0.19
Total for Perennial Grasses		366	237	291	19.47	8.18	18.52
Total for Grasses		378	461	362	19.54	8.72	18.72
F	Cryptantha sp.	-	1	-	-	.00	-
F	Descurainia pinnata (a)	a ⁵	b ²¹	a ¹	.00	.32	.00
F	Draba sp. (a)	-	1	2	-	.00	.01
F	Lappula occidentalis (a)	a ⁻	b ³⁷	c ⁶²	-	.34	.32
F	Lepidium sp. (a)	a ⁻	b ¹⁴	ab ²	-	.13	.01
F	Navaretia intertexta (a)	a ⁻	c ⁷⁷	b ²¹	-	.63	.05
F	Salsola iberica (a)	a ⁻	b ¹⁰	a ⁻	-	.03	-
F	Townsendia incana	1	-	-	.00	-	-
Total for Annual Forbs		5	160	88	0.00	1.45	0.39
Total for Perennial Forbs		1	1	0	0.00	0.00	0
Total for Forbs		6	161	88	0.00	1.46	0.39

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

BROWSE TRENDS--

Management unit 09, Study no: 22

Type	Species	Strip Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
B	Artemisia tridentata wyomingensis	53	47	45	3.39	2.01	1.16
B	Atriplex confertifolia	72	69	66	2.25	9.68	4.62
B	Ceratoides lanata	0	0	1	-	-	-
B	Gutierrezia sarothrae	28	2	6	.73	.00	.15
B	Opuntia sp.	10	11	14	.56	.71	.36
Total for Browse		163	129	132	6.94	12.41	6.30

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 22

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	2.61	1.61
Atriplex confertifolia	13.81	4.59
Gutierrezia sarothrae	-	.13
Opuntia sp.	.61	.66

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 22

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	3.5	1.5

BASIC COVER--

Management unit 09, Study no: 22

Cover Type	Average Cover %		
	'00	'05	'10
Vegetation	27.92	20.73	25.18
Rock	.07	.11	.17
Pavement	20.76	16.83	12.90
Litter	30.07	19.79	29.40
Cryptogams	6.69	1.58	5.72
Bare Ground	40.15	50.43	39.93

PELLET GROUP DATA--

Management unit 09, Study no: 22

Type	Quadrat Frequency			Days use per acre (ha)		
	'00	'05	'10	'00	'05	'10
Rabbit	9	49	21	-	-	-
Elk	-	-	2	-	1 (2)	26 (65)
Deer	24	22	44	40 (99)	29 (73)	54 (132)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 22

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>									
00	2240	1	53	46	-	16	2	32	12/22
05	1280	0	42	58	360	33	13	55	15/28
10	1260	6	33	60	-	35	38	62	11/24
<i>Atriplex confertifolia</i>									
00	2340	2	62	36	-	3	0	15	8/14
05	2260	1	90	9	-	0	0	4	16/30
10	1900	2	47	51	140	21	2	56	12/24
<i>Ceratoides lanata</i>									
00	0	0	0	0	-	0	0	0	-/-
05	0	0	0	0	-	0	0	0	-/-
10	20	0	0	100	-	0	0	100	-/-
<i>Chrysothamnus depressus</i>									
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	10/22
<i>Gutierrezia sarothrae</i>									
00	1740	0	36	64	-	0	1	80	5/7
05	60	67	33	0	-	0	0	0	10/11
10	140	0	100	0	-	0	0	0	8/11
<i>Opuntia sp.</i>									
00	260	0	92	8	-	0	0	8	3/12
05	360	11	78	11	-	0	0	6	4/15
10	320	0	94	6	-	0	0	6	5/17

BROWN'S PARK RIVER CORRIDOR STUDY COMPARISON
TREND STUDY NO. 9-21 & 9-22

Site Information

Site Description: The studies were placed to monitor differences between livestock and wildlife use on two sides of a fence line that was built in 1963. The fence was built to exclude cattle grazing on one side of the fence line, while allowing grazing on the other side. Wildlife are not excluded from either side of the fence line, but cattle are excluded from the south side of the fence. The Livestock (9-21) study is on the north side of the fence and the Wildlife (9-22) study is on the south side. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Taylor Flat allotment. The studies are approximately a half mile south of the Green River at Brown's Park on a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass flat. Pellet group transect data indicated that deer predominantly use the area. Deer use has been similar between the two studies, though it was higher on the Livestock study in 2005. Estimated use by elk was minimal in both studies in 2000 and 2005, but increased to more moderate levels in 2010. Cattle use has been light on the Livestock study throughout the sample years (Table 1).

Browse: The primary browse in the area is a mixture of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and shadscale (*Atriplex confertifolia*). The two studies have displayed similar trends for the species over the sample years. Wyoming big sagebrush cover and density is higher on the Livestock study than the Wildlife study, but there has been a general decrease in the density and cover sagebrush on both studies since 2000 (Table 2). Shadscale cover and density was higher on the Wildlife study than on the Livestock study. However, both studies displayed a similar trend of increased cover and decreased decadence of shadscale in 2005 (Table 3).

Herbaceous Understory: Grasses are similar, but fairly limited in diversity, on both of the studies. The dominant grass species is needle-and-thread (*Stipa comata*). Annual grasses are not abundant on the studies, but there was a significantly higher nested frequency of sixweeks fescue (*Vulpia octoflora*) on both studies in 2005. Cover of perennial grasses was higher on the Wildlife study in 2000, but the sum of nested frequency has remained similar throughout the study years (Table 4). Cover of perennial grasses was higher in 2000 on the Wildlife study due to a higher amount of cover of needle-and-thread. Perennial forbs are extremely rare on both studies (Table 4). There was a large increase of annual forbs on both studies in 2005, but annual forbs decreased again in 2010.

Soil: Due to the close proximity of the studies, soil conditions are nearly identical. The soil texture of the studies is a sandy loam with a slightly alkaline pH. Vegetation cover is typically similar between the studies, but bare ground cover is slightly higher on the Livestock study with higher cover of litter and cryptogams on the Wildlife study.

Study Summary

Study Name	Year	Deer	Elk	Cattle
		days use/acre (ha)	days use/acre (ha)	days use/acre (ha)
Livestock (9-21)	2000	31 (76)	--	--
	2005	58 (144)	5 (12)	7 (16)
	2010	71 (175)	29 (71)	9 (23)
Wildlife (9-22)	2000	40 (99)	--	--
	2005	29 (73)	1 (2)	--
	2010	54 (132)	26 (65)	--

Table 1. Pellet group transect data estimated use for the Browns Park River Corridor comparison studies.

Study Name	Year	Percent Cover	Density <i>Plants/acre</i>	Percent Young <i>(Plants/acre)</i>	Percent Mature <i>(Plants/acre)</i>	Percent Decadent <i>(Plants/acre)</i>	Ave. height/crown <i>(in)</i>
Livestock (9-21)	2000	9.28	3740	7	64	29	11/25
	2005	8.72	3420	6	60	33	15/29
	2010	5.26	2980	3	41	56	9/22
Wildlife (9-22)	2000	3.39	2240	1	53	46	12/22
	2005	2.01	1280	0	42	58	15/28
	2010	1.16	1260	6	33	60	11/24

Table 2. Browse characteristics of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) for the Browns Park River Corridor comparison studies.

Study Name	Year	Percent Cover	Density <i>Plants/acre</i>	Percent Young <i>(Plants/acre)</i>	Percent Mature <i>(Plants/acre)</i>	Percent Decadent <i>(Plants/acre)</i>	Ave. height/crown <i>(in)</i>
Livestock (9-21)	2000	1.25	1720	6	57	37	7/12
	2005	3.11	1740	13	80	7	13/23
	2010	1.26	1680	14	33	52	10/20
Wildlife (9-22)	2000	2.25	2340	2	62	36	8/14
	2005	9.68	2260	1	90	9	16/30
	2010	4.62	1900	2	47	51	12/24

Table 3. Browse characteristics of shadscale (*Atriplex confertifolia*) for the Browns Park River Corridor comparison studies.

Study Name	Year	Perennial Grass Species			Perennial Forb Species		
		<i>n</i>	<i>Sum of Nested Frequency</i>	<i>Percent Cover</i>	<i>n</i>	<i>Sum of Nested Frequency</i>	<i>Percent Cover</i>
Livestock (9-21)	2000	3	341	7.16	2	15	0.03
	2005	4	300	8.28	2	27	0.12
	2010	6	333	18.06	1	15	0.27
Wildlife (9-22)	2000	2	366	19.47	1	1	0.0
	2005	5	237	8.18	1	1	0.0
	2010	5	291	18.52	0	0	0.0

Table 4. Number of species sampled (*n*), sum of nested frequency and cover of perennial grasses and perennial forbs for the Browns Park River Corridor comparison studies.

ROCK CREEK - TREND STUDY NO. 9-23-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: Not Available

Land Ownership: Ute Tribe

Elevation: 7147 ft. (2179 m)

Aspect: Southeast

Slope: 6%

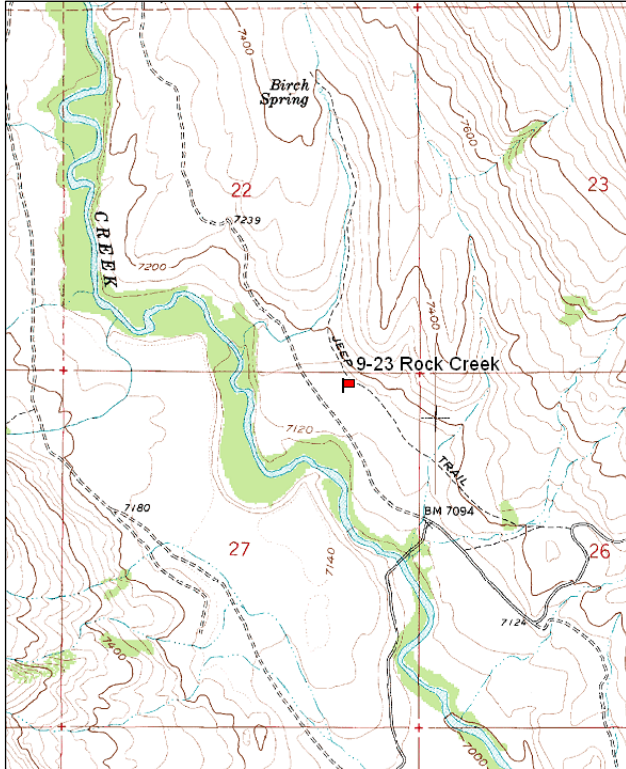
Transect bearing: 330° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Rebar for belt 4 is on the 2 foot mark.

Directions:

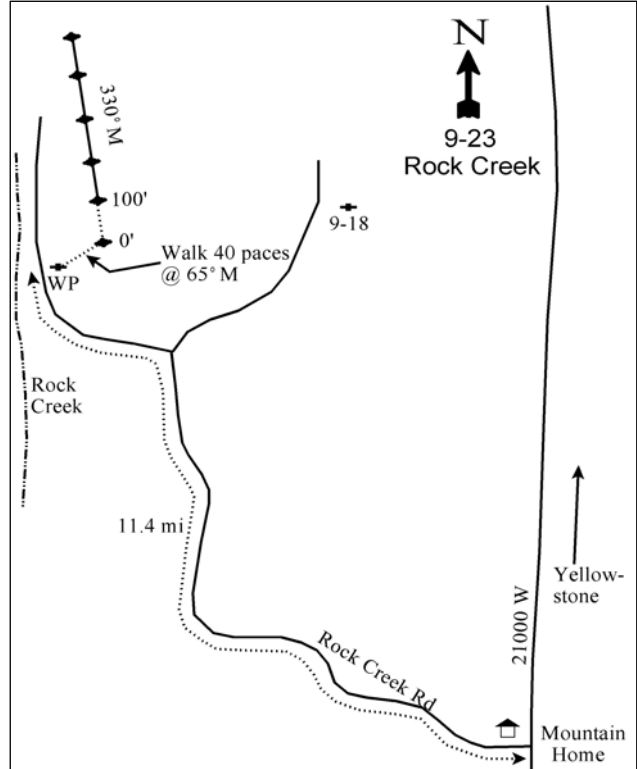
From the corner store in Mountain Home (21000 W and 6750 N), travel 11.4 miles northwest toward Rock Creek. The witness post is on the right (east) side of the road. From the witness post walk 40 paces at 65°M to the 0-foot stake, which is marked by browse tag #9172.

Map Name: Dry Mountain



Township: 1N Range: 6W Section: 27

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 538384 E 4478840 N

ROCK CREEK - TREND STUDY NO. 9-23

Site Information

Site Description: The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community with scattered pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). The land is owned and managed by the Uintah and Ouray Tribes in the McAfee Basin area. The area is on the border between crucial winter and crucial summer range for both deer and elk, and is likely used during both seasons. The area may be inaccessible to wildlife in more severe winters. Pellet group transect data has indicated moderate use by deer and light to moderate use by elk since 2005. Estimated use by cattle has been light since 2005 (Table - Pellet Group Data).

Browse: Mountain big sagebrush is the key browse species, providing nearly all of the browse cover and the majority of the vegetation cover (Table - Browse Trends). Mountain big sagebrush is comprised of a dense stand of fairly large, heavily used plants. Decadence and poor vigor of sagebrush are moderately high, though recruitment of young plants is fairly good. There is also a small population of antelope bitterbrush (*Purshia tridentata*) that displays heavy use. Most of the bitterbrush plants have a prostrate growth form, averaging about one and half feet in height. Other shrubs on the site include shadscale (*Atriplex confertifolia*), rubber rabbitbrush (*Chrysothamnus nauseosus*) and broom snakeweed (*Gutierrezia sarothrae*). Broom snakeweed was fairly abundant in 2005, but decreased substantially in 2010 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and fairly abundant on the site, and are primarily comprised of native perennial species. Needle-and-thread (*Stipa comata*), bottlebrush squirreltail (*Sitanion hystrix*), mutton bluegrass (*Poa fendleriana*) and Sandberg bluegrass (*P. secunda*) are the dominant perennial grasses. Cheatgrass (*Bromus tectorum*), an annual, was moderately abundant on the site in 2005, but decreased substantially in nested frequency and cover in 2010. Other perennial grass species include thickspike wheatgrass (*Agropyron dasystachyum*), Indian ricegrass (*Oryzopsis hymenoides*) and sedge (*Carex* sp.). Forbs are fairly diverse, but are not abundant on the site. Annual forbs were prevalent in 2005, but decreased substantially in 2010 (Table - Herbaceous Trends).

Soil: Soil texture is a sandy loam with a slightly acidic soil reaction (pH 6.5) (Table - Soil Analysis Data). Bare ground cover is fairly high, especially in the interspaces between shrubs. Vegetation and litter cover are moderate (Table - Basic Cover) and some erosion is noticeable. The soil erosion condition was classified as slight in 2005 and 2010 because of soil and litter movement, slight pedestals around shrubs and flow patterns.

Trend Assessments

Browse:

- **2005 to 2010 - slightly up (+1):** The density of mountain big sagebrush increased by 13% from 3,960 plants/acre to 4,480 plants/acre, though cover remained similar. Recruitment of young sagebrush plants increased from 3% to 13%. Decadence and poor vigor decreased slightly, but both remained moderately high at 27% and 18%, respectively.

Grass:

- **2005 to 2010 - up (+2):** The perennial grass sum of nested frequency increased by 21% with a slight increase in cover from 12% to 13%. Cheatgrass decreased significantly in nested frequency and cover decreased from 4% to less than 1%.

Forb:

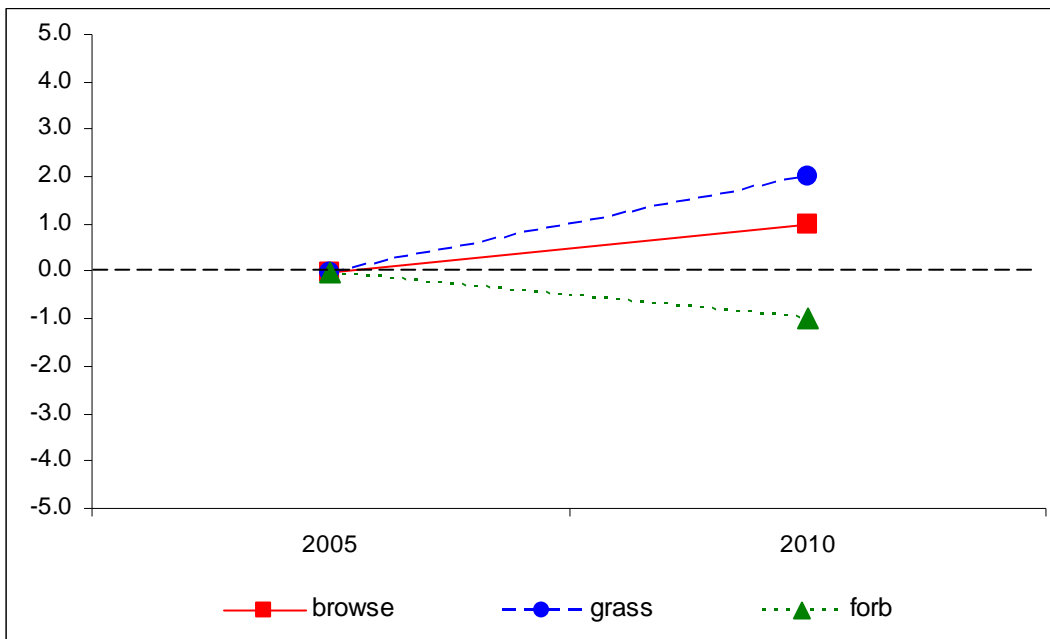
- **2005 to 2010 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 23%, but forbs were already rare on the site. Cover of perennial forbs decreased from 2% to less than 1%. Annual forbs also decreased substantially on the site.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 9, study no: 23

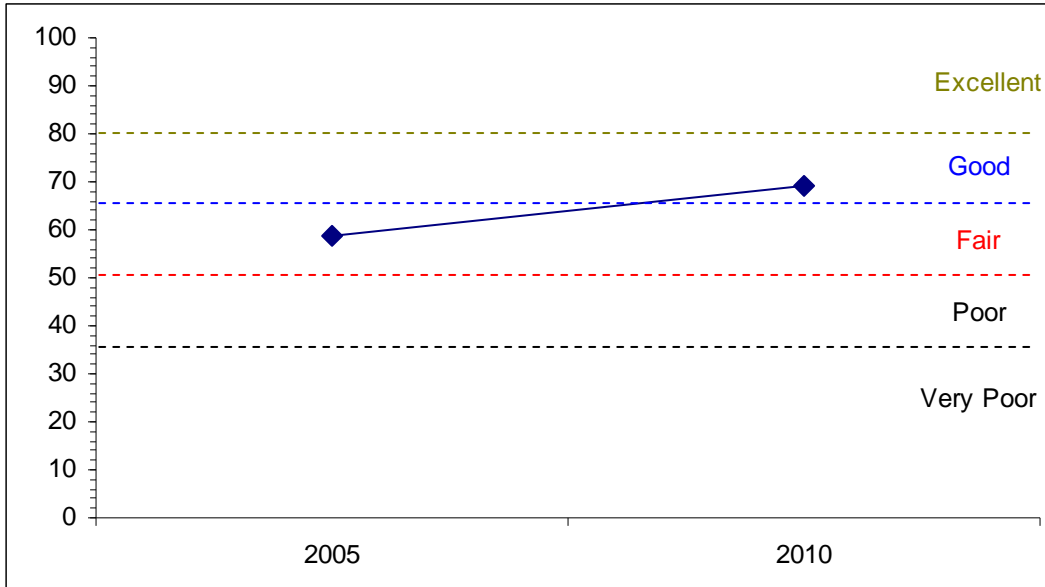
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
05	27.2	5.4	1.8	24.1	-3.1	3.1	0.0	58.6	Fair
10	28.6	7.6	6.1	25.4	-0.1	1.3	0.0	69.0	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 9, Study no: 23



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 9, Study no: 23



HERBACEOUS TRENDS--
 Management unit 09, Study no: 23

Type	Species	Nested Frequency		Average Cover %	
		'05	'10	'05	'10
G	Agropyron cristatum	-	4	-	.01
G	Agropyron dasystachyum	73	58	.71	.52
G	Agropyron spicatum	5	6	.03	.04
G	Bouteloua gracilis	3	6	.03	.03
G	Bromus tectorum (a)	_b 154	_a 35	3.60	.10
G	Carex sp.	_a 31	_b 86	.20	.93
G	Koeleria cristata	2	7	.00	.39
G	Oryzopsis hymenoides	5	7	.18	.06
G	Poa fendleriana	_a 7	_b 76	.27	1.34
G	Poa secunda	157	116	2.47	.80
G	Sitanion hystrix	_b 81	_a 57	1.96	1.41
G	Stipa comata	_a 138	_b 179	6.00	6.99
G	Stipa lettermani	1	5	.15	.15
G	Vulpia octoflora (a)	_b 146	_a 5	.47	.01
Total for Annual Grasses		300	40	4.07	0.11
Total for Perennial Grasses		503	607	12.03	12.71
Total for Grasses		803	647	16.11	12.82
F	Allium sp.	_b 51	_a 18	.26	.04
F	Astragalus convallarius	3	1	.18	.01
F	Astragalus sp.	2	3	.00	.00
F	Calochortus nuttallii	2	-	.00	-
F	Chaenactis douglasii	-	4	-	.01
F	Chenopodium leptophyllum(a)	-	4	-	.01
F	Collomia linearis (a)	7	-	.04	-

Type	Species	Nested Frequency		Average Cover %	
		'05	'10	'05	'10
F	<i>Comandra pallida</i>	17	18	.69	.33
F	<i>Cordylanthus</i> sp. (a)	2	-	.00	-
F	<i>Cryptantha</i> sp.	5	1	.04	.03
F	<i>Delphinium nuttallianum</i>	1	-	.00	-
F	<i>Descurainia pinnata</i> (a)	6	-	.01	-
F	<i>Draba</i> sp. (a)	11	-	.04	-
F	<i>Erigeron pumilus</i>	7	5	.12	.04
F	<i>Gayophytum ramosissimum</i> (a)	_b 36	_a 3	.08	.00
F	<i>Gilia</i> sp. (a)	_b 71	_a 1	.25	.00
F	<i>Lappula occidentalis</i> (a)	9	7	.02	.01
F	<i>Machaeranthera grindelioides</i>	1	9	.00	.04
F	<i>Microsteris gracilis</i> (a)	22	27	.11	.05
F	<i>Penstemon watsonii</i>	7	-	.09	-
F	<i>Plantago patagonica</i> (a)	_b 128	_a 30	.41	.09
F	<i>Polygonum douglasii</i> (a)	_b 78	_a 15	.20	.07
F	<i>Schoenrambe linifolia</i>	3	9	.01	.04
F	<i>Sphaeralcea coccinea</i>	12	18	.10	.12
Total for Annual Forbs		370	87	1.18	0.25
Total for Perennial Forbs		111	86	1.53	0.67
Total for Forbs		481	173	2.71	0.92

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

BROWSE TRENDS--

Management unit 09, Study no: 23

Type	Species	Strip Frequency		Average Cover %	
		'05	'10	'05	'10
B	<i>Artemisia tridentata vaseyana</i>	85	95	20.43	20.57
B	<i>Atriplex confertifolia</i>	3	0	-	-
B	<i>Chrysothamnus nauseosus</i>	1	1	.15	-
B	<i>Eriogonum corymbosum</i>	1	0	-	-
B	<i>Gutierrezia sarothrae</i>	33	12	1.83	.04
B	<i>Opuntia</i> sp.	32	35	.62	.42
B	<i>Purshia tridentata</i>	13	13	1.14	1.95
Total for Browse		168	156	24.18	22.99

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 23

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	26.91	27.20
Chrysothamnus nauseosus	-	.10
Eriogonum corymbosum	.08	-
Gutierrezia sarothrae	1.33	.13
Opuntia sp.	.58	.58
Purshia tridentata	2.34	2.58

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 23

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	1.5	1.3
Purshia tridentata	3.0	3.1

BASIC COVER--

Management unit 09, Study no: 23

Cover Type	Average Cover %	
	'05	'10
Vegetation	35.58	38.11
Rock	2.58	3.35
Pavement	.46	1.23
Litter	36.63	47.40
Cryptogams	3.44	1.34
Bare Ground	38.35	28.14

SOIL ANALYSIS DATA --

Management unit 9, Study no: 23, Study Name: Rock Creek

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.8	6.6	55.1	13.8	31.1	1.8	14.4	147.2	0.4

PELLET GROUP DATA--

Management unit 09, Study no: 23

Type	Quadrat Frequency		Days use per acre (ha)	
	'05	'10	'05	'10
Rabbit	45	23	-	-
Elk	7	3	22 (55)	9 (22)
Deer	51	23	48 (119)	36 (88)
Cattle	-	1	-	7 (18)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 23

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 vaseyana</i>									
05	3960	3	65	32	2820	26	41	20	23/36
10	4480	13	60	27	240	27	46	18	23/37
<i>Atriplex confertifolia</i>									
05	100	20	80	-	-	80	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
05	20	0	0	100	-	0	0	100	17/38
10	20	0	0	100	-	0	0	100	25/23
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
05	0	0	0	-	-	0	0	0	11/8
10	0	0	0	-	-	0	0	0	-/-
<i>Eriogonum corymbosum</i>									
05	20	0	100	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
05	1700	1	96	2	-	0	0	1	9/11
10	320	19	81	0	-	0	0	0	8/9
<i>Leptodactylon pungens</i>									
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	13/15
<i>Opuntia sp.</i>									
05	1540	1	97	1	-	0	0	0	3/6
10	1180	7	93	0	160	0	0	0	2/8
<i>Pediocactus simpsonii</i>									
05	0	0	0	-	-	0	0	0	3/4
10	0	0	0	-	-	0	0	0	5/5
<i>Purshia tridentata</i>									
05	420	14	57	29	-	29	62	14	21/37
10	500	4	96	0	-	8	64	0	16/32

BRUSH CREEK SUBSTATION - TREND STUDY NO. 9-24-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Year-Long (Fawning habitat), Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Loam (Wyoming Big Sagebrush), R034XY212UT

Land Ownership: BLM

Elevation: 5845 ft. (1782 m)

Aspect: South

Slope: 2%

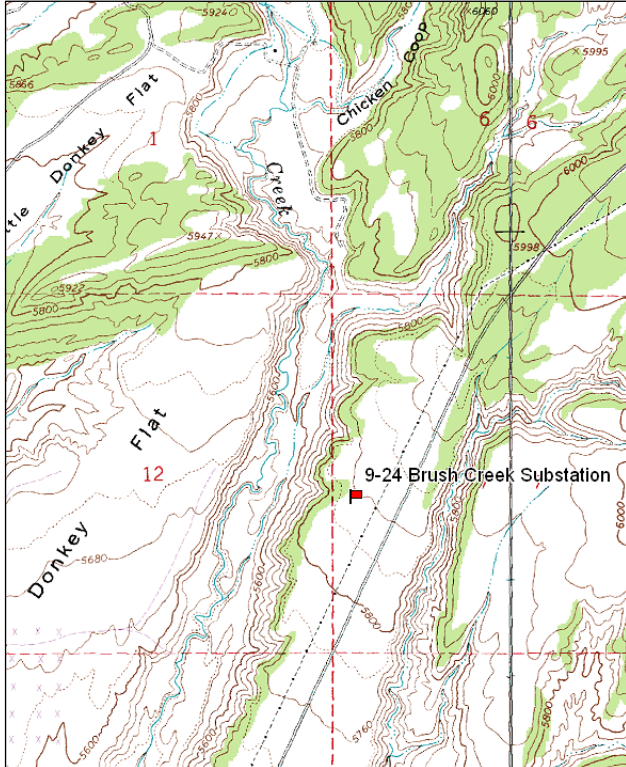
Transect bearing: 4° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft)

Directions:

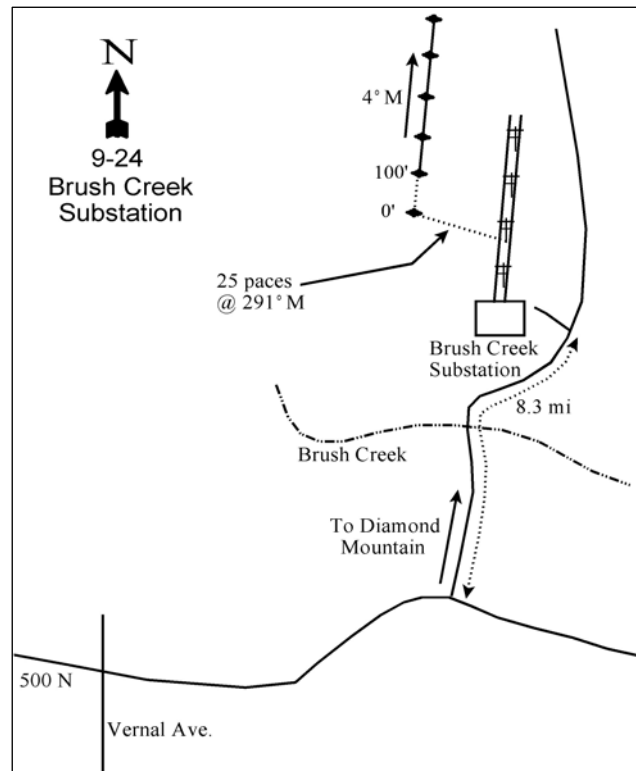
From the intersection of Vernal Avenue and 500 North in Vernal, head east on 500 North. Turn north on the road that leads to Diamond Mountain. Drive 8.3 miles to a short road on the left that leads to the Brush Creek Substation. Turn north and follow the power lines to the second set of power poles to power pole number 28/4. From the western most pole walk 25 paces at 291°M to the 0-foot stake, which is marked with browse tag number #61.

Map Name: Jensen Ridge



Township: 3S Range: 23E Section: 7

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 636706 E 4492739 N

BRUSH CREEK SUBSTATION - TREND STUDY NO. 9-24

Site Information

Site Description: The study samples a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community on land managed by the Bureau of Land Management (BLM) within the S.J. Hatch grazing allotment. The area to the east of the site was treated with the herbicide Plateau, a Dixie harrow and aerial seeding (Table - Seed Mix) as part of the Brush Creek Bench Sage Restoration ([WRI Project #315](#)) in the fall of 2008. It appears that the last belt of the transect may have been affected by the treatment. Pellet group transect data has indicated decreasing use by deer from very heavy use in 1997 to light use in 2010. Estimated use by elk and cattle has been light since 1997 (Table - Pellet Group Data).

Browse: Browse is limited on the site. Wyoming big sagebrush is the dominant browse species and provided abundant cover in 1997, but decreased substantially in cover in 2005 (Table - Browse Trends). This change in trend for sagebrush was also observed on the Buckhorn Canyon (9-25) study in this region. There was also a decrease in sagebrush density in 2005 with the surviving sagebrush being mostly decadent plants with poor vigor. Decadence and poor vigor decreased in 2010 with a large increase in the recruitment of young plants. Use of sagebrush was moderate to heavy in 1997 and 2005, but was light to moderate in 2010. The only other common browse on the site is a small population of pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are extremely poor on the site. The only species that provided notable cover was the annual species cheatgrass (*Bromus tectorum*), but it only occurred at moderately low cover. Only three perennial grasses were observed at low frequency and cover. These include bottlebrush squirreltail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*) and needle-and-thread (*Stipa comata*). Forbs are diverse and abundant on the site. Perennial forbs were very rare at the outset of the study in 1997, but were exceptionally abundant in 2005. Perennial forbs returned to more moderate levels in 2010. Scarlet globemallow (*Sphaeralcea coccinea*) is the dominant forb with other common forbs being timber poisonvetch (*Astragalus convallarius*) and hoary aster (*Machaeranthera canescens*). Annuals forbs were also rare at the outset of the study, but have been abundant on the site since 2005, with many weedy species such as halogeton (*Halogeton glomerata*) and Russian thistle (*Salsola iberica*) (Table - Herbaceous Trends).

Soil: Soils have a sandy loam texture with a slightly alkaline soil reaction (pH 7.9) (Table - Soil Analysis Data). Bare ground cover is fairly high, especially in the shrub interspaces where some erosion is noticeable. Vegetation and litter cover are lacking on the site (Table - Basic Cover). Soil and litter movement was apparent with slight pedestals around shrubs. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1997 to 2005 - down (-2):** The density of Wyoming big sagebrush decreased by 84% from 8,240 plants/acre to 1,280 plants/acre and cover decreased from 16% to 3%. Decadence of sagebrush increased from 16% to 84% and poor vigor increased from 12% to 69%.
- **2005 to 2010 - up (+2):** Wyoming big sagebrush density increased nearly three-fold to 3,380 plants/acre though cover remained similar. Most of the increase in density was due to a substantial increase in the recruitment of young sagebrush plants, which increased to 47% of the population. Decadence of sagebrush decreased to 5% and poor vigor decreased to 1%. Despite the large increase, the sagebrush population is well below 1997 levels.

Grass:

- **1997 to 2005 - down (-1):** There was a 79% decrease in the sum of nested frequency of perennial grasses, but perennial grasses were already rare on the site. Cheatgrass is the dominant grass species on the site.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses continued to decrease and perennial grasses were extremely rare on the site.

Forb:

- **1997 to 2005 - slightly up (+1):** The perennial forb sum of nested frequency increased nearly three-fold and cover increased from less than 1% to 23%. However, annual forbs also increased substantially on the site, many weedy species including halogeton and Russian thistle being sampled.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 48% and cover decreased to 6%. Annual forbs also decreased in frequency, but increased in cover from 11% to 18%. The weedy species Russian thistle provided the majority of the forb cover on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 9, study no: 24

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
97	20.2	10.2	1.0	1.9	-2.6	1.1	0.0	31.7	Fair
05	3.1	0.0	0.0	1.0	-2.7	10.0	0.0	11.4	Very Poor-Poor
10	3.1	0.0	0.0	0.6	-3.8	10.0	0.0	9.8	Very Poor-Poor

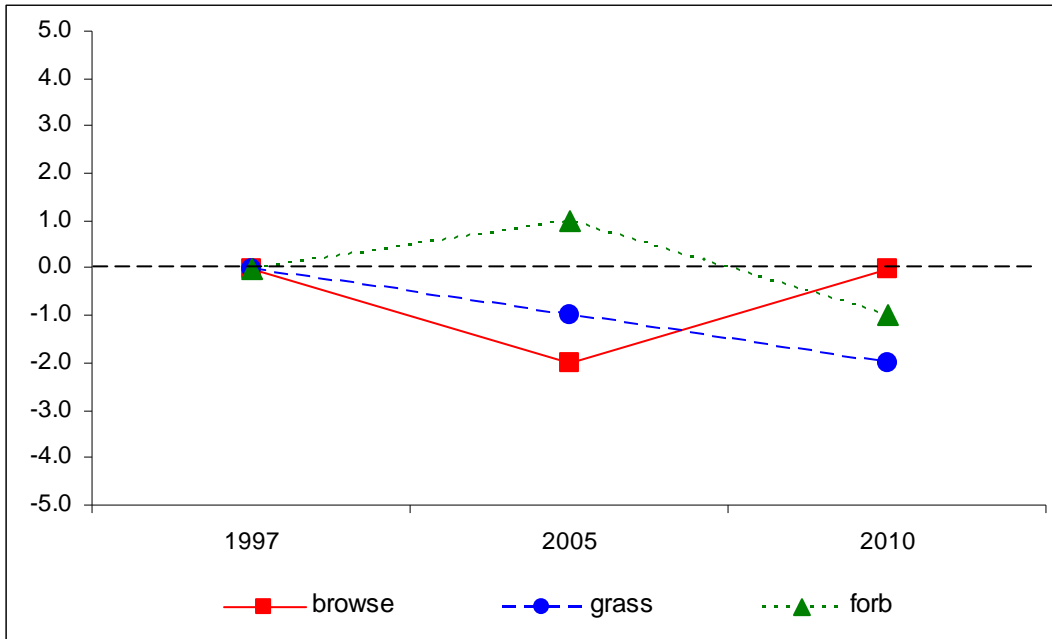
SEED MIX --

Management unit 9, study no: 24

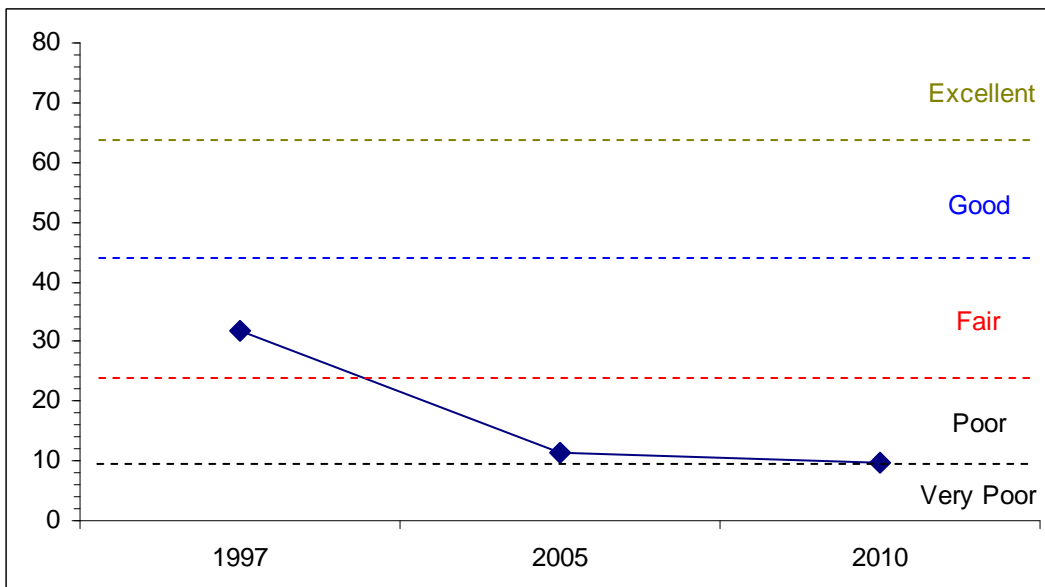
Project Name: Bench Creek Sage Restoration			
WRI Database #:315			
Application: Aerial		Acres: 300	
Seed type		lbs in mix	lbs/acre
F	Alfalfa 'Ladak'	600	2.00
G	Crested Wheatgrass 'Douglas'	450	1.50
G	Crested Wheatgrass 'Hycrest'	300	1.00
G	Russian Wildrye 'Bozoisky'	300	1.00
G	Sandberg Bluegrass	150	0.50
G	Snake River Wheatgrass 'Secar'	300	1.00
G	Thickspike Wheatgrass 'Critana'	300	1.00
B	Forage Kochia--Lander NV	300	1.00
B	Sagebrush, Wyoming--Sanpete UT	300	1.00
Total Pounds:		3000	10.00
PLS Pounds:			7.71

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 24



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 9, Study no: 24



HERBACEOUS TRENDS--

Management unit 09, Study no: 24

Type	Species	Nested Frequency			Average Cover %		
		'97	'05	'10	'97	'05	'10
G	<i>Bromus tectorum</i> (a)	b ₂₉₂	a ₁₃₉	b ₃₄₆	3.46	3.54	5.13
G	<i>Oryzopsis hymenoides</i>	a ⁻	ab ₅	b ₁₂	-	.04	.17
G	<i>Sitanion hystrix</i>	c ₁₄₆	b ₂₃	a ₃	.92	.45	.06
G	<i>Stipa comata</i>	3	3	1	.03	.02	.06
Total for Annual Grasses		292	139	346	3.46	3.54	5.13
Total for Perennial Grasses		149	31	16	0.95	0.51	0.28
Total for Grasses		441	170	362	4.41	4.06	5.42
F	<i>Agoseris glauca</i>	-	1	-	-	.03	-
F	<i>Alyssum alyssoides</i> (a)	a ₆	b ₄₈	a ₁₀	.02	.91	.02
F	<i>Arabis</i> sp.	1	-	-	.00	-	-
F	<i>Arenaria</i> sp.	-	-	2	-	-	.00
F	<i>Astragalus convallarius</i>	28	46	33	.19	3.50	2.11
F	<i>Chaenactis stevioides</i>	a ⁻	b ₁₈	a ⁻	-	.42	-
F	<i>Chenopodium leptophyllum</i> (a)	a ₈	a ₂	b ₂₃	.01	.01	.07
F	<i>Collinsia parviflora</i> (a)	a ⁻	b ₂₇	a ⁻	-	.19	-
F	<i>Cryptantha</i> sp.	b ₁₅	a ₁	ab ₆	.03	.00	.19
F	<i>Descurainia pinnata</i> (a)	a ⁻	b ₁₄₇	a ₂	-	3.15	.01
F	<i>Eriogonum cernuum</i> (a)	a ₁	b ₃₃	a ₃	.00	.45	.03
F	<i>Eriogonum racemosum</i>	2	-	5	.06	.00	.03
F	<i>Gilia</i> sp. (a)	a ⁻	b ₃₇	a ⁻	-	.74	-
F	<i>Halogeton glomeratus</i> (a)	a ⁻	b ₅₁	b ₄₅	-	.48	1.20
F	<i>Lactuca serriola</i>	a ⁻	b ₂₄	a ⁻	-	.34	-
F	<i>Lappula occidentalis</i> (a)	a ₁₄	b ₁₃₄	a ₃₁	.03	2.14	.43
F	<i>Machaeranthera canescens</i>	a ₂₈	c ₁₁₆	b ₇₀	.07	3.91	.39
F	<i>Microsteris gracilis</i> (a)	-	-	2	-	-	.00
F	<i>Navarretia intertexta</i> (a)	a ⁻	b ₁₇	a ⁻	-	.35	-
F	<i>Phlox longifolia</i>	b ₁₃	ab ₉	a ₁	.03	.04	.00
F	<i>Plantago patagonica</i> (a)	-	6	-	-	.03	-
F	<i>Salsola iberica</i> (a)	a ⁻	b ₁₂₄	c ₂₅₂	-	2.22	16.42
F	<i>Sisymbrium altissimum</i> (a)	-	10	2	-	.38	.03
F	<i>Sphaeralcea coccinea</i>	a ₄₂	c ₁₉₅	b ₁₁₆	.13	13.68	3.19
F	<i>Townsendia</i> sp.	a ⁻	b ₄₁	4	-	.59	.03
Total for Annual Forbs		29	636	370	0.06	11.09	18.23
Total for Perennial Forbs		129	451	237	0.53	22.55	5.97
Total for Forbs		158	1087	607	0.59	33.64	24.21

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

BROWSE TRENDS--

Management unit 09, Study no: 24

Type	Species	Strip Frequency			Average Cover %		
		'97	'05	'10	'97	'05	'10
B	Artemisia tridentata wyomingensis	100	34	36	16.13	2.45	2.47
B	Opuntia sp.	9	12	6	.03	.33	.33
Total for Browse		109	46	42	16.17	2.78	2.81

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 24

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	3.34	4.43

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 24

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.3	1.3

BASIC COVER--

Management unit 09, Study no: 24

Cover Type	Average Cover %		
	'97	'05	'10
Vegetation	18.79	35.26	33.40
Rock	.46	.35	.05
Pavement	4.31	1.76	2.59
Litter	22.62	33.88	32.02
Cryptogams	5.05	1.14	.33
Bare Ground	44.67	38.60	41.37

SOIL ANALYSIS DATA --

Management unit 9, Study no: 24, Study Name: Brush Creek Substation

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.3	7.6	57.4	22.1	20.6	1.4	8.4	67.2	0.4

PELLET GROUP DATA--

Management unit 09, Study no: 24

Type	Quadrat Frequency			Days use per acre (ha)		
	'97	'05	'10	'97	'05	'10
Rabbit	9	26	6	-	-	-
Elk	16	1	1	12 (30)	1 (2)	1 (2)
Deer	61	46	24	154 (380)	45 (111)	21 (51)
Cattle	-	-	8	2 (5)	6 (14)	7 (16)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 24

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>									
97	8240	2	82	16	-	56	42	12	14/25
05	1280	5	11	84	15000	36	61	69	13/18
10	3380	47	49	5	-	20	9	1	13/19
<i>Chrysothamnus nauseosus</i>									
97	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	23/29
<i>Gutierrezia sarothrae</i>									
97	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	17/12
<i>Opuntia sp.</i>									
97	180	0	89	11	-	0	0	11	4/11
05	260	0	62	38	-	0	0	23	4/14
10	140	0	100	0	-	0	14	29	6/13
<i>Sarcobatus vermiculatus</i>									
97	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	27/35

BUCKHORN CANYON - TREND STUDY NO. 9-25-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Loam (Wyoming Big Sagebrush), R034XY212UT

Land Ownership: BLM

Elevation: 5970 ft. (1820 m)

Aspect: South

Slope: 3%

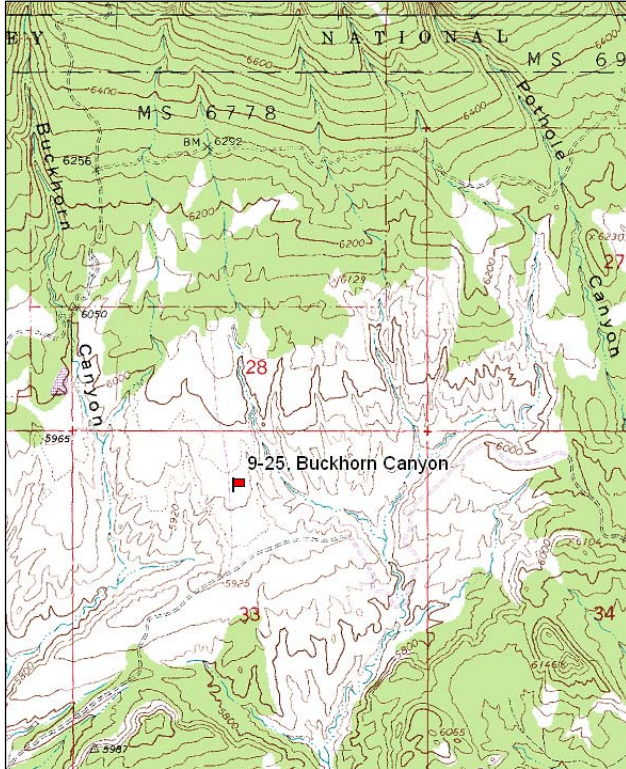
Transect bearing: 158° magnetic

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

Directions:

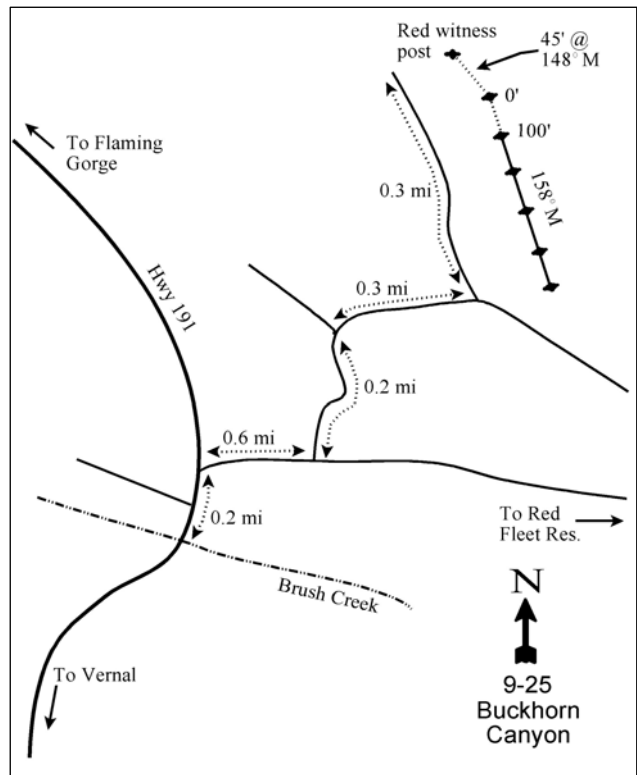
From Vernal proceed north on Highway 191. After Highway 191 crosses brush creek continue 0.2 miles and turn right onto the road that leads to Red Fleet Reservoir. On this road proceed 0.6 miles. Turn left onto a dirt road. Go 0.2 miles to a fork. Turn right and go 0.3 miles to another fork. Turn left and go 0.3 miles. The witness post is a red full high fence post about 50 feet to the east. The 0-foot stake is 45 feet to the south at 148° M, and is marked with browse tag #120.

Map Name: Donkey Flat



Township: 3N Range: 22E Section: 33

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 630897 E 4496132 N

BUCKHORN CANYON - TREND STUDY NO. 9-25

Site Information

Site Description: The study is located approximately 11 miles north of Vernal off Highway 191. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Brush Creek allotment. A lop and scatter treatment was done on 1,200 acres in the area in November of 2004, which removed many of the small Utah juniper (*Juniperus osteosperma*) that were scattered throughout the study site. Pellet group transect has indicated moderate to heavy use by deer with very heavy use in 2001. Estimated use by elk was moderate in 2001, but light since 2005. Estimated cattle use has been moderate since 2001 (Table - Pellet Group Data). A lot of the pellet groups sampled had been displaced by runoff and overland flow in multiple sample years.

Browse: Browse was abundant on the site at the outset of the study in 2001, but browse cover decreased substantially in 2005 and is now only fairly abundant. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is the dominant browse species and provides nearly all of the browse cover on the site (Table - Browse Trends). At the outset of the study the sagebrush was comprised of a dense population of mature and decadent plants with little recruitment of young plants. Since 2005, young plants have comprised a large part of the population. Vigor was poor in the sagebrush population at the outset of the study, but was fairly good in 2010. Utilization of sagebrush has been moderate to heavy, though use was mostly light in 2010. Small populations of pricklypear cactus (*Opuntia* sp.) and Utah juniper are the only other browse on the study (Table - Browse Characteristics).

Herbaceous Understory: Grasses are fairly diverse and abundant for a Wyoming big sagebrush community. Thickspike wheatgrass (*Agropyron dasystachyum*) and needle-and-thread (*Stipa comata*) are the most abundant grasses. Other perennial grasses sampled include Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail (*Sitanion hystrix*) and Indian ricegrass (*Oryzopsis hymenoides*). Needle-and-thread had a patchy distribution, while Sandberg bluegrass was found growing primarily underneath the safety of sagebrush crowns. Cheatgrass (*Bromus tectorum*) increased substantially in 2010, but was less common in other sample years. Perennial forbs are not particularly abundant on the site. Scarlet globemallow (*Sphaeralcea coccinea*) is the main perennial species that increased. Annual forbs were common in 2005, but have been less prevalent in the other sample years (Table - Herbaceous Cover).

Soil: Soils have a clay loam texture and a slightly alkaline soil reaction (pH 7.7). Phosphorus and potassium may have limited availability for plant growth and development at 4.1 ppm and 57.6 ppm, respectively (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). There is a layer of stone found between 8 and 12 inches below the surface. Low amounts of herbaceous vegetation and litter cover with high amounts of bare ground allow significant erosion to occur (Table - Basic Cover). The soil erosion condition was classified as stable in 2010, but was slight in 2005 due to pedestals around sagebrush stems and surface litter translocation during recent thunderstorms.

Trend Assessments

Browse:

- **2001 to 2005 - down (-2):** Density of Wyoming big sagebrush decreased by 16% from 4,900 plants/acre to 4,120 plants/acre and cover decreased from 21% to 6%. Decadence increased from 49% to 57% and poor vigor increased from 22% to 44%. More of the population was young with an increase in recruitment from 2% to 31% of the population.
- **2005 to 2010 - up (+2):** The density of sagebrush increased by 59% to 6,540 plants/acre and cover increased to 9%. Decadence decreased to 21% and poor vigor decreased to 14%. Recruitment of young plants increased to 39% of the population.

Grass:

- **2001 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased from 5% to 8%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but cover increased to 13%. Cheatgrass increased significantly in nested frequency and cover increased from less than 1% to 2%.

Forb:

- **2001 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased by 23%, but cover increased from 1% to 5%. Annual forbs increased substantially in frequency and cover.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial forbs remained similar, but cover decreased to 3%. Annual forbs decreased to below 2001 levels in frequency and cover.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

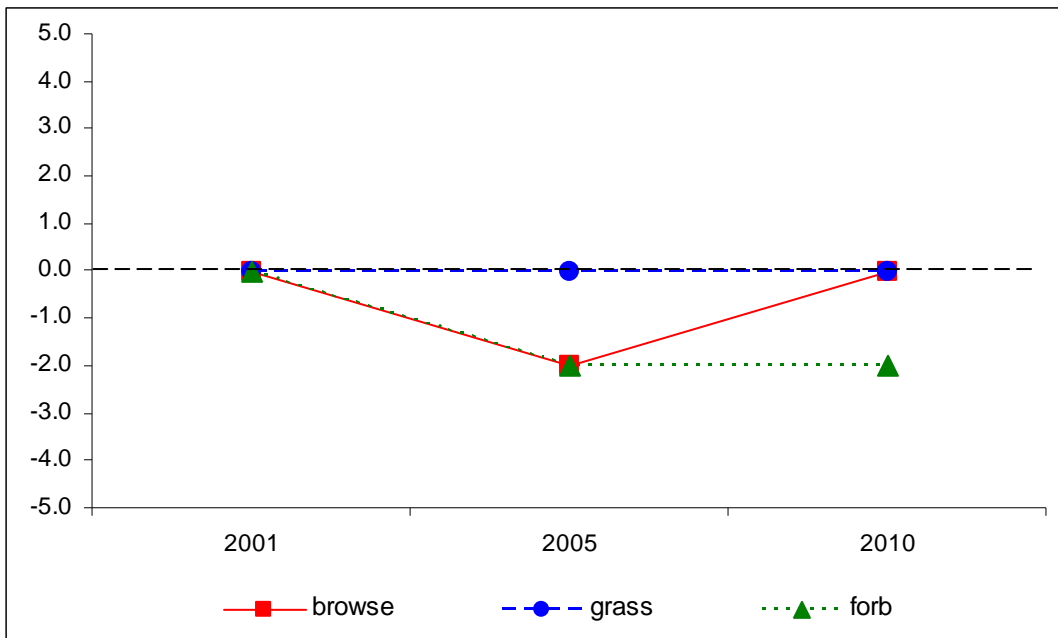
Management unit 9, study no: 25

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
01	26.6	0.3	1.0	10.8	-0.1	2.1	0.0	40.9	Fair
05	7.6	-2.1	15.0	15.3	-0.4	10.0	0.0	45.3	Fair-Good
10	11.5	8.7	15.0	25.8	-1.5	6.5	0.0	66.0	Good-Excellent

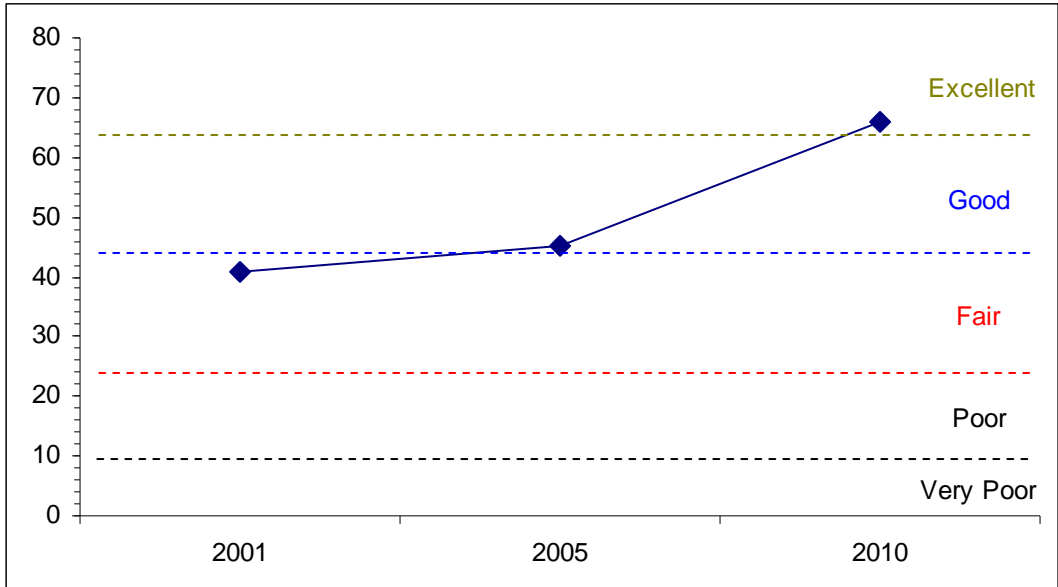
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 9, Study no: 25



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 9, Study no: 25



HERBACEOUS TRENDS--
 Management unit 09, Study no: 25

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
G	<i>Agropyron dasystachyum</i>	187	186	180	2.12	4.30	6.36
G	<i>Agropyron intermedium</i>	-	4	-	-	.03	-
G	<i>Bromus tectorum</i> (a)	a25	a52	b134	.09	.58	2.00
G	<i>Oryzopsis hymenoides</i>	2	5	14	.03	.05	.24
G	<i>Poa secunda</i>	106	84	77	1.23	.94	.83
G	<i>Sitanion hystrix</i>	b57	ab46	a25	.96	.26	.44
G	<i>Stipa comata</i>	a50	a54	b93	1.07	2.04	5.01
Total for Annual Grasses		25	52	134	0.09	0.58	2.00
Total for Perennial Grasses		402	379	389	5.42	7.64	12.89
Total for Grasses		427	431	523	5.51	8.22	14.90
F	<i>Astragalus convallarius</i>	5	5	2	.19	.28	.03
F	<i>Calochortus nuttallii</i>	11	11	3	.02	.03	.00
F	<i>Chenopodium leptophyllum</i> (a)	-	4	1	-	.01	.00
F	<i>Collinsia parviflora</i> (a)	-	2	-	-	.00	-
F	<i>Cryptantha</i> sp.	-	7	-	-	.07	-
F	<i>Descurainia pinnata</i> (a)	b50	c92	a10	.11	1.21	.07
F	<i>Eriogonum cernuum</i> (a)	-	1	-	-	.00	-
F	<i>Gilia</i> sp. (a)	a-	b15	a3	-	.38	.00
F	<i>Lappula occidentalis</i> (a)	b100	c323	a2	.21	7.25	.00
F	<i>Lomatium</i> sp.	-	2	2	-	.00	.00
F	<i>Machaeranthera canescens</i>	2	4	5	.01	.03	.06
F	<i>Phlox longifolia</i>	b124	a16	a17	.56	.07	.08
F	<i>Ranunculus testiculatus</i> (a)	a9	b37	a-	.02	.39	-
F	<i>Salsola iberica</i> (a)	a-	b68	a5	-	.37	.16

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
F	Schoenocrambe linifolia	-	-	1	-	-	.03
F	Sphaeralcea coccinea	_a 67	_b 117	_b 138	.25	4.64	3.02
F	Townsendia sp.	20	14	5	.03	.22	.02
F	Tragopogon dubius	-	-	4	-	-	.00
Total for Annual Forbs		159	542	21	0.35	9.63	0.25
Total for Perennial Forbs		229	176	177	1.07	5.36	3.26
Total for Forbs		388	718	198	1.43	15.00	3.51

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

BROWSE TRENDS--

Management unit 09, Study no: 25

Type	Species	Strip Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
B	Artemisia tridentata wyomingensis	73	80	85	21.31	6.06	9.19
B	Juniperus osteosperma	0	1	2	1.00	.18	.53
B	Opuntia sp.	14	16	17	.45	.65	.21
Total for Browse		87	97	104	22.76	6.89	9.94

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 25

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	7.40	10.14
Juniperus osteosperma	.20	.51
Opuntia sp.	.48	.51

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 25

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	3.5	1.4

BASIC COVER--

Management unit 09, Study no: 25

Cover Type	Average Cover %		
	'01	'05	'10
Vegetation	27.13	25.62	31.47
Rock	.04	.04	.00
Pavement	.46	1.01	.36
Litter	31.23	30.46	46.59
Cryptogams	4.40	2.79	1.55
Bare Ground	50.20	50.00	34.18

SOIL ANALYSIS DATA --

Management unit 9, Study no: 25, Study Name: Buckhorn Canyon

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.2	7.7	35.6	33.8	30.6	1.4	4.1	57.6	0.4

PELLET GROUP DATA--

Management unit 09, Study no: 25

Type	Quadrat Frequency			Days use per acre (ha)		
	'01	'05	'10	'01	'05	'10
Rabbit	25	66	29	-	-	-
Elk	10	9	4	28 (69)	11 (26)	9 (22)
Deer	62	47	33	175 (431)	37 (91)	57 (141)
Cattle	10	5	8	28 (68)	29 (72)	21 (52)
Horse	-	-	-	-	-	2 (4)

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 25

		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>Artemisia tridentata wyomingensis</i>										
01	4900	2	49	49	-	41	12	22	19/28	
05	4120	31	12	57	14900	24	41	44	19/27	
10	6540	39	40	21	400	11	20	14	16/26	
<i>Atriplex canescens</i>										
01	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	39/56	
<i>Grayia spinosa</i>										
01	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	24/56	
10	0	0	0	-	-	0	0	0	32/74	
<i>Gutierrezia sarothrae</i>										
01	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	12/15	
10	0	0	0	-	-	0	0	0	-/-	
<i>Juniperus osteosperma</i>										
01	0	0	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	120	100	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
01	420	10	67	24	-	0	0	0	3/11	
05	640	3	84	13	-	0	0	22	4/15	
10	420	0	95	5	-	0	0	0	4/16	

SUMMARY
WILDLIFE MANAGEMENT UNIT 9 - SOUTH SLOPE, VERNAL

Community Types

Deer winter range within a unit is summarized into three categories based on ecological potentials which include low potential, mid-level potential and high potential. Low potential sites include desert shrub, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and cliffrose (*Cowania mexicana* ssp. *stansburiana*) communities. Mid-level potential sites include mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) communities. High potential sites include mountain brush communities. Black sagebrush (*A. nova*) and basin big sagebrush (*A. tridentata* ssp. *tridentata*) communities are placed within the low potential or mid-level potential scales based on precipitation and elevation. Deer summer range is summarized separately from winter range as a fourth category and typically includes aspen (*Populus tremuloides*) and high elevation mountain brush communities. Eighteen interagency range trend studies were sampled in Unit 9 during the summer of 2010. Five of the range trend studies in the unit [Little Hole (9-9), John Starr Flat (9-13), Mud Springs Draw (9-15), Gooseberry Spring (9-18) and Seep Hollow (9-20)] are categorized as high potential sites for deer winter range and sample mountain brush communities. Many of these high potential sites are also used as summer range by deer. All of these studies are also classified as crucial elk winter range. Eight of the studies [Taylor Mountain (9-2), Dry Fork Mountain (9-3), Sawtooth Flat Spring (9-4), Warren Draw (9-7), Toliver Creek Chaining (9-10), Mosby Mountain (9-16), Farm Creek (9-17), Mosby Mountain South (9-19) and Rock Creek (9-23)] are categorized as mid-level potential sites for deer winter range and sample mountain big sagebrush communities. Though categorized as deer winter range in this summary, many of the studies are also considered to be crucial deer summer range and fawning habitat. Also, all of these studies are considered to be crucial elk winter range with summer use by elk occurring on many of the sites. Six of the studies [Red Mountain Allotment (9-1), Island Park (9-5), Browns Park River Corridor Cattle (9-21) and Wildlife (9-22), Brush Creek Substation (9-24) and Buckhorn Canyon (9-25)] are classified as low potential deer winter range sites and sample Wyoming big sagebrush communities. The Island Park and Brush Creek Substation studies are considered to be crucial year-long deer habitat. All of the studies except the two Browns Park River Corridor studies are also considered to be crucial elk winter range. There were no studies in this unit that were considered to be strictly summer range.

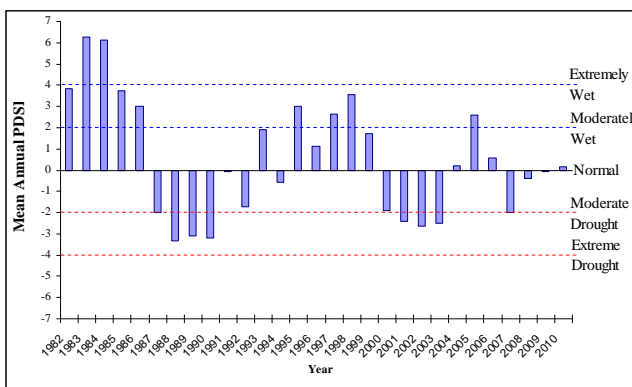


Figure 1. The 29 year mean annual Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

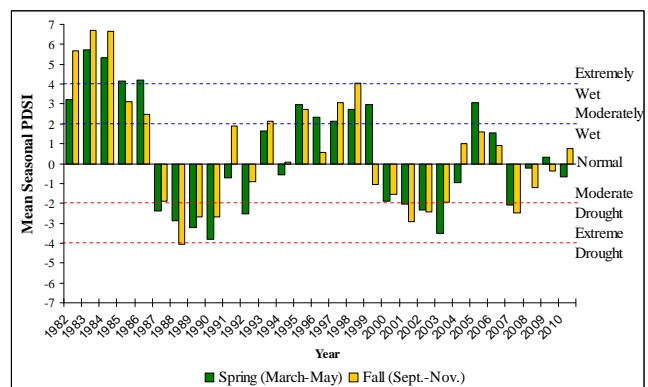


Figure 2. The 29 year mean spring (March-May) and fall (Sept.-Nov.) Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

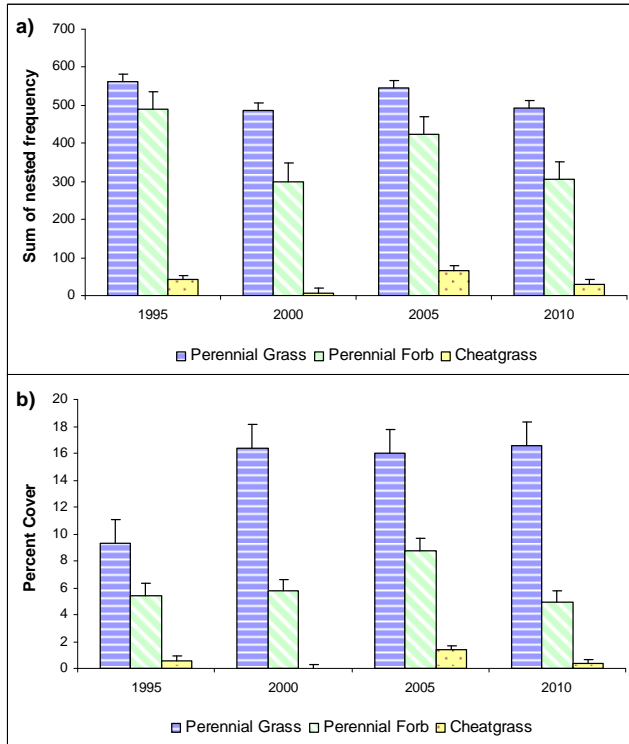


Figure 3. a) High potential sites mean perennial grass, perennial forb and cheatgrass sum of nested frequency (n=5) by year for WMU 9, South Slope, Vernal. b) High potential sites mean perennial grass, perennial forb and cheatgrass cover (n=5) by year for WMU 9.

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Precipitation and Palmer Drought Severity Index (PDSI) data for the unit were compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the Northern Mountains (Division 5). Most of the studies in Unit 9 fall along the border between the Northern Mountains and the Uintah Basin (Division 6), with several studies (Red Mountain Allotment and Island Park) falling within the Uintah Basin. Only precipitation data for the Northern Mountains is included in this summary. For further information on precipitation for the Uintah Basin, refer to the Unit 10 Summary section. The Northern Mountains had a historic annual mean precipitation of 19.11 inches from 1895 to 2010. The mean annual PDSI of the Northern Mountains displays a cycle of several wet years followed by several drought years, over the course of study years in the unit. Wetter than normal years in the Northern Mountains included 1982-1986, 1993, 1995-1999 and 2005, and drought years included 1987-1992, 2000-2003 and 2007 (Figure 1 and Figure 2) (Time Series Data 2011).

Mountain Brush Communities (High Potential)

Browse: The high potential cumulative median browse trend increased from 1982 to 1995, but decreased through 2005 before increasing again in 2010 (Figure 10a). The browse composition in the mountain brush studies tends to be a mixture of four predominant species; serviceberry (*Amelanchier utahensis*), mountain big sagebrush, true mountain mahogany (*Cercocarpus montanus*) and bitterbrush (*Purshia tridentata*). Dominance in cover of these four browse species varies across the studies, though mountain big sagebrush

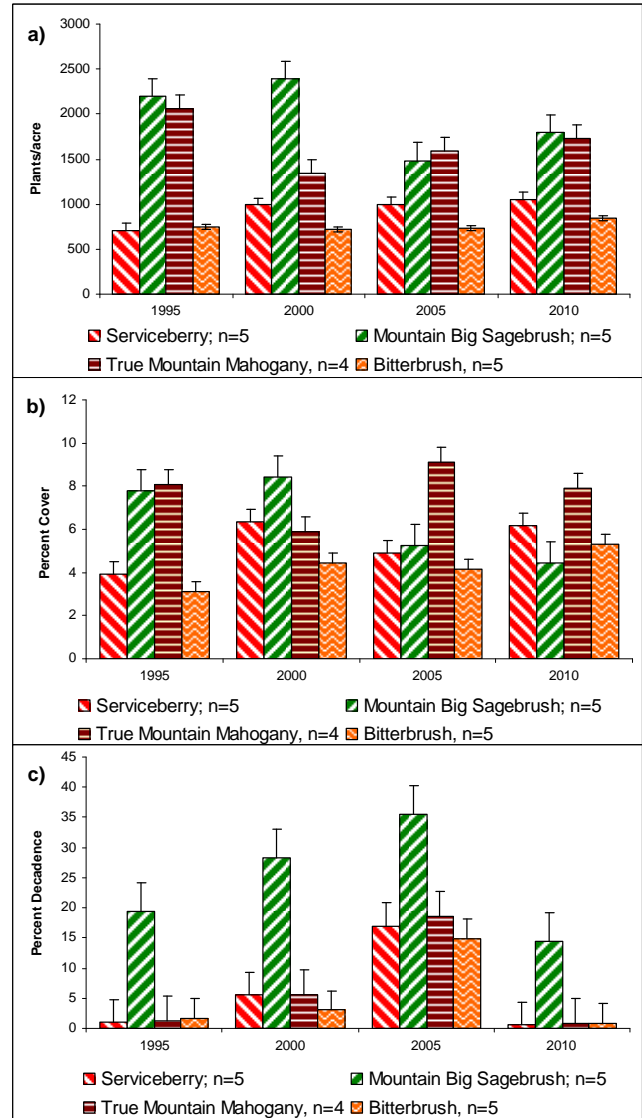


Figure 4. a) High potential sites mean density of mountain brush by year for WMU 9, South Slope, Vernal. b) High potential sites mean cover of mountain brush by year for WMU 9. c) High potential sites mean population decadence of mountain brush by year for WMU 9.

typically has the highest density. True mountain mahogany was not sampled on the Gooseberry study. The Mud Springs Draw study was not sampled in 2000 which influences the trend for that year, particularly for true mountain mahogany which is dominant on the study. The density of serviceberry increased substantially from 1995 to 2000, then remained stable throughout the remaining sample years. Density of mountain big sagebrush decreased significantly in 2005. There was a significant decrease in the density of true mountain mahogany in 2000 due to the Mud Springs Draw study not being sampled, but density was also significantly lower than 1995 in the 2005 and 2010 study years. Density of mahogany did increase in 2010, though not significantly. The density of bitterbrush remained similar throughout the early study years, then increased slightly, but significantly, in 2010 (Figure 4a). Cover of serviceberry and mountain big sagebrush displayed similar trends as the density of the two species, though cover of mountain big sagebrush did not increase in 2010 like density did. The cover of true mountain mahogany was significantly lower in 2000, but was similar in all other sample years. The decrease in cover of mahogany in 2000 is likely an artifact of the Mud Springs Draw study not being sampled in that year. Cover of bitterbrush increased significantly in 2000, then increased significantly again in 2010 (Figure 4b). Decadence has been low in most of the mountain brush species on the studies, though decadence of mountain big sagebrush has been moderate to high. There was a general increase in decadence in all of the species in 2005 (Figure 4c), following several drought years (Figure 1 and Figure 2) as well as increased use by wildlife in that year (Figure 11a).

Herbaceous Understory: Despite a general downward trend in the high potential median cumulative grass trend since 1988 (Figure 10a), grasses on these studies appear to be in good condition. Grasses within these communities are diverse and abundant. The annual species cheatgrass (*Bromus tectorum*) is present, but is not overly abundant on any of the study sites. The mean sum of nested frequency of perennial grasses was significantly lower in 2000 and 2010 than in 1995 and 2005 (Figure 3a). Mean cover of perennial grasses increased significantly in 2000 and remained higher throughout the following sample years (Figure 3b). Much of the discrepancy between the general trend and the mean trends of sum of nested frequency and cover of perennial grasses is due to composition changes on the study sites. In general across the studies, there was a decrease in the sum of nested frequency of low cover producing species as one high cover producing species increased in dominance on the site. Examples are the increase of Kentucky bluegrass (*Poa pratensis*) on the Little Hole study, and the increase of needle-and-thread (*Stipa comata*) on the Mud Springs Draw and Seep Hollow studies. These composition changes caused the sum of nested frequency of perennial grasses to decrease, thus decreasing the general trend, while cover often times increased.

The high potential median cumulative forb trend for the unit has fluctuated since 1998 (Figure 10a). Perennial forbs are also diverse within the sampled communities, but are typically not nearly as abundant as perennial grasses. The mean sum of nested frequency of perennial forbs was significantly lower in 2000 and 2010 than in 1995 and 2005 (Figure 3a). Cover of perennial forbs was significantly higher in 2005 than any other sample year (Figure 3b).

Utilization: Pellet group transect data indicates that both deer and elk predominantly use the area. The mean deer and elk days use/acre on the unit was moderate in 2000 and 2010 with a marked increase in use for both species in 2005. Cattle use appears to be light on these studies (Figure 11a). Moose pellets have also occasionally been sampled on the Little Hole and Mud Springs Draw studies.

Deer Desirable Components Index (DCI): The high potential deer DCI has remained relatively similar, though with a slight general trend upward over the sample years. The ranking of the DCI has been good throughout the sample years (Table 1 and Figure 9).

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	29.4	12.9	8.0	18.6	-0.3	8.5	0.0	77.2	Good
00	29.3	10.6	6.9	29.3	0.0	8.0	0.0	84.0	Good
05	28.9	9.3	7.7	28.3	-0.8	9.5	0.0	82.8	Good
10	29.6	13.9	10.5	27.5	-0.2	8.2	0.0	89.5	Good-Excellent

Table 1. High potential scale mean deer DCI scores (n=5) by year for WMU 9, South Slope, Vernal. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

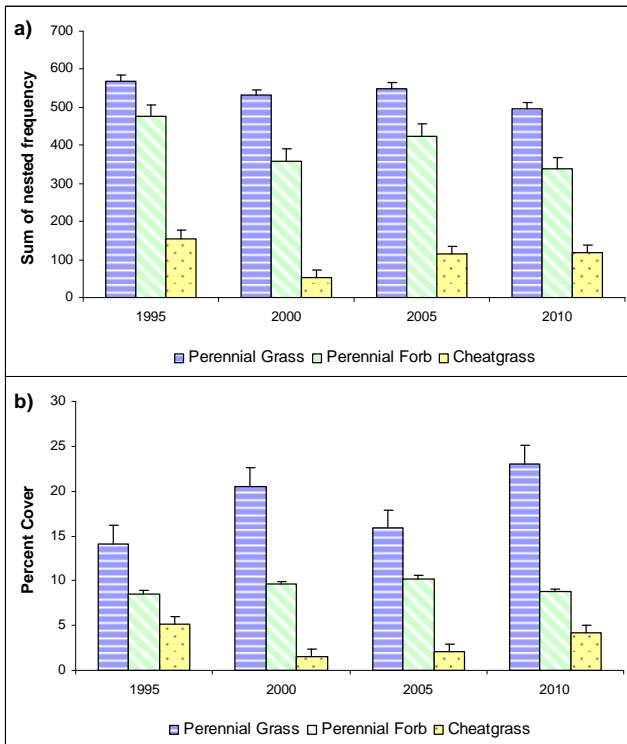


Figure 5. a) Mid-level potential sites mean perennial grass, perennial forb and cheatgrass sum of nested frequency (n=9) by year for WMU 9, South Slope, Vernal. b) Mid-level potential sites mean perennial grass, perennial forb and cheatgrass cover (n=9) by year for WMU 9.

Mountain Big Sagebrush Communities (Mid-Level Potential)

Browse: The mid-level potential studies cumulative median browse trend increased from 1982 to 2000, but then decreased again in both 2005 and 2010 (Figure 10b). The dominant browse species on all of the mid-level potential studies is mountain big sagebrush, though many of the studies also have a large component of bitterbrush. The Mosby Mountain and Mosby Mountain South studies also have a small, but healthy, component of serviceberry. The Toliver Creek Chaining study samples a pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining done in 1986 that has had limited reestablishment of mountain big sagebrush. The Dry Fork Mountain study was not sampled in 2005 due to a

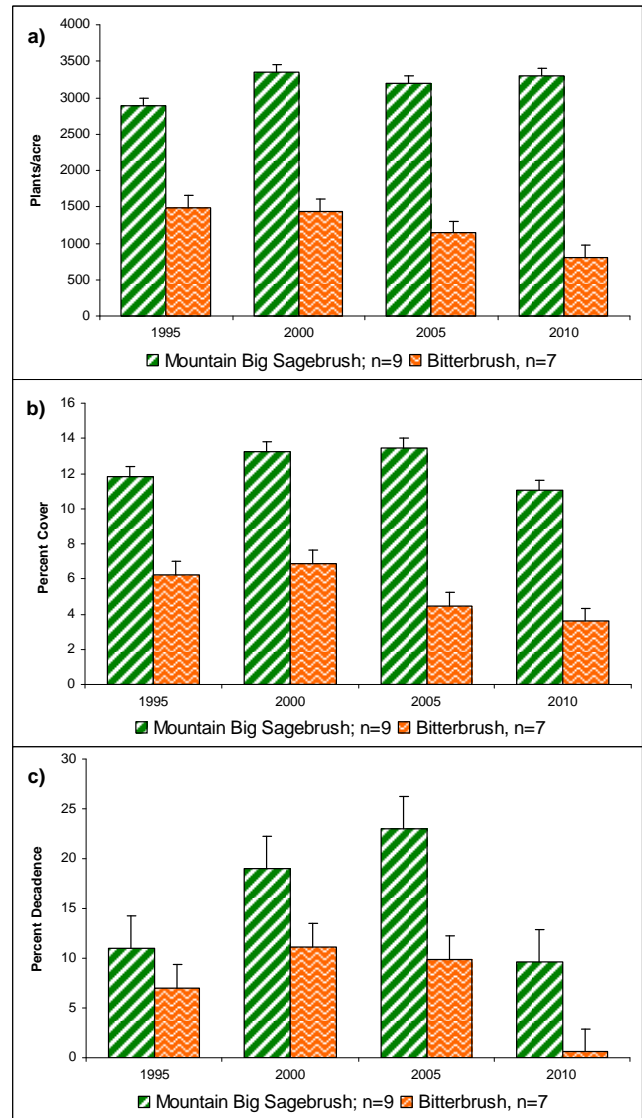


Figure 6. a) Mid-level potential sites mean density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and bitterbrush (*Purshia tridentata*) by year for WMU 9, South Slope, Vernal. b) Mid-level potential sites mean cover of mountain big sagebrush and bitterbrush by year for WMU 9. c) Mid-level potential sites mean population decadence of mountain big sagebrush and bitterbrush by year for WMU 9.

wildfire that burned the site that summer and the Farm Creek study was burned in the Neola wildfire in 2007. Following the wildfires, the browse component decreased substantially on each of these studies. Density of mountain big sagebrush increased significantly in 2000 and has remained higher throughout the remaining sample years (Figure 6a). Cover of mountain big sagebrush also increased significantly in 2000, but decreased significantly in 2010 to around 1995 levels (Figure 6b). Decadence of sagebrush increased significantly in 2000 with another large, but not significant increase in 2005 before decreasing significantly to 1995 levels in 2010 (Figure 6c). Bitterbrush has decreased steadily in density on the studies since 2000. The decrease in density was significant in 2010, but not in 2005 (Figure 6a). Cover of bitterbrush decreased significantly in 2005, but remained similar in 2010 (Figure 6b). Decadence of bitterbrush increased in 2000, but not significantly, and remained elevated in 2005. Decadence of bitterbrush decreased significantly in 2010 on the studies (Figure 6c)

Herbaceous Understory: The mid-level potential median cumulative grass trend has decreased slightly for several years since 1995, but grasses generally remained in very good condition for these studies (Figure 10b). Grasses within these communities are diverse and very abundant. The annual species cheatgrass (*Bromus tectorum*) was sampled on most of the studies, but tends not to be a prevalent component on the sites. The exception is the Toliver Creek Chaining study which has been dominated by cheatgrass in several sample years. The mean sum of nested frequency of perennial grasses was significantly higher in 1995 than all other sample years and significantly lower in 2010 than all other sample years (Figure 5a). Despite the decrease in frequency the cover of perennial grasses was significantly higher in 2000 and 2010 than in 1995 and 2005 (Figure 5b). The nested frequency of cheatgrass was significantly lower on the studies in 2000 than in the other sample years (Figure 5a).

The mid-level potential median cumulative forb trend has fluctuated over the sample years with slight increases and decreases in each sample year. The overall trend has remained fairly stable (Figure 10b). Perennial forbs are also diverse and fairly abundant within most of the sampled communities. The mean sum of nested frequency of perennial forbs was significantly lower in 2000 and 2010 than in 1995 and 2000, though mean cover increased slightly, but significantly, in 2000 and decreased significantly in 2010 (Figure 5a and Figure 5b).

Utilization: Pellet group transect data indicates that deer predominantly use these study areas. The mean deer days use/acre on the unit has been moderate to moderately heavy over the course of the study years with the highest use occurring in 2005. The mean elk days use/acre has been mostly light on the sites. Cattle use also appears to be light on the studies (Figure 11b).

Deer Desirable Components Index (DCI): The mid-level potential deer DCI remained fairly stable over the sample years with rankings ranging from fair to good throughout the sample years (Table 2 and Figure 9).

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	18.6	10.4	4.0	25.1	-2.9	7.4	0.0	62.6	Fair
00	20.2	8.2	4.1	28.5	-0.4	7.0	0.0	67.6	Good
05	20.7	7.3	3.6	26.3	-1.0	7.1	0.0	63.9	Fair-Good
10	17.2	9.5	4.8	28.3	-2.5	7.9	0.0	65.1	Fair-Good

Table 2. Mid-level potential scale mean deer DCI scores (n=9) by year for WMU 9, South Slope, Daggett. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

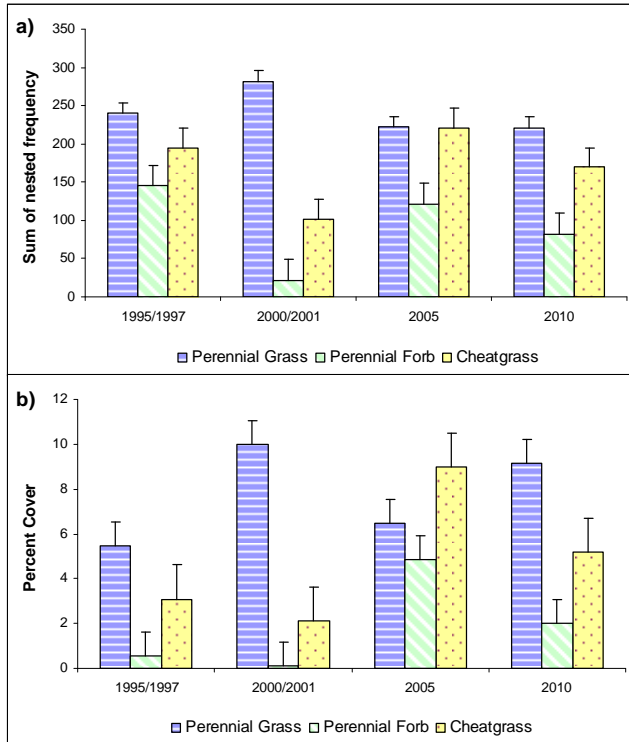


Figure 7. a) Low potential sites mean perennial grass, perennial forb and cheatgrass sum of nested frequency (n=6) by year for WMU 9, South Slope, Vernal. b) Low potential sites mean perennial grass, perennial forb and cheatgrass cover (n=6) by year for WMU 9.

Wyoming Big Sagebrush Communities (Low Potential)

Browse: The low potential site cumulative median browse trend has decreased substantially and steadily since 1995/1997 (Figure 10c). The dominant browse species on these low potential studies is Wyoming big sagebrush. A small wildfire removed most of the browse on the Island Park study in 2010, but cover and density of sagebrush was already fairly low on that study. There was a significant decrease in the mean density of Wyoming big sagebrush in 2000/2001, though this decrease appears to be an artifact of the high density Brush Creek Substation study not being read during those sample years. There was also a general die-off of sagebrush on the Island Park, Brush Creek Substation and Buckhorn Canyon studies sampled in 2005 that decreased the mean density of the studies significantly in 2005. Density increased slightly, but remained at depressed levels in 2010 (Figure 8a). The mean cover of Wyoming big sagebrush reflected the changes in density throughout the sample years (Figure 8b). The mean decadence of Wyoming big sagebrush increased significantly from moderate levels to high levels in 2000/2001, and remained elevated throughout the remaining sample years (Figure 8c).

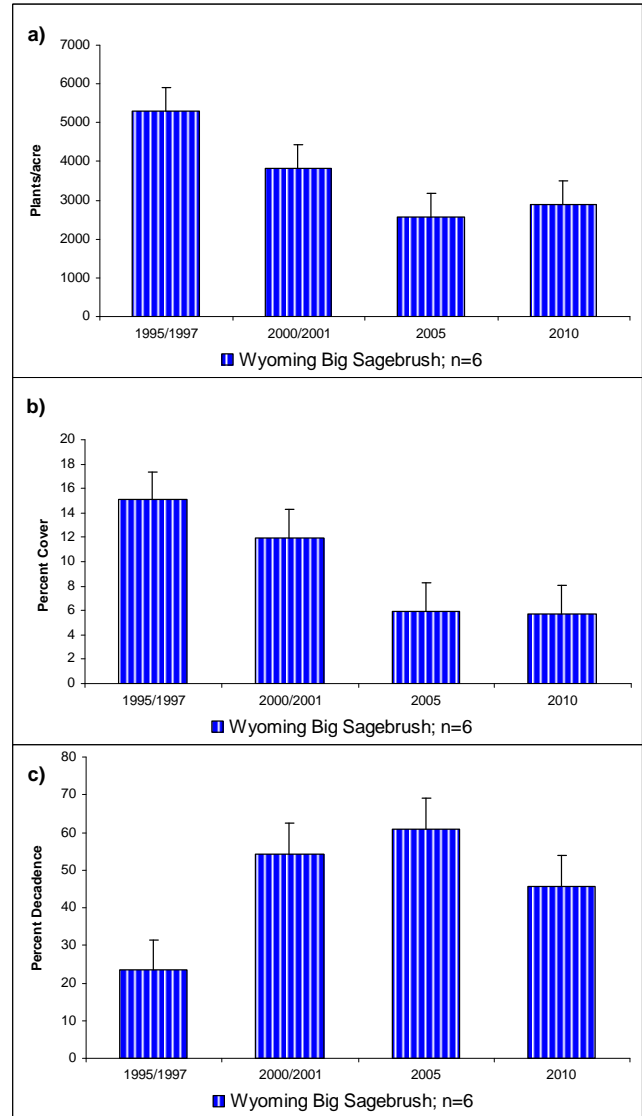


Figure 8. a) Low potential sites mean density of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) by year for WMU 9, South Slope, Vernal. b) Low potential sites mean cover of Wyoming big sagebrush by year for WMU 9. c) Low potential sites mean population decadence of Wyoming big sagebrush by year for WMU 9.

Herbaceous Understory: The low potential median cumulative grass trend decreased substantially from 1995/1997 to 2005 (Figure 10c). Grasses within these communities are typically fairly diverse and abundant, except for the Red Mountain Allotment and Brush Creek Substation studies which are limited in grasses. The annual species cheatgrass (*Bromus tectorum*) is fairly common on the studies, but is the dominant grass species on the Red Mountain Allotment and Brush Creek Substation studies. The cheatgrass mean nested frequency was significantly lower in 2000/2001 than the other sample years (Figure 7a). The mean cover of cheatgrass was significantly higher in 2005 than the other sample years (Figure 7b). Mean sum of nested

frequency of perennial grasses was significantly higher in 2000/2001 than all of the other sample years (Figure 7a). The mean cover of perennial grasses was significantly higher in 2000/2001 and 2010 than in the 1995/1997 and 2005 sample years (Figure 7b).

The low potential median cumulative forb trend has remained relatively stable throughout the study years (Figure 10c). Perennial forbs are not as frequent or abundant as perennial grasses or cheatgrass within the sampled communities. The mean sum of nested frequency of perennial forbs was significantly lower in 2000/2001 than the other sample years (Figure 7a). Mean cover of perennial forbs was significantly higher in 2005 than the other sample years (Figure 7b).

Utilization: Pellet group transect data indicates that deer predominantly use these study areas, though elk use was heavier on the Island Park study than deer use. The mean deer days use/acre on the unit has been mostly heavy over the course of the study years, though there was a substantial decrease in use in 2005. The mean elk and cattle days use/acre have been mostly light on the study sites (Figure 11c), though cattle use was moderate on the Buckhorn Canyon study. Cattle are excluded from the Island Park and Browns Park River Corridor-Wildlife studies.

Deer Desirable Components Index (DCI): The low potential deer DCI decreased steadily from 1995/1997 to 2005 before increasing slightly again in 2010. Most of the decrease is due to decreases in the cover of preferred browse and an increase in decadence. The ranking ranged from fair to poor-fair (Table 3 and Figure 9).

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95/97	19.3	9.0	5.1	11.2	-3.8	1.2	0.0	41.9	Fair
00/01	16.5	-0.3	1.4	14.6	-1.8	1.3	0.0	31.8	Fair
05	10.5	1.4	3.7	12.3	-6.5	3.5	0.0	24.9	Poor-Fair
10	8.2	1.9	3.4	16.1	-3.3	3.0	0.0	29.3	Fair

Table 3. Low potential scale mean deer DCI scores (n=6) by year for WMU 9, South Slope, Vernal. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

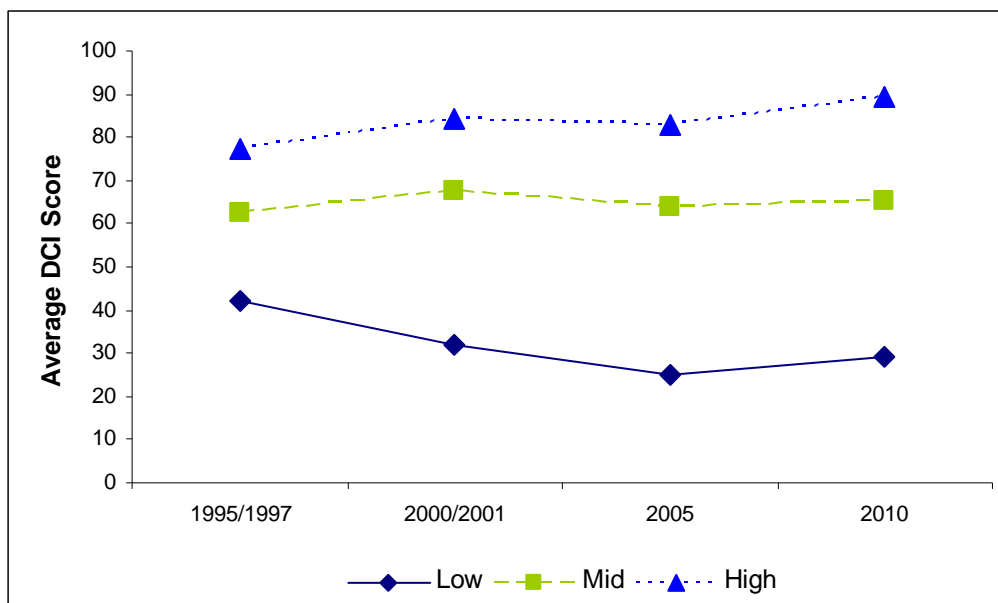


Figure 9. Mean low (n=6), mid-level (n=9) and high (n=5) potential scale deer DCI scores by year for WMU 9, South Slope, Vernal. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

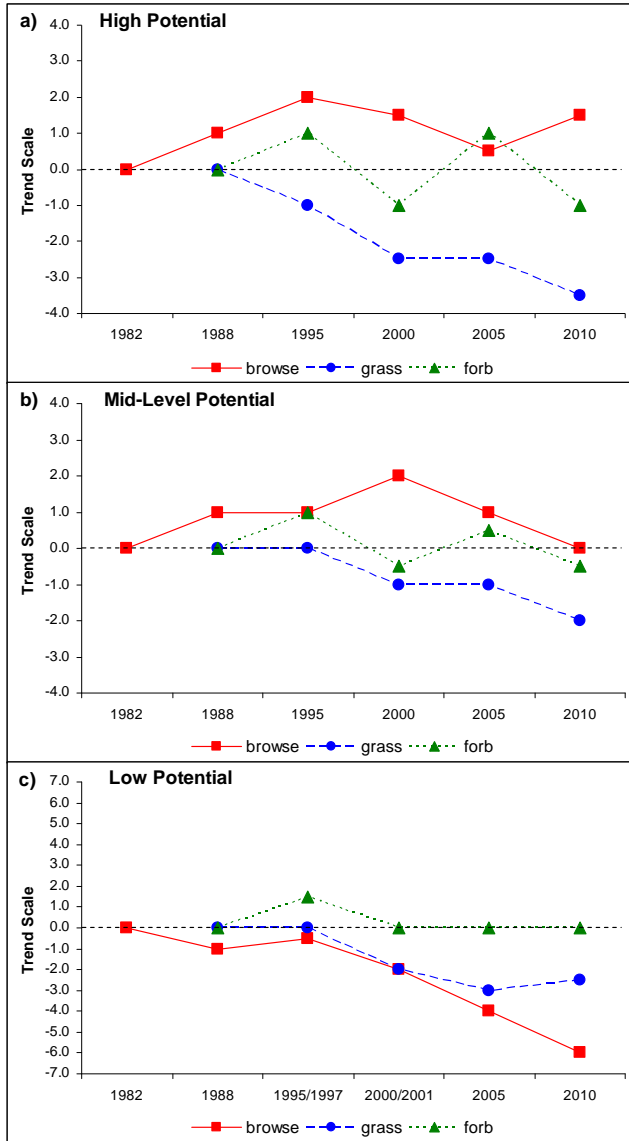


Figure 10. a) High potential sites (n=5) cumulative median browse, grass and forb trends by year for WMU 9, South Slope, Vernal. b) Mid-level potential sites (n=9) cumulative median browse, grass and forb trends by year for WMU 9. c) Low potential sites (n=6) cumulative median browse, grass and forb trends by year for WMU 9.

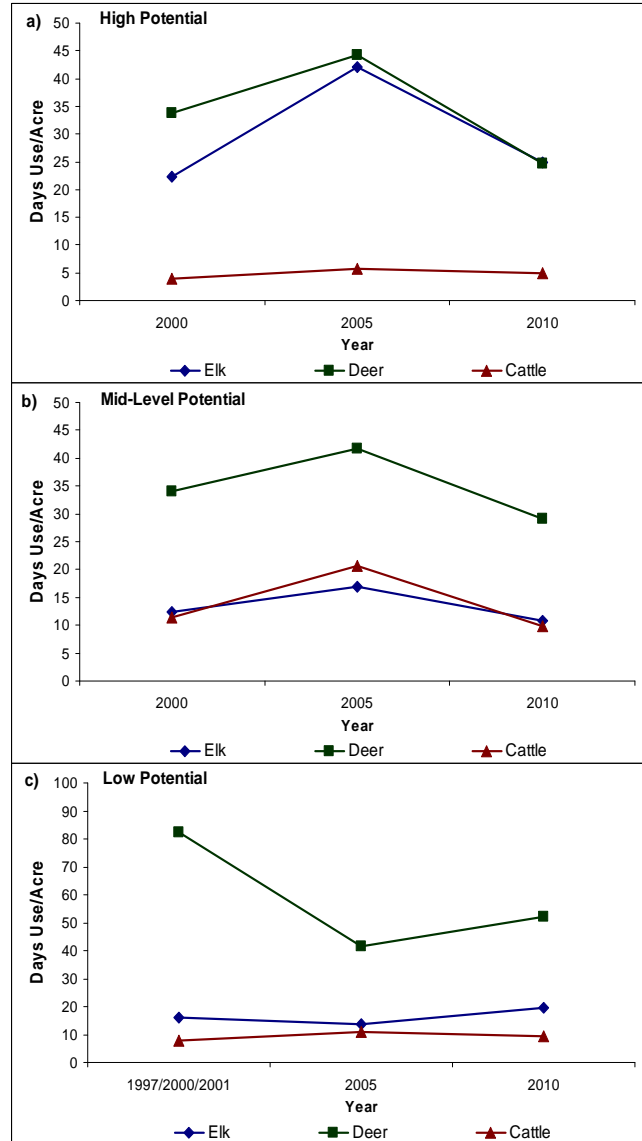
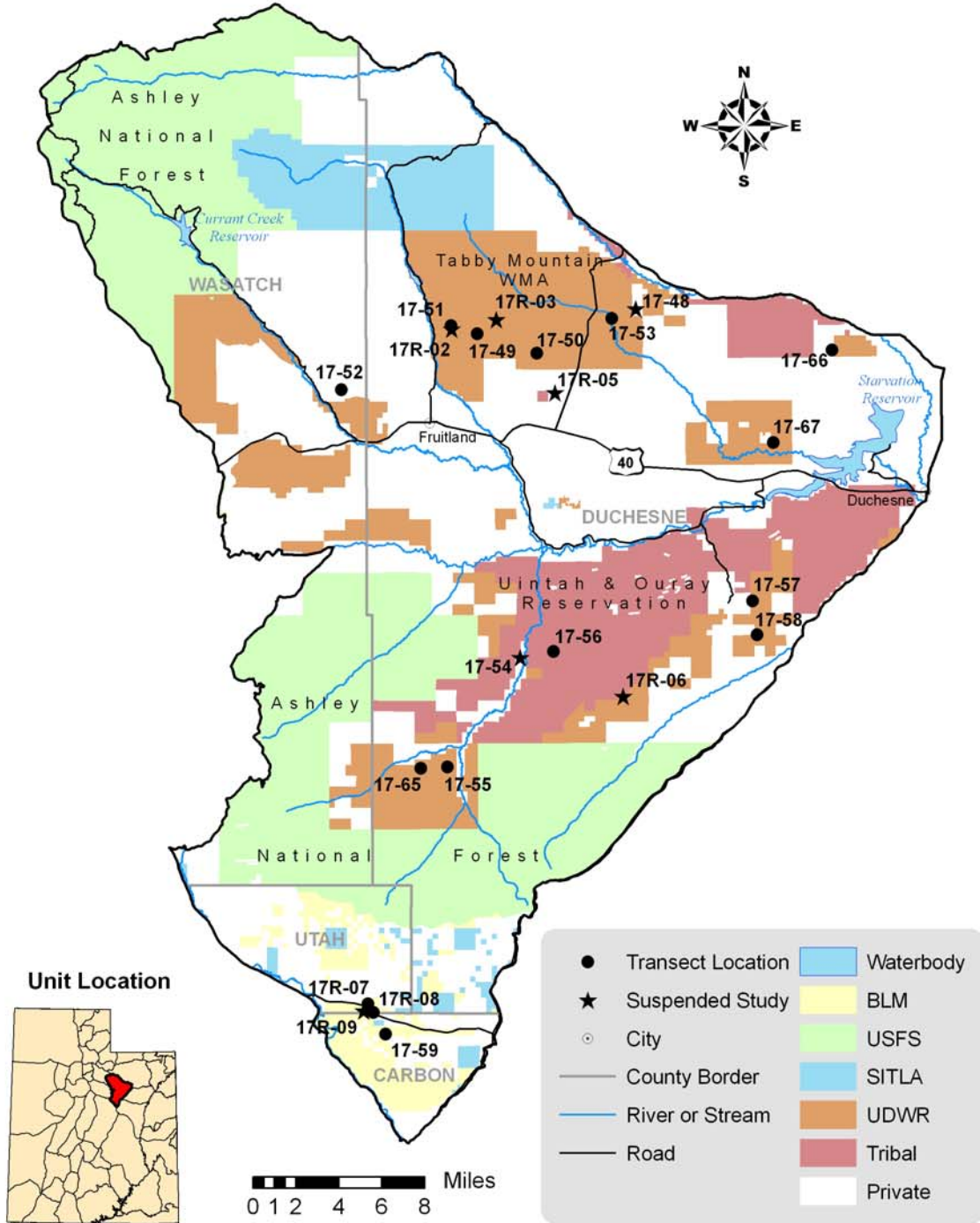


Figure 11. a) High potential sites (n=5) mean animals days use/acre by year for WMU 9, South Slope, Vernal. b) Mid-level potential sites (n=9) mean animal days use/acre by year for WMU 9. c) Low potential sites (n=6) mean animal days use/acre by year for WMU 9.

Management Unit 17



WILDLIFE MANAGEMENT UNIT 17 - WASATCH MOUNTAINS

Boundary Description

Salt Lake, Summit, Wasatch, Duchesne, Carbon, Utah counties - Boundary begins at the junction of Interstate 15 and Interstate 80 in Salt Lake City, then east on I-80 to Highway US-40; south on US-40 to Highway SR-32; east on SR-32 to Highway SR-35; southeast on SR-35 to Highway SR-87; south on SR-87 to Duchesne and Highway US-191; south on US-191 to Highway US-6; northeast on US-6 to I-15; north on I-15 to I-80 in Salt Lake City.

Management Unit Description

Management Unit 17 is divided into six smaller, more manageable subunits. These are Diamond Fork (17A), Timpanogas (17A), Salt Lake (17A), Heber (17A), and Currant Creek-Avintaquin (17B and 17C). The Northeastern Region 2010 report covers only the Current Creek-Avintaquin subunits. The Salt Lake subunit no longer contains range trend studies due to lack of access and development. The Diamond Fork, Timpanogas and Heber subunits are monitored as part of the Central Region rotation, which were last read in 2007 and will be reread in 2012.

There are approximately 720,200 acres of deer range within the Current Creek-Avintaquin subunits with 36% classified as winter range, 58% as summer range and 6% as year-long range. The U.S. Forest Service administers 26% of the deer range, Bureau of Land Management (BLM) 2%, private landowners 40%, Utah Division of Wildlife Resources (UDWR) 15%, Utah State Institutional Trust Lands (SITLA) 5% and Native American Trust Lands 10%. There is an estimated 706,600 acres of elk range within the Current Creek-Avintaquin subunits with 50% classified as winter range, 18% as summer range, 18% as transitional range and 14% as year-long range. The U.S. Forest Service administers 27% of the elk range, BLM 3%, private landowners 40%, UDWR 16%, SITLA 5% and Native American Trust Lands 10%. The areas of most concern in this unit are the winter ranges, which are very limited in quantity and quality. Residential developments along the Wasatch Front have consumed much of the crucial winter range that was available to wildlife and is projected to continue in the future. Because most of the winter range in this unit now lies on private land, managing wildlife populations is a challenge. Critical issues facing management of big game within Unit 17 include crop depredation, habitat quantity and quality, and highway mortality.

Range Trend Studies

Sixteen interagency range trend studies were sampled in Unit 17 during the summer of 2010. Nine of these studies were established in 1982 and have had regular monitoring through 2010. Three of the studies [Grey Wolf Mountain (17-49), Lower Santaquin Draw (17-50) and Two Bar Ranch (17-53)] sample Wyoming big sagebrush communities, three studies [Santaquins Cabin (17-51), Skitzzy Canyon (17-57) and Buck Knoll (17-58)] sample chained and seeded pinyon-juniper communities, two studies [Lower Horse Ridge (17-55) and Sam's Canyon (17-56)] sample mountain brush communities, and one study [Cutoff (17-52)] samples a mountain big sagebrush community. One study [Emma Park (15-59)] was established in 1994 and samples another mountain big sagebrush community. Two further studies were established in 2005. One study [Sand Wash (17-66)] samples a Wyoming big sagebrush community and one study [Little Horse Ridge (17-65)] samples a mountain brush community. A special study [Rabbit Gulch (17-67)] was established to monitor a Wyoming big sagebrush community in 1997 and has been monitored as a regular range study since 2005. Two more special studies [Emma Park Harrow Grazed (17R-7) and Emma Park Harrow Ungrazed (17R-8)] were established in 2001 to monitor grazing differences on a harrow project in a mountain big sagebrush community. One other special study [Allen Smith Reseed (17R-22)] was established in 2006 to monitor a seeding project in a former Wyoming big sagebrush community. There are seven studies on Units 17B and 17C that have been suspended for various reasons and were not sampled in 2010. For further information on suspended studies, refer to past reports at <http://wildlife.utah.gov/range/>.

GREY WOLF MOUNTAIN - TREND STUDY NO. 17-49-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 7082 ft. (2159 m)

Aspect: East

Slope: 4%

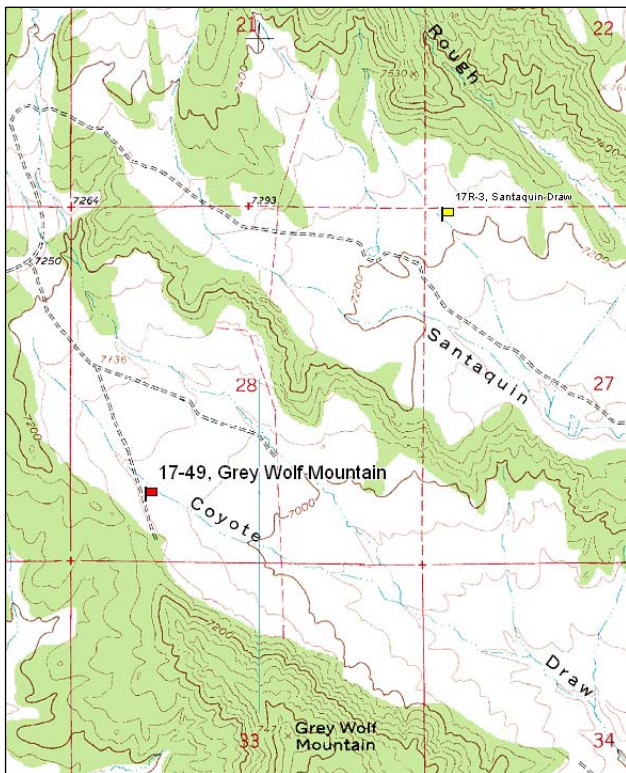
Transect bearing: 97° magnetic

Belt placement: line 1 (15 & 96ft), line 2 (39ft), line 3 (52ft), line 4 (66ft).

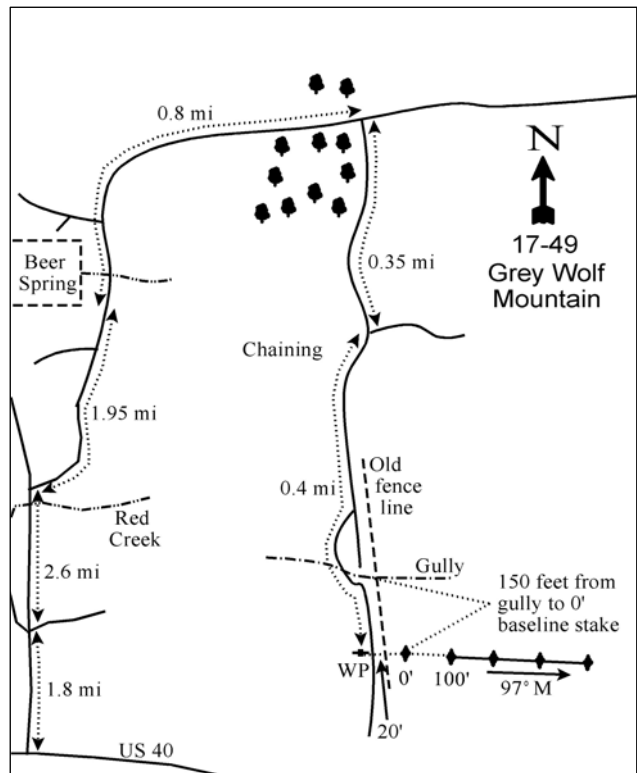
Directions:

From U.S. 40 in Fruitland, travel north up the Red Creek Road 1.8 miles to a 3-way fork. Take the middle fork and go 2.6 miles. After crossing Red Creek, turn right onto a dirt road. Proceed northeast on this road for 1.95 miles to Beer Spring. From the southwest corner of the fenced spring bear right and continue for 0.8 miles. Turn right and go 0.35 miles. Stay right and go 0.4 miles going around the gully to an old fence line to a witness post on the right. It may not be possible to drive across the deep gully. The 0-foot stake is 20 feet east of the witness post and is marked by browse tag #7090. The 0-foot stake is approximately 150 feet south of the gully.

Map Name: Tabby Mountain



Diagrammatic Sketch:



Township: 2S Range: 8W Section: 28

GPS: NAD 83, UTM 12T 517136 E 4458065 N

Site Information

Site Description: The study is located at the north end of Grey Wolf Mountain near the head of Coyote Draw. The study replaced a line-intercept study established in 1981. The land is administered by the Utah Division of Wildlife Resources (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA) in an area which is utilized as winter range by both deer and elk. The area was disked on contour and seeded in the fall of 1990 as a habitat and watershed improvement project. No seed mix data was available, but several commonly seeded species were sampled in 1995 (Table - Herbaceous Trends). Livestock grazing was removed after the treatment. Cattle and horses grazed the area prior to the treatment and use was reported to be heavy in 1988. Numerous trespassing cattle have been observed in the area during past readings. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. Pellet group transect data has estimated moderate use by deer since 2000. Estimated use by elk was light in 2000 and 2010, but more moderate in 2005. Estimated cattle use has been light since 2000, but has also slightly increased over that time (Table - Pellet Group Data).

Browse: The key browse species on the site is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). There appears to be some hybridization with mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) and basin big sagebrush (*A. tridentata* ssp. *tridentata*) since some of the sagebrush display characteristics of both these subspecies. All the sagebrush encountered on the study was classified as Wyoming big sagebrush to alleviate confusion. These shrubs vary considerably in color, size, growth form, and degree of hedging. Typically, the Wyoming big sagebrush occurs more in the flat and the basin big sagebrush type occurs more along the gullies with deeper soils. The big sagebrush population is comprised of mostly mature plants that have experienced heavy use since 2000. The population of big sagebrush is healthy with low decadence and good vigor. Recruitment of young big sagebrush plants was high at the outset of the study, but decreased to only fair levels in 2005. Small populations of winterfat (*Ceratoides lanata*), fourwing saltbush (*Atriplex canescens*) and rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) provide a limited amount of additional forage for wintering big game. Corymbed eriogonum (*Eriogonum corymbosum*) and narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) are also fairly abundant (Table - Browse Characteristics), and it was noted that both species were heavily used in 2010. Forage kochia (*Kochia prostrata*) was first sampled in 2005. Cover and density of kochia had increased by 2010.

Herbaceous Understory: Grasses are dominated by the introduced species crested wheatgrass (*Agropyron cristatum*). Crested wheatgrass was reported to be heavily utilized in both 1982 and 1988. After the disking treatment, crested wheatgrass declined significantly in nested frequency, but it continues to be the most abundant grass species. Several other grasses were encountered following the treatment, yet all occur in small numbers. Forbs were also more abundant after treatment with useful species including Lewis flax (*Linum lewisii*), yellow sweet clover (*Melilotus officinalis*), small burnet (*Sanguisorba minor*), low penstemon (*Penstemon humilus*) and scarlet globemallow (*Sphaeralcea coccinea*) sampled regularly in 1995. Only scarlet globemallow remained common in 2010 (Table - Herbaceous Trends).

Soil: Soils are alluvial deposited with a clay loam texture and a slightly alkaline soil reaction (pH 7.5). Phosphorus may have limited availability for plant growth and development at 3.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is very high and protective ground cover has been poor in the past, consisting mostly of old mature sagebrush cover (Table - Basic Cover). There is evidence of some overland flow between shrubs and rills, which feed into a large (10' to 12' deep) active gully northeast of the transect. The only factor preventing increased erosion is the cover provided by herbaceous vegetation. The soil erosion condition was classified as stable in 2010, but was slight in 2005 because of small pedestals surrounding shrubs and perennial grasses, gullies covering 2-5% of the site, some minor soil and litter movement, as well as small rills and flow patterns between perennial species.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** There was a five-fold increase in the density of big sagebrush primarily due to a substantial increase in the recruitment of young plants.
- **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 big sagebrush increased slightly from 3% to 10%, but is still considered good and poor vigor decreased from 10% to 5%. Recruitment of young plants decreased, but remained excellent at 45% of the population.
- **1995 to 2000 - slightly up (+1):** The density of big sagebrush increased by 22% from 2,300 plants/acre to 2,800 plants/acre, and cover increased from 3% to 4%. Recruitment of young sagebrush plants decreased to 29% of the population.
- **2000 to 2005 - down (-2):** Big sagebrush density decreased by 30% to 1,960 plants/acre, though cover remained similar. Decadence of big sagebrush increased from 13% to 19% and recruitment of young plants decreased to 9% of the population.
- **2005 to 2010 - stable (0):** There was a slight decrease in the density of big sagebrush to 1,760 plants/acre, but cover increased to 5%. There was a decrease in decadence to 10%, though recruitment of young plants remained low at 7%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** There was little change in the sum of nested frequency of perennial grasses, though composition improved with many perennial species sampled for the first time in low numbers.
- **1995 to 2000 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 11% and cover increased from 10% to 18%. The increase in frequency was due to a significant increase in the nested frequency of crested wheatgrass.
- **2000 to 2005 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 14% despite an increase in cover to 20%. Many of the perennial species sampled in 1995 were no longer sampled.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.

Forb:

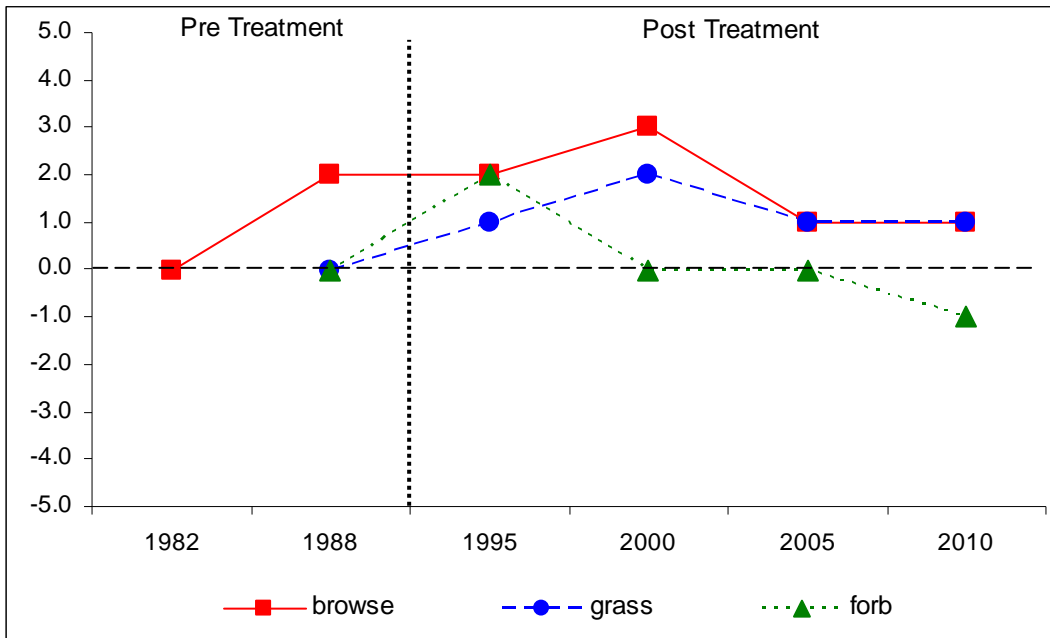
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 57% with many useful forbs sampled for the first time.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 47% and cover decreased from 8% to 3%. There was a significant decrease in the nested frequency of many of the useful forbs including Lewis flax, yellow sweetclover, and small burnet.
- **2000 to 2005 - stable (0):** The perennial forb sum of nested frequency and cover changed little.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 16% and cover decreased from 4% to 3%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
 Management unit 17, study no: 49

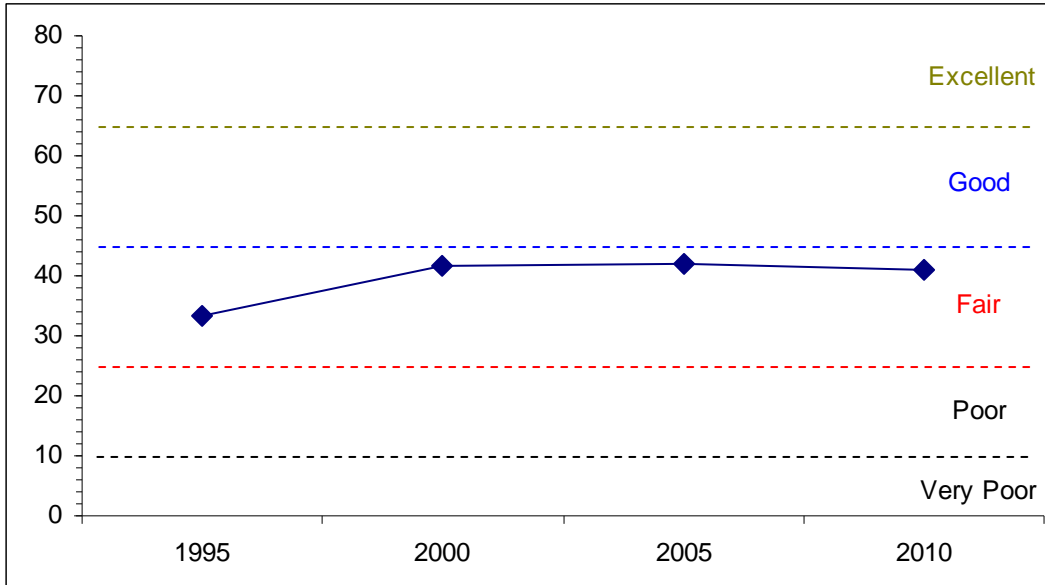
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	3.3	0.0	0.0	20.1	0.0	10.0	0.0	33.3	Fair
00	5.2	0.0	0.0	30.0	0.0	6.5	0.0	41.6	Fair
05	4.5	0.0	0.0	30.0	0.0	7.6	0.0	42.1	Fair
10	6.1	0.0	0.0	30.0	0.0	4.9	0.0	41.1	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 17, Study no: 49



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 17, Study no:49



HERBACEOUS TRENDS--
 Management unit 17, Study no: 49

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	ab316	a260	b326	ab311	b325	9.44	17.05	19.77	21.57
G	Agropyron dasystachyum	a6	ab21	b31	ab6	ab11	.28	.35	.09	.19
G	Agropyron intermedium	a-	b30	a5	a-	a6	.12	.03	-	.01
G	Bromus inermis	-	4	2	-	-	.01	.03	-	-
G	Carex sp.	-	10	1	-	2	.04	.00	-	.01
G	Dactylis glomerata	-	8	5	-	-	.04	.09	-	-
G	Elymus junceus	-	-	-	5	1	-	-	.33	.00
G	Oryzopsis hymenoides	-	6	-	2	1	.06	-	.03	.03
G	Poa fendleriana	-	-	7	-	-	-	.15	-	-
G	Poa secunda	-	2	-	-	-	.03	-	-	-
G	Secale cereale (a)	-	7	-	-	-	.06	-	-	-
G	Stipa comata	-	-	1	-	-	-	.03	-	-
Total for Annual Grasses		0	7	0	0	0	0.06	0	0	0
Total for Perennial Grasses		322	341	378	324	346	10.04	17.76	20.22	21.82
Total for Grasses		322	348	378	324	346	10.10	17.76	20.22	21.82
F	Agoseris glauca	a-	b61	a-	a-	a-	1.92	-	-	-
F	Allium sp.	-	6	-	4	-	.02	-	.01	-
F	Arabis sp.	-	-	3	-	-	-	.00	-	-
F	Astragalus convallarius	17	23	6	27	17	.21	.07	.36	.13
F	Astragalus mollissimus	-	5	4	-	-	.01	.04	-	-
F	Astragalus sp.	-	-	-	-	3	-	-	-	.03
F	Astragalus tenellus	1	-	-	3	-	-	-	.03	-
F	Calochortus nuttallii	a-	b7	a-	b17	b8	.03	-	.04	.03
F	Chaenactis douglasii	-	-	3	-	-	-	.00	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Chenopodium fremontii</i> (a)	-	7	-	-	-	.01	-	-	-
F	<i>Chenopodium leptophyllum</i> (a)	-	b10	a-	a-	a-	.02	-	-	-
F	<i>Cirsium</i> sp.	-	-	3	-	-	.15	.00	-	-
F	<i>Cordylanthus kingii</i> (a)	-	b11	a-	ab5	ab1	.08	-	.01	.00
F	<i>Crepis acuminata</i>	-	-	-	2	2	-	-	.00	.00
F	<i>Cymopterus</i> sp.	-	-	1	3	-	-	.15	.00	-
F	<i>Descurainia pinnata</i> (a)	-	5	-	2	-	.01	-	.01	-
F	<i>Erigeron eatonii</i>	-	3	-	-	2	.00	-	-	.03
F	<i>Hedysarum boreale</i>	-	7	5	-	-	.08	.07	-	-
F	<i>Lactuca serriola</i>	-	1	-	-	-	.01	-	-	-
F	<i>Lappula occidentalis</i> (a)	-	a-	a-	b16	ab7	-	-	.21	.01
F	<i>Linum lewisii</i>	a-	c69	b19	a-	a-	1.16	.36	-	-
F	<i>Lygodesmia grandiflora</i>	-	3	-	5	-	.00	-	.09	-
F	<i>Machaeranthera canescens</i>	b21	a4	a4	a7	a-	.03	.03	.12	-
F	<i>Machaeranthera grindelioides</i>	4	-	-	2	-	.00	-	.01	-
F	<i>Melilotus officinalis</i>	a-	b16	a3	a-	a3	.32	.15	-	.03
F	<i>Penstemon humilis</i>	10	11	8	3	1	.65	.05	.15	.03
F	<i>Phlox hoodii</i>	c101	b35	b38	a5	a10	.43	.96	.19	.32
F	<i>Phlox longifolia</i>	b70	b76	a20	b53	ab51	.29	.13	.55	.20
F	<i>Sanguisorba minor</i>	a-	b28	a2	a-	a-	.21	.03	-	-
F	<i>Sphaeralcea coccinea</i>	c183	c166	bc152	ab117	a110	2.40	.98	1.02	.77
F	<i>Tragopogon dubius</i>	ab4	b8	a-	a-	ab4	.18	-	-	.04
F	<i>Trifolium gymnocarpon</i>	a8	bc46	ab33	c68	bc55	.19	.17	1.19	.84
Total for Annual Forbs		0	33	0	23	8	0.12	0	0.22	0.01
Total for Perennial Forbs		419	575	304	316	266	8.34	3.24	3.79	2.47
Total for Forbs		419	608	304	339	274	8.47	3.24	4.02	2.49

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

BROWSE TRENDS--

Management unit 17, Study no: 49

T y p e	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	<i>Artemisia tridentata wyomingensis</i>	50	65	55	54	2.61	3.95	3.40	4.51
B	<i>Atriplex canescens</i>	0	1	0	0	-	-	-	-
B	<i>Ceratoides lanata</i>	9	6	9	8	.03	.18	.18	.18
B	<i>Chrysothamnus depressus</i>	2	2	0	0	.01	-	-	-
B	<i>Chrysothamnus nauseosus hololeucus</i>	3	5	1	0	.03	.03	.00	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	54	61	56	49	1.96	2.41	2.04	1.08
B	<i>Eriogonum corymbosum</i>	71	72	70	64	1.45	2.00	2.38	.76
B	<i>Gutierrezia sarothrae</i>	1	4	16	7	-	.03	.28	.16
B	<i>Kochia prostrata</i>	0	0	8	10	-	-	.03	.18
B	<i>Opuntia sp.</i>	15	14	3	3	.01	.00	.00	-
B	<i>Pinus edulis</i>	0	1	1	0	-	-	-	-
Total for Browse		205	231	219	195	6.11	8.63	8.34	6.88

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 49

Species	Percent Cover	
	'05	'10
<i>Artemisia tridentata wyomingensis</i>	4.11	4.46
<i>Ceratoides lanata</i>	.28	-
<i>Chrysothamnus nauseosus hololeucus</i>	.05	-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	2.78	1.01
<i>Eriogonum corymbosum</i>	2.66	1.23
<i>Gutierrezia sarothrae</i>	.56	-
<i>Kochia prostrata</i>	.18	.23

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 49

Species	Average leader growth (in)	
	'05	'10
<i>Artemisia tridentata wyomingensis</i>	1.5	1.2

BASIC COVER--

Management unit 17, Study no: 49

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	6.25	8.00	23.68	30.28	29.74	29.97
Rock	0	0	0	.00	0	0
Pavement	0	0	0	.11	.04	0
Litter	40.25	36.00	21.52	33.00	23.30	28.74
Cryptogams	0	6.25	.23	.49	.90	.14
Bare Ground	53.50	49.75	54.37	58.32	56.52	58.84

SOIL ANALYSIS DATA --

Management unit 17, Study no: 49, Study Name: Grey Wolf Mountain

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.5	7.5	42.9	26.8	30.3	2.1	3.6	204.8	0.7

PELLET GROUP DATA--

Management unit 17, Study no: 49

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	2	1	6	6	-	-	-
Elk	7	15	32	18	13 (31)	47 (116)	20 (50)
Deer	11	25	14	18	34 (84)	58 (144)	40 (78)
Cattle	1	2	7	7	6 (14)	15 (26)	20 (48)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 49

		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>Artemisia tridentata wyomingensis</i>										
82	1265	11	84	5	1133	42	5	5	23/27	
88	6465	73	24	3	5599	14	11	10	20/17	
95	2300	45	45	10	180	14	3	5	15/20	
00	2800	29	58	13	40	39	21	1	15/22	
05	1960	9	71	19	80	35	35	8	16/21	
10	1760	7	83	10	-	55	27	11	17/22	
<i>Atriplex canescens</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	100	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Ceratoides lanata										
82	332	20	80	0	-	40	0	0	8/8	
88	199	33	67	0	-	0	67	0	7/7	
95	360	6	94	0	-	22	0	0	10/12	
00	220	0	100	0	-	18	55	0	5/9	
05	320	0	94	6	-	56	44	6	10/12	
10	280	14	79	7	-	50	7	7	7/11	
Chrysothamnus depressus										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	40	50	50	-	-	0	0	0	6/8	
00	40	0	100	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	60	67	33	-	-	0	0	0	17/14	
00	280	29	71	-	-	0	0	0	9/14	
05	20	100	0	-	-	0	0	0	13/21	
10	0	0	0	-	-	0	0	0	7/9	
Chrysothamnus viscidiflorus viscidiflorus										
82	1933	0	100	0	-	0	0	0	10/12	
88	3531	26	34	40	399	21	4	9	7/5	
95	3200	18	83	0	20	1	0	0	11/14	
00	2960	3	96	1	20	0	0	0	7/12	
05	2720	10	89	1	20	4	5	1	10/14	
10	2300	5	95	0	-	16	44	0	6/10	
Eriogonum corymbosum										
82	2533	0	100	0	-	37	0	16	13/15	
88	3464	12	54	35	66	33	13	0	14/13	
95	2960	19	81	0	100	0	0	0	14/16	
00	2760	7	91	2	40	0	0	.72	12/16	
05	3020	23	73	5	60	15	4	3	12/16	
10	2340	6	91	3	100	40	11	7	10/12	
Gutierrezia sarothrae										
82	0	0	0	0	-	0	0	0	-/-	
88	399	0	67	33	-	0	0	17	8/8	
95	20	0	100	0	-	0	0	0	-/-	
00	120	0	100	0	-	0	0	0	6/9	
05	1040	6	94	0	-	0	0	0	6/7	
10	300	7	93	0	-	7	0	0	5/5	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Kochia prostrata										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	480	75	25	-	4160	13	4	0	9/18	
10	1000	50	50	-	260	8	8	0	8/16	
Opuntia sp.										
82	599	0	100	0	-	0	0	0	3/7	
88	732	18	36	45	599	0	0	0	4/10	
95	360	11	89	0	-	0	0	0	4/6	
00	300	0	93	7	20	0	0	0	3/3	
05	80	25	75	0	-	0	0	0	4/8	
10	100	0	100	0	-	0	0	0	4/7	
Pinus edulis										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	100	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	

LOWER SANTAQUIN DRAW - TREND STUDY NO. 17-50-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 6890 ft. (2101 m)

Aspect: East

Slope: 4%

Transect bearing: 180° magnetic

Belt placement: line 1 (11 & 83ft), line 2 (38ft), line 3 (54ft), line 4 (79ft).

Directions:

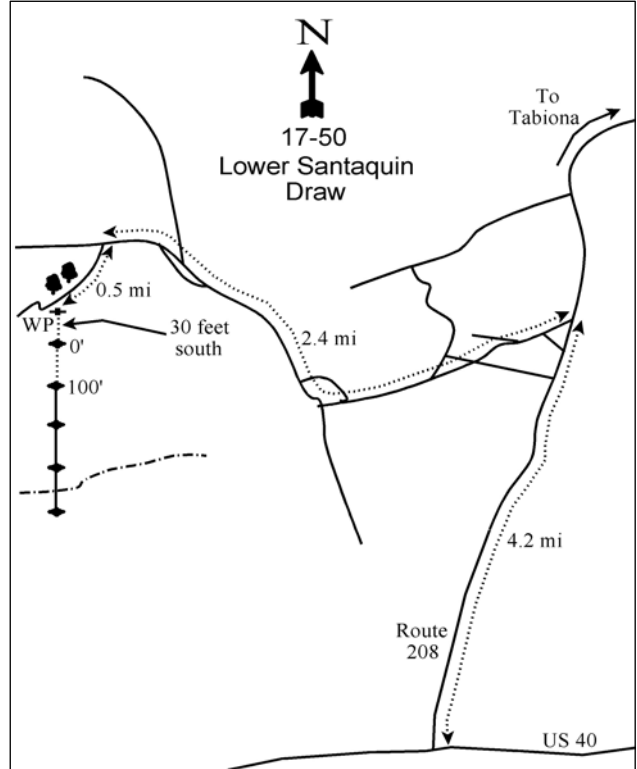
From Highway U.S. 40, take Route 208 towards Tabiona for 4.2 miles and turn west onto a dirt road. Go 2.4 miles on the main road towards Santaquin Draw. Take the road to the left for 0.5 miles to the next intersection to a group of juniper trees and a witness post. From the witness post the 0-foot stake is 30 feet to the south and is marked with browse tag #7021.

Map Name: Tabiona



Township: 2S Range: 8W Section: 35

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 521619 E 4456595 N

LOWER SANTAQUIN DRAW - TREND STUDY NO. 17-50

Site Information

Site Description: The study monitors a big sagebrush (*Artemisia tridentata* spp.) and grass community on deer and elk winter range in Lower Santaquin Draw. Low ridges covered with pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands are within the immediate proximity of the study site, providing important escape and thermal cover. The area is managed by the Utah Division of Wildlife Resources (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA), and has had many antler sheds, winter-killed deer and pellet groups observed during the sample years. Numerous jackrabbit pellets and cattle pats were also observed during study establishment in 1982. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. Pellet group transect data has estimated mostly light use by deer since 2000, with slightly more moderate use in 2005. Estimated use by elk has steadily increased from moderate use in 2000 to heavy use in 2010. Estimated cattle use has been light since 2000.

Browse: The key browse species consists of a moderately dense stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). The site contains sagebrush with characteristics of both mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) and Wyoming big sagebrush, but for ease all sagebrush was categorized as Wyoming big sagebrush. The population of big sagebrush is comprised of mostly mature plants with high amounts of decadence, though vigor is good. Recruitment of young big sagebrush plants has been good over the course of the study. Utilization of big sagebrush has been a mixture of moderate to heavy use. The only other palatable browse species is a small, but stable population of winterfat (*Ceratoides lanata*). Use of winterfat has been moderate to heavy. Less desirable browse species occur in low numbers and consist of narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*), broom snakeweed (*Gutierrezia sarothrae*) and pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant, but are dominated by the introduced species crested wheatgrass (*Agropyron cristatum*). The perennial grass species thickspike wheatgrass (*A. dasystachyum*) and needle-and-thread (*Stipa comata*) are less abundant, but are fairly common. Forbs are fairly diverse, but are not very abundant. Timber poisonvetch (*Astragalus convallarius*), Hood's phlox (*Phlox hoodii*) and scarlet globemallow (*Sphaeralcea coccinea*) provide the majority of the forb cover (Table - Herbaceous Trends).

Soil: The soils are an alluvial deposited loam with slightly alkaline soil reactivity (pH 7.6) (Table - Soil Analysis Data). Bare ground cover is high, but there is good protective ground cover provided by sagebrush and crested wheatgrass (Table - Basic Cover). Sheet erosion is a factor and stream courses in the area tend to be rather deep, steep-sided gullies, effectively lowering the immediate area's water table. There are active gullies around the site and a single 4-foot gully near the end of the baseline. The soil erosion condition was classified as stable in 2010, but was slight in 2005 because of large frequent pedestals surrounding shrubs and perennial grasses, gullies covering less than 2% of the site, some minor soil and litter movement, as well as small rills and flow patterns between perennial species.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** Density of the primary browse species, Wyoming big sagebrush, remained similar. Decadence increased from 25% to 44%, but poor vigor decreased from 34% to 3%. Recruitment of young sagebrush plants remained excellent at 27% of the population.
- **1988 to 1995 - slightly up (+1):** 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 to 8% and poor vigor remained low at 6%. Recruitment of young sagebrush plants decreased, but remained good at 16%.

- **1995 to 2000 - stable (0):** Wyoming big sagebrush density and cover decreased slightly, but the population remained healthy with good recruitment of young plants.
- **2000 to 2005 - down (-2):** The density of Wyoming big sagebrush decreased by 41% from 5,020 plants/acre to 2,960 plants/acre and cover decreased from 9% to 6%. Decadence of sagebrush increased from 22% to 41% and poor vigor increased from 13% to 30%. Recruitment of young sagebrush remained good at 18%, however.
- **2005 to 2010 - slightly down (-1):** There was a 16% decrease in the density of Wyoming big sagebrush to 2,500 plants/acre, though cover remained similar. Decadence of sagebrush decreased, but was still high at 34% and poor vigor increased to 37%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. Composition changed slightly, however, with a significant decrease in the nested frequency of sedge (*Carex sp.*) and a significant increase in the nested frequency of crested wheatgrass, thickspike wheatgrass and needle-and-thread.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial grasses remained similar, though cover increased from 13% to 17% due to an increase in the cover of crested wheatgrass.
- **2000 to 2005 - stable (0):** The perennial forb sum of nested frequency changed little, but cover increased to 20%, again primarily due to an increase in the cover of crested wheatgrass.
- **2005 to 2010 - stable (0):** The sum of nested frequency and cover of perennial grasses changed little. Needle-and-thread has steadily increased in nested frequency and cover since 2000.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 12%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 20% and cover decreased from 4% to 3%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover increased to 4%.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 25% and cover decreased to 2%.

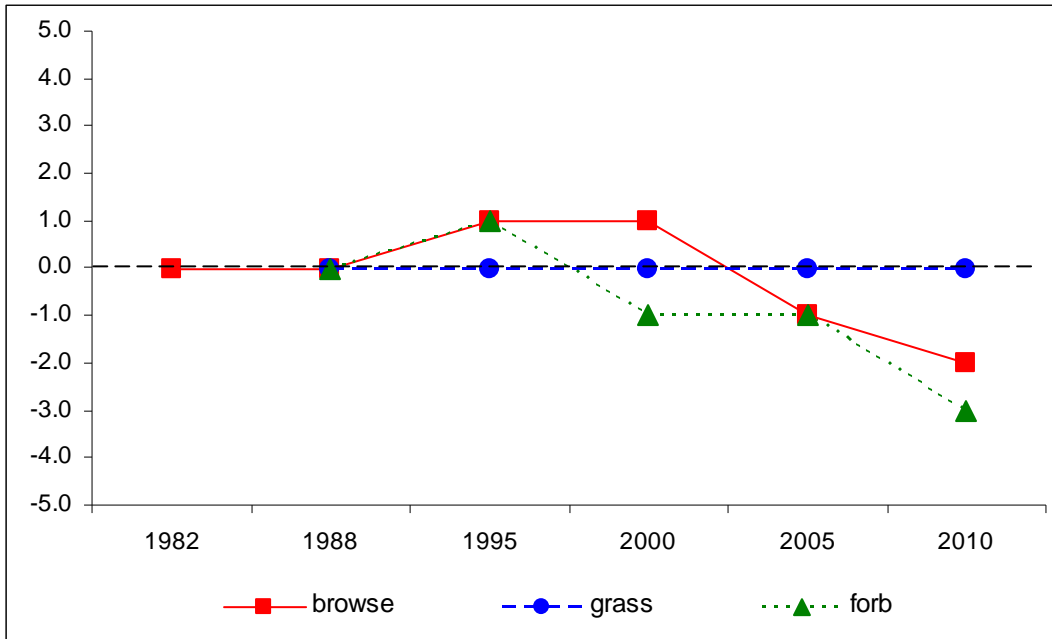
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17, study no: 50

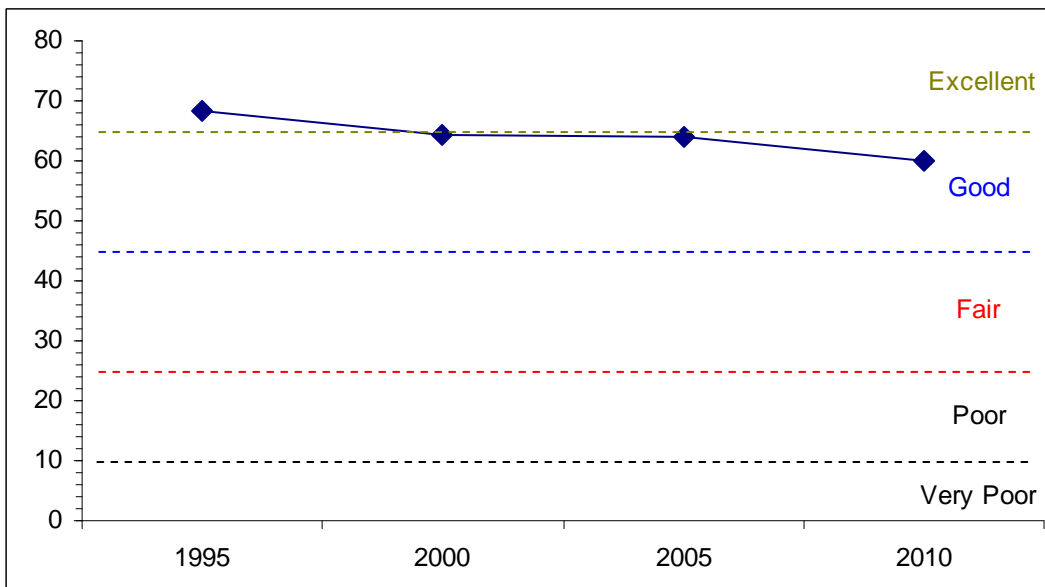
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	13.7	12.7	7.8	25.7	0.0	8.5	0.0	68.3	Excellent
00	13.3	9.0	6.9	30.0	0.0	5.2	0.0	64.4	Good-Excellent
05	9.5	5.4	10.6	30.0	0.0	8.6	0.0	64.1	Good-Excellent
10	9.1	6.1	10.9	30.0	0.0	3.9	0.0	59.9	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 50



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 17, Study no: 50



HERBACEOUS TRENDS--
Management unit 17, Study no: 50

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron cristatum</i>	bc307	d331	cd319	a263	ab283	12.21	16.75	18.44	18.58
G	<i>Agropyron dasystachyum</i>	a-	b13	bc9	bc30	c27	.02	.05	.47	.45
G	<i>Carex sp.</i>	b37	a9	a10	a5	a3	.07	.10	.01	.03
G	<i>Oryzopsis hymenoides</i>	ab15	a9	a2	b32	a6	.22	.04	.30	.04
G	<i>Poa secunda</i>	-	-	-	1	8	-	-	.03	.06
G	<i>Stipa comata</i>	a-	b13	ab7	b21	c51	.30	.06	.81	1.23
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		359	375	347	352	378	12.84	17.01	20.07	20.41
Total for Grasses		359	375	347	352	378	12.84	17.01	20.07	20.41
F	<i>Allium sp.</i>	-	2	-	-	-	.00	-	-	-
F	<i>Astragalus convallarius</i>	a4	b20	ab18	ab25	ab19	.78	.09	.31	.14
F	<i>Astragalus tenellus</i>	a-	b6	a-	ab4	a-	.19	-	.16	-
F	<i>Calochortus nuttallii</i>	-	3	-	4	3	.01	-	.01	.00
F	<i>Chenopodium leptophyllum(a)</i>	-	-	-	2	-	-	-	.00	-
F	<i>Cordylanthus kingii (a)</i>	-	1	-	-	-	.01	-	-	-
F	<i>Descurainia pinnata (a)</i>	-	a1	a-	b16	a-	.00	-	.08	-
F	<i>Draba sp. (a)</i>	-	5	-	-	-	.01	-	-	-
F	<i>Lappula occidentalis (a)</i>	-	a-	a-	b60	a1	-	-	1.76	.00
F	<i>Leucelene ericoides</i>	-	-	8	1	3	-	.04	.01	.00
F	<i>Lygodesmia grandiflora</i>	-	-	-	1	-	-	-	.00	-
F	<i>Machaeranthera canescens</i>	ab2	b10	a-	ab7	a-	.02	-	.07	-
F	<i>Phlox hoodii</i>	b79	b77	b72	a35	a25	2.02	1.77	.66	.51
F	<i>Phlox longifolia</i>	20	25	10	17	11	.06	.02	.21	.03
F	<i>Schoenocrambe linifolia</i>	2	3	-	4	-	.01	-	.01	-
F	<i>Senecio multilobatus</i>	1	-	-	-	-	-	-	-	-
F	<i>Sphaeralcea coccinea</i>	b143	ab121	a109	a106	a83	.98	.65	2.44	.81
F	<i>Tragopogon dubius</i>	-	-	1	-	-	-	.00	-	-
F	<i>Trifolium gymnocarpon</i>	a6	ab20	a11	b27	b29	.17	.02	.38	.43
Total for Annual Forbs		0	7	0	78	1	0.02	0	1.85	0.00
Total for Perennial Forbs		257	287	229	231	173	4.26	2.62	4.28	1.95
Total for Forbs		257	294	229	309	174	4.29	2.62	6.14	1.96

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

BROWSE TRENDS--

Management unit 17, Study no: 50

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	87	80	67	61	10.30	9.44	5.72	6.35
B	Ceratoides lanata	35	34	41	44	.62	1.03	1.88	.91
	Chrysothamnus depressus	0	1	0	0				
B	Chrysothamnus nauseosus graveolens	0	12	0	0	-	.69	-	-
B	Chrysothamnus nauseosus hololeucus	9	1	5	3	.33	.00	-	-
B	Chrysothamnus viscidiflorus stenophyllus	5	5	8	6	.31	.30	.31	.53
B	Gutierrezia sarothrae	3	1	0	2	.06	-	-	.03
B	Leptodactylon pungens	3	0	1	8	.01	-	.03	.18
B	Opuntia sp.	28	34	19	21	.44	.76	.91	.72
B	Pediocactus simpsonii	0	2	1	1	-	.00	-	-
B	Purshia tridentata	0	0	0	0	-	.15	-	-
Total for Browse		170	170	142	146	12.09	12.38	8.87	8.74

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 50

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	4.58	5.51
Ceratoides lanata	1.20	.61
Chrysothamnus nauseosus	-	.08
Chrysothamnus nauseosus graveolens	.15	-
Chrysothamnus nauseosus hololeucus	.10	-
Chrysothamnus viscidiflorus stenophyllus	.36	.15
Opuntia sp.	.08	.25

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 50

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.7	1.4
Ceratoides lanata	3.4	2.9

BASIC COVER--

Management unit 17, Study no: 50

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	6.50	7.00	32.09	31.07	31.29	31.58
Rock	0	0	.15	0	.00	.63
Pavement	0	0	.01	.02	.04	.04
Litter	58.50	53.00	39.47	40.61	25.48	41.29
Cryptogams	0	1.75	1.44	4.18	3.39	1.11
Bare Ground	35.00	38.25	32.60	44.56	49.93	45.15

SOIL ANALYSIS DATA --

Management unit 17, Study no: 50, Study Name: Lower Santaquin Draw

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.6	7.6	45.3	36.2	18.6	1.0	2.0	99.2	0.5

PELLET GROUP DATA--

Management unit 17, Study no: 50

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	4	15	12	3	-	-	-
Elk	17	28	45	17	31 (77)	41 (101)	52 (127)
Deer	29	15	31	31	15 (37)	28 (69)	11(28)
Cattle	-	4	2	4	8 (20)	-	6 (14)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 50

		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>Artemisia tridentata wyomingensis</i>										
82	5065	25	50	25	1866	41	28	34	20/23	
88	4998	27	29	44	733	45	13	3	19/23	
95	5420	16	76	8	180	66	17	6	18/30	
00	5020	15	63	22	100	53	24	13	18/26	
05	2960	18	41	41	300	27	22	30	18/27	
10	2500	18	48	34	40	38	39	37	17/27	
<i>Ceratoides lanata</i>										
82	865	0	77	23	-	46	31	8	10/8	
88	1331	45	40	15	66	20	25	10	6/8	
95	1040	8	90	2	60	8	2	4	11/13	
00	1100	4	91	5	-	44	45	4	7/8	
05	1700	31	66	4	1840	35	22	1	9/13	
10	1960	48	52	0	40	23	22	4	7/9	

		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 depressus										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	100	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Chrysothamnus nauseosus graveolens										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	240	17	67	17	-	8	8	8	19/20	
05	0	0	0	0	-	0	0	0	16/15	
10	0	0	0	0	-	0	0	0	-/-	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	200	10	80	10	-	0	0	10	20/21	
00	40	100	0	0	-	0	0	0	-/-	
05	120	0	67	33	-	33	17	33	17/18	
10	60	0	67	33	-	33	0	33	18/17	
Chrysothamnus viscidiflorus stenophyllus										
82	133	0	100	0	-	0	0	0	14/9	
88	332	40	40	20	-	0	0	20	24/15	
95	300	0	100	0	-	0	0	0	13/17	
00	280	0	100	0	20	0	0	0	8/18	
05	320	25	75	0	-	0	0	0	9/11	
10	220	36	55	9	-	45	9	9	10/14	
Eriogonum corymbosum										
82	0	0	0	-	-	0	0	0	-/-	
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	7/14	
10	0	0	0	-	-	0	0	0	-/-	
Gutierrezia sarothrae										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	80	0	100	-	-	0	0	0	5/6	
00	20	0	100	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	6/10	
10	60	33	67	-	-	0	0	0	6/7	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Leptodactylon pungens										
82	1998	30	70	-	-	0	0	0	1/7	
88	0	0	0	-	-	0	0	0	-/-	
95	60	100	0	-	40	0	0	0	2/3	
00	0	0	0	-	60	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	-/-	
10	240	8	92	-	-	8	0	17	2/5	
Opuntia sp.										
82	533	0	100	0	-	0	0	0	3/7	
88	865	23	38	38	66	8	0	69	3/8	
95	940	11	85	4	20	0	0	2	5/11	
00	1180	12	80	8	-	0	0	8	4/9	
05	520	4	88	8	20	0	0	4	4/12	
10	520	4	92	4	-	0	0	4	4/11	
Pediocactus simpsonii										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	40	50	0	50	-	0	0	50	0/2	
05	20	0	100	0	-	0	0	0	1/2	
10	20	0	100	0	-	0	0	0	2/2	

SANTAQUINS CABIN - TREND STUDY NO. 17-51-10

Vegetation Type: Chained, Seeded Pinyon-Juniper

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 7210 ft. (2198 m)

Aspect: Southeast

Slope: 5%

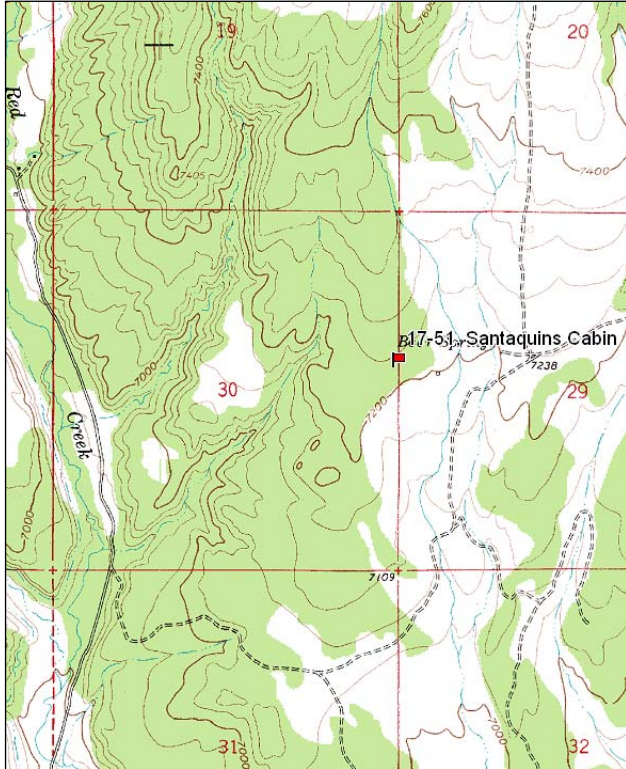
Transect bearing: 159° magnetic

Belt placement: line 1 (19 & 94ft), line 2 (29ft), line 3 (57ft), line 4 (71ft).

Directions:

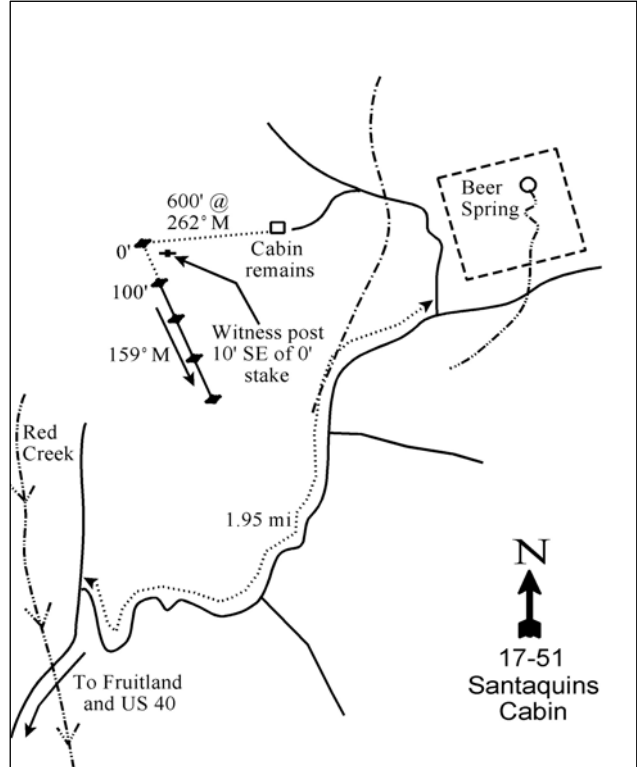
From US 40 in Fruitland, travel north up 45000 S. 1.8 miles to a 3-way fork. Take the middle fork and go 2.5 miles. After crossing Red Creek, turn right onto a dirt road. Go northeast up this road for 1.95 miles, keeping left at two major forks. At Beer Spring, turn left and go along the west side of the fenced spring to a wide, shallow wash. Cross the wash, then bear left onto a faint road. Follow it for about 100 yards to the remains of Santaquins cabin. From the cabin walk west at 262°M for 600 feet, following the old line intercept study, to the 4th stake. From the 4th line-intercept stake, walk 11 paces south to the start of the baseline. The 0-foot baseline stake is marked with red browse tag #7022. There is a witness post southeast of the 0' stake.

Map Name: Tabby Mountain



Township: 2S Range: 8W Section: 30

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 515174 E 4458691 N

SANTAQUINS CABIN - TREND STUDY NO. 17-51

Site Information

Site Description: This study is on winter range located near Santaquins Cabin in an area administered by the Utah Division of Wildlife Resources (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA). The study is in a chained and seeded pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) area west of Beer Spring. The last 200 feet of the baseline transect was treated by a disking treatment in the fall of 1995. Strips and patches were disked and seeded over approximately 270 acres in the area. No seed mix data was available for the treatment. A lop and scatter treatment was done as part of the Coyote Draw Pinyon and Juniper Thinning ([WRI Project #328](#)) in the summer of 2006 that removed many of the pinyon and juniper trees that had become reestablished. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. This area is used heavily by wintering big game, especially deer, though pellet group transect data has estimated decreasing use by deer from very heavy in 2000 to light use in 2010. Estimated elk use has fluctuated from light use in 2000, to heavy use in 2005 and more moderate use in 2010. Estimated use by cattle has been light since 2000 (Table Pellet Group Data).

Browse: The key browse species on the chaining is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) which has provided the majority of the browse cover since 1995 (Table - Browse Trends). There appears to be some sagebrush which exhibit characteristics of basin big sagebrush (*A. tridentata* ssp. *tridentata*) as well as hybrids of Wyoming big sagebrush and basin big sagebrush, but all sagebrush was classified as Wyoming big sagebrush at this location. The sagebrush population is comprised of a mixture of young and mature plants with moderate to heavy use. The population is healthy with low decadence and good vigor. Several other browse species occur, but all are sampled in small numbers (Table - Browse Characteristics). Some pinyon and juniper trees had reestablished on the site following the chaining, but the 2006 treatment removed most of the trees with those remained being mostly young and small (Table - Point-Quarter Tree Data).

Herbaceous Understory: Grasses are diverse and abundant on the site. Crested wheatgrass (*Agropyron cristatum*) is the dominant grass species, but thickspike wheatgrass (*A. dasystachyum*), intermediate wheatgrass (*A. intermedium*), sedge (*Carex* sp.), Russian wildrye (*Elymus junceus*) and Indian ricegrass (*Oryzopsis hymenoides*) are also common. Forbs are diverse but they do not provide very much forage. The only common forb throughout the study has been scarlet globemallow (*Sphaeralcea coccinea*) (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a slightly alkaline soil reaction (pH 7.7). Phosphorus may have limited availability for plant growth and development at 3.3 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover has been moderate to high over the sample years with much of the protective cover provided by chaining litter and vegetation cover (Table - Basic Cover). A number of small, south flowing gullies traverse the area. These have stabilized since the chaining treatment. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly down (-1):** The density of sagebrush decreased by 22% from 5,665 plants/acre to 4,398 plants/acre, though recruitment of young plants remained very high at 48% of the population. Decadence and poor vigor of sagebrush increased slightly.
- **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. Recruitment of young sagebrush plants decreased, but remained very good at 17% of the population. Poor vigor of sagebrush decreased from 11% to 2%, though decadence remained similar.

- **1995 to 2000 - slightly down (-1):** The density of Wyoming big sagebrush decreased by 24% from 3,040 plants/acre to 2,320 plants/acre, though much of this decrease is likely due to the disking treatment that was done on 2 of the 5 density strips. Cover of sagebrush decreased slightly from 10% to 8%, but remains the dominant browse species.
- **2000 to 2005 - slightly down (-1):** There was little change in the density or cover of Wyoming big sagebrush, but decadence increased from 8% to 21% and poor vigor increased from 4% to 19%.
- **2005 to 2010 - up (+2):** The Wyoming big sagebrush density increased nearly three-fold from 2,160 plants/acre to 5,740 plants/acre, with a slight increase in cover to 9%. Decadence of sagebrush decreased to 4% and poor vigor decreased to 7%. Recruitment of young sagebrush plants increased and comprised half of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial grasses increased by 20%.
- **1995 to 2000 - down (-2):** The perennial grass sum of nested frequency decreased by 23%, though cover increased from 13% to 17% with a large increase in the cover of crested wheatgrass.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial forbs, but it remained similar.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 21% and cover decreased from 4% to 2%.
- **2000 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased by 25%, though cover remained similar.
- **2005 to 2010 - stable (0):** There was little change in either the sum of nested frequency or cover of perennial forbs.

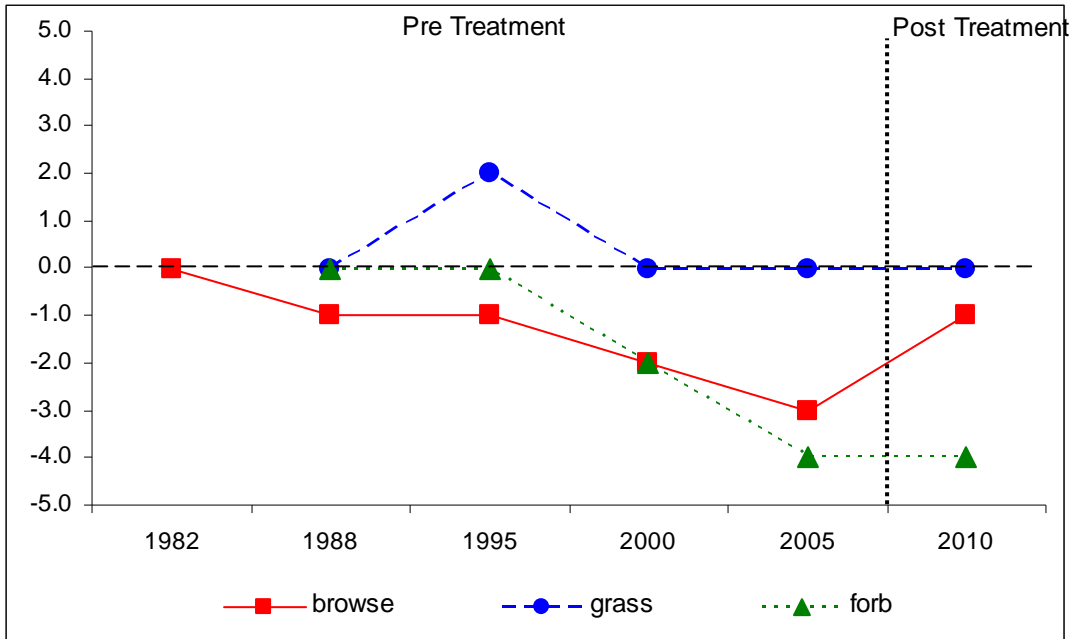
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17, study no: 51

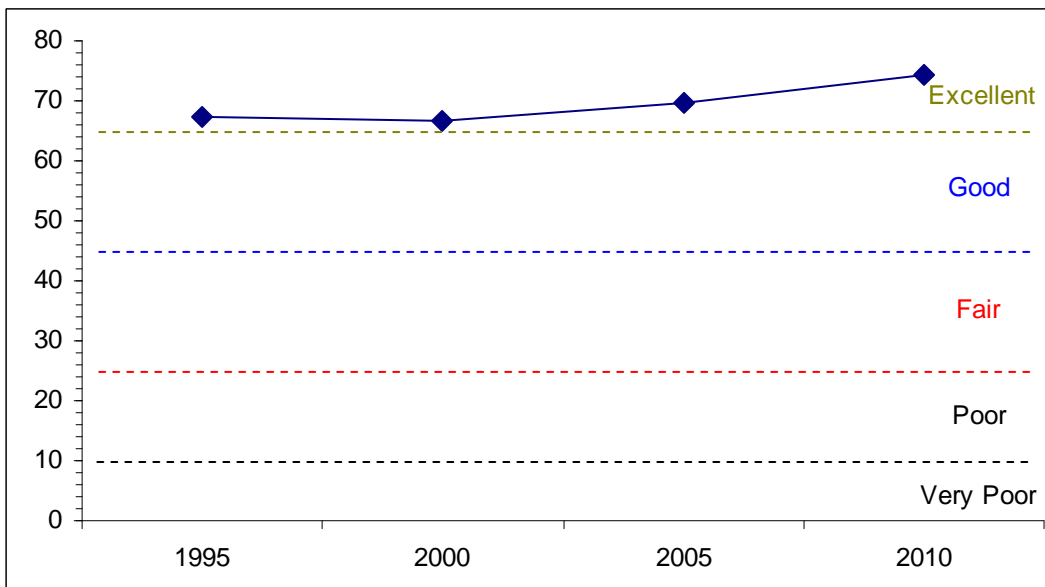
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	12.3	12.9	8.4	25.9	0.0	8.0	0.0	67.5	Excellent
00	10.7	12.7	9.3	30.0	0.0	4.2	0.0	66.8	Good-Excellent
05	11.4	9.1	15.0	30.0	-0.1	4.2	0.0	69.6	Excellent
10	11.6	13.8	15.0	30.0	-0.1	3.8	0.0	74.2	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 17, Study no: 51



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 17, Study no: 51



HERBACEOUS TRENDS--

Management unit 17, Study no: 51

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	ab172	ab165	a136	a156	b208	3.85	7.93	8.34	9.64
G	Agropyron dasystachyum	b152	ab113	ab134	a90	a89	3.99	4.32	3.36	4.36
G	Agropyron intermedium	a-	d86	c44	b14	bc36	1.69	.93	.22	.21
G	Bromus inermis	c75	b43	ab24	a3	a13	.78	.83	.04	.28
G	Bromus tectorum (a)	-	a-	a-	ab11	b20	-	-	.08	.09
G	Carex sp.	a-	c60	c57	b25	bc52	1.27	2.12	.40	.54
G	Elymus junceus	a-	a6	a3	b18	ab14	.06	.15	1.43	1.01
G	Festuca ovina	b32	a3	a-	a5	a1	.03	-	.04	.00
G	Oryzopsis hymenoides	ab46	b67	a21	ab52	a29	.86	.38	1.27	.81
G	Poa secunda	a-	a4	a1	b15	a3	.03	.00	.27	.03
G	Sitanion hystrix	ab11	b16	ab10	ab9	a-	.13	.25	.08	.00
G	Stipa comata	a-	bc22	bc23	c30	b14	.22	.43	.65	.42
Total for Annual Grasses		0	0	0	11	20	0	0	0.08	0.08
Total for Perennial Grasses		488	585	453	417	459	12.94	17.36	16.14	17.35
Total for Grasses		488	585	453	428	479	12.94	17.36	16.23	17.44
F	Agoseris glauca	-	-	3	-	-	-	.00	-	-
F	Antennaria rosea	-	-	1	-	-	-	.00	-	-
F	Astragalus convallarius	a-	ab6	ab4	ab9	b12	.06	.04	.07	.10
F	Astragalus tenellus	c91	b23	ab13	a-	ab2	.28	.20	.03	.03
F	Calochortus nuttallii	a-	b8	a-	ab5	ab3	.03	-	.04	.01
F	Castilleja sp.	-	-	-	-	-	-	-	.03	-
F	Chenopodium fremontii (a)	-	b13	a-	c25	a-	.05	-	.22	-
F	Chenopodium leptophyllum(a)	-	3	-	5	7	.00	-	.02	.01
F	Cirsium sp.	1	2	1	3	-	.01	.03	.01	-
F	Cordylanthus kingii (a)	-	c25	a-	ab5	bc15	.28	-	.01	.11
F	Cryptantha sp.	-	-	3	3	-	-	.03	.01	-
F	Cymopterus sp.	-	4	-	2	-	.01	-	.01	-
F	Descurainia pinnata (a)	-	2	-	2	-	.01	-	.00	-
F	Erigeron sp.	3	7	8	1	-	.04	.06	.00	-
F	Hedysarum boreale	-	-	4	-	-	-	.09	-	-
F	Lappula occidentalis (a)	-	b18	a-	b25	ab12	.08	-	.31	.09
F	Machaeranthera canescens	b21	a7	a3	ab10	a3	.06	.04	.07	.00
F	Machaeranthera grindelioides	b8	a-	ab1	a-	a-	.00	.00	-	-
F	Medicago sativa	c58	b28	b25	a7	a4	1.70	.56	.30	.18
F	Penstemon humilis	a-	ab8	b15	a2	ab10	.07	.20	.06	.12
F	Penstemon sp.	-	4	-	-	-	.00	-	-	-
F	Phlox hoodii	ab8	ab14	b19	a-	a6	.61	.43	-	.03
F	Phlox longifolia	-	1	-	-	-	.00	-	-	-
F	Polygonum douglasii (a)	-	b10	a-	ab8	a2	.03	-	.02	.00
F	Schoenocrambe linifolia	3	3	-	-	-	.00	-	-	.00
F	Senecio multilobatus	3	-	-	4	-	-	-	.03	-
F	Sisymbrium altissimum (a)	-	2	-	6	-	.00	-	.04	-
F	Sphaeralcea coccinea	a24	b73	b61	b64	b68	.85	.37	1.20	1.37

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Taraxacum officinale	-	4	-	-	-	.01	-	-	-
F	Tragopogon dubius	1	-	-	-	-	-	-	-	-
F	Trifolium gymnocarpon	a ⁻	b ¹²	a ⁻	ab ¹¹	ab ⁶	.22	-	.19	.04
F	Unknown forb-perennial	4	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	73	0	76	36	0.47	0	0.63	0.22
Total for Perennial Forbs		225	204	161	121	114	4.00	2.08	2.08	1.90
Total for Forbs		225	277	161	197	150	4.48	2.08	2.71	2.13

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

BROWSE TRENDS--

Management unit 17, Study no: 51

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	74	56	47	73	9.66	8.36	8.59	9.15
B	Atriplex canescens	0	1	1	0	-	-	.38	-
B	Chrysothamnus depressus	3	6	1	2	.16	.21	.15	.15
B	Chrysothamnus nauseosus graveolens	0	4	0	7	-	.15	-	.21
B	Chrysothamnus nauseosus hololeucus	35	11	11	10	1.16	.06	.41	.21
B	Chrysothamnus parryi	0	19	22	23	-	1.02	1.28	1.22
B	Chrysothamnus viscidiflorus viscidiflorus	4	2	4	3	-	-	.03	-
B	Eriogonum corymbosum	3	2	3	3	.15	.15	-	.66
B	Gutierrezia sarothrae	13	15	1	4	.24	.24	-	.21
B	Juniperus osteosperma	0	4	4	0	-	.03	.18	-
B	Leptodactylon pungens	4	3	3	3	.15	.15	.00	.00
B	Opuntia sp.	6	8	5	4	.00	.18	.15	.30
B	Pediocactus simpsonii	1	0	1	1	.00	-	.03	.03
B	Pinus edulis	0	3	3	1	-	-	.03	-
Total for Browse		143	134	106	134	11.54	10.57	11.24	12.16

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 51

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	8.36	12.44
Atriplex canescens	.18	-
Chrysothamnus nauseosus graveolens	-	.30
Chrysothamnus nauseosus hololeucus	.43	.08
Chrysothamnus parryi	.95	1.00
Eriogonum corymbosum	.25	.33
Gutierrezia sarothrae	-	.15
Juniperus osteosperma	.31	-
Opuntia sp.	.03	.08
Pinus edulis	.31	.36

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 51

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	3.2	1.2

POINT-QUARTER TREE DATA--

Management unit 17, Study no: 51

Species	Trees per Acre				Average diameter (in)			
	'95	'00	'05	'10	'95	'00	'05	'10
Juniperus osteosperma	47	18	34	22	2.2	2.1	3.7	1.3
Pinus edulis	17	36	27	24	1.4	1.5	2.3	1.0

BASIC COVER--

Management unit 17, Study no: 51

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.50	2.25	29.18	35.20	28.07	34.27
Rock	0	.25	.04	.02	0	0
Pavement	0	0	.14	.80	.12	.14
Litter	56.00	55.75	44.87	59.80	33.79	50.95
Cryptogams	0	0	1.22	1.00	1.16	.65
Bare Ground	35.50	41.75	27.60	32.01	49.23	37.23

SOIL ANALYSIS DATA --

Management unit 17, Study no: 51, Study Name: Santaquins Cabin

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		% sand	% silt	% clay				
11.6	7.7	49.6	27.1	23.3	3.0	3.3	134.4	0.8

PELLET GROUP DATA--

Management unit 17, Study no: 51

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	18	24	27	25
Elk	6	2	28	19
Deer	47	55	37	50
Cattle	-	4	1	1

Days use per acre (ha)		
'00	'05	'10
-	-	-
4 (10)	52 (127)	32 (78)
139 (343)	60 (149)	22 (55)
9 (22)	6 (14)	4 (11)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 51

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>									
82	5665	51	49	0	5533	13	4	0	20/20
88	4398	48	42	9	-	55	23	11	22/23
95	3040	17	76	7	20	42	16	2	33/38
00	2320	19	73	8	120	32	4	4	18/24
05	2160	32	46	21	10940	19	30	19	25/30
10	5740	49	47	4	800	16	38	7	23/31
<i>Atriplex canescens</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	0	0	0	32/32
05	20	0	100	-	-	0	100	0	31/34
10	0	0	0	-	-	0	0	0	17/26
<i>Ceratoides lanata</i>									
82	0	0	0	-	-	0	0	0	-/-
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	18/22
10	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus depressus</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	300	0	100	0	-	0	0	0	6/15
00	260	0	92	8	-	38	15	0	1/5
05	20	0	100	0	-	0	0	0	-/-
10	40	0	100	0	-	0	0	0	4/23

		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 graveolens										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	80	0	50	50	-	0	0	25	23/23	
05	0	0	0	0	-	0	0	0	17/24	
10	260	8	85	8	-	15	0	8	19/22	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	0	-	0	0	0	-/-	
88	199	100	0	0	-	0	33	33	-/-	
95	2380	9	91	0	-	0	0	0	14/14	
00	260	31	69	0	-	8	0	15	17/18	
05	240	33	50	17	-	8	25	17	18/20	
10	220	0	100	0	-	0	0	0	22/25	
Chrysothamnus parryi										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	1880	2	98	-	-	43	1	0	5/8	
05	1240	11	89	-	220	0	5	0	7/10	
10	1480	4	96	-	-	0	0	0	10/11	
Chrysothamnus viscidiflorus viscidiflorus										
82	66	0	100	0	-	0	0	0	6/10	
88	0	0	0	0	-	0	0	0	-/-	
95	80	25	75	0	-	0	0	0	11/15	
00	40	0	50	50	-	0	0	50	-/-	
05	160	0	100	0	20	0	0	0	10/13	
10	60	0	100	0	-	0	0	0	13/16	
Eriogonum corymbosum										
82	66	0	100	0	-	0	0	0	15/16	
88	66	0	100	0	-	0	0	0	15/13	
95	80	25	75	0	-	0	0	0	16/30	
00	60	0	100	0	-	0	0	0	16/20	
05	60	33	67	0	-	33	33	0	13/18	
10	80	0	75	25	20	0	0	25	14/24	
Gutierrezia sarothrae										
82	0	0	0	-	-	0	0	0	-/-	
88	199	0	100	-	-	0	0	0	6/9	
95	680	6	94	-	-	0	0	0	9/11	
00	860	2	98	-	-	0	0	0	4/6	
05	120	0	100	-	20	0	0	0	7/12	
10	80	0	100	-	-	0	0	0	7/9	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Juniperus osteosperma										
82	0	0	0	-	-	0	0	0	-/-	
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	80	75	25	-	-	0	0	0	-/-	
05	100	60	40	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Leptodactylon pungens										
82	533	0	100	-	-	0	0	0	2/7	
88	0	0	0	-	-	0	0	0	-/-	
95	160	0	100	-	-	0	0	0	6/7	
00	240	0	100	-	-	0	0	0	3/6	
05	100	20	80	-	20	0	0	0	2/8	
10	140	0	100	-	-	0	0	0	4/6	
Opuntia sp.										
82	933	0	100	0	-	0	0	0	3/13	
88	1532	9	91	0	-	0	0	0	3/4	
95	120	0	100	0	-	0	0	0	6/14	
00	220	27	64	9	-	0	0	0	4/12	
05	140	14	86	0	-	0	0	0	4/12	
10	100	20	80	0	-	0	0	0	4/13	
Pediocactus simpsonii										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	1/2	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	1/2	
10	20	0	100	-	-	0	0	0	1/3	
Pinus edulis										
82	0	0	0	-	-	0	0	0	-/-	
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	100	0	-	-	0	0	0	-/-	
05	60	67	33	-	-	0	0	0	-/-	
10	20	0	100	-	-	0	0	0	-/-	
Tetradymia canescens										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	14/12	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	21/27	

CUTOFF - TREND STUDY NO. 17-52-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Private

Elevation: 7200 ft. (2195 m)

Aspect: West

Slope: 10%

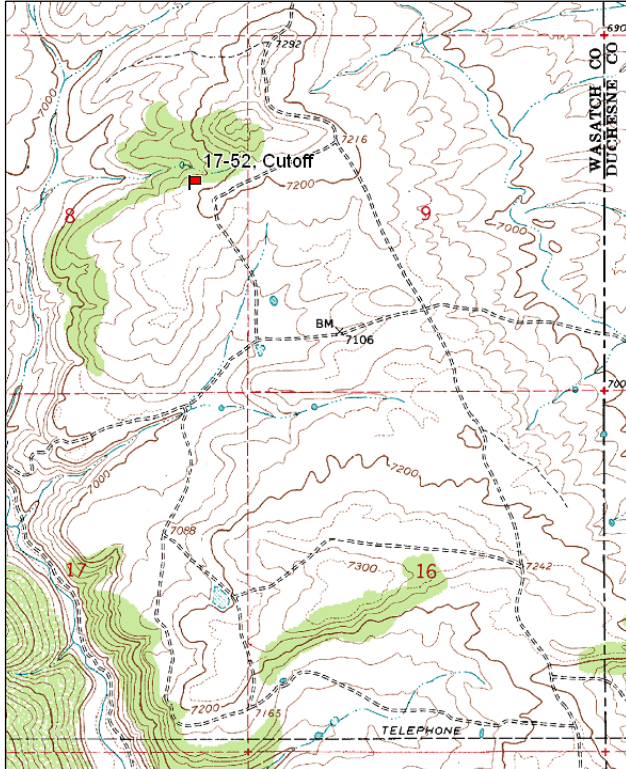
Transect bearing: 179° magnetic

Belt placement: line 1 (6 & 90ft), line 2 (26ft), line 3 (57ft), line 4 (69ft).

Directions:

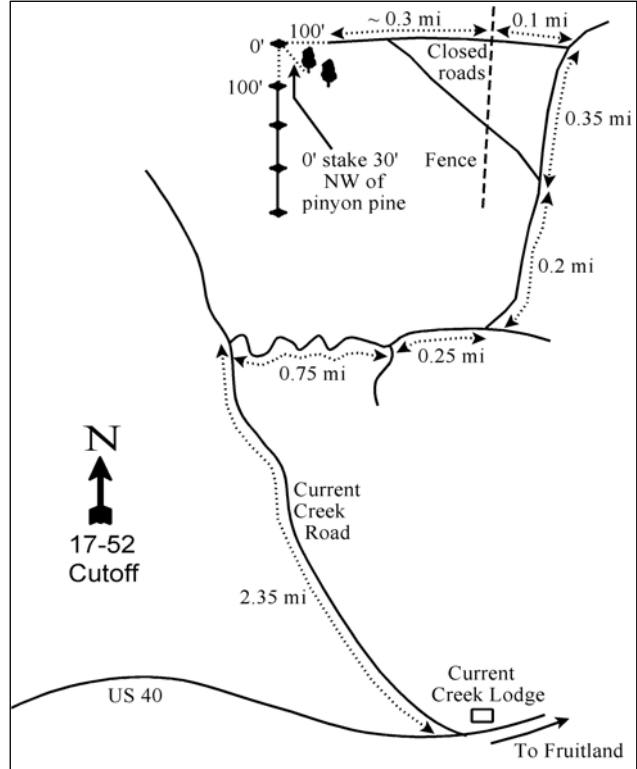
From the intersection of Currant Creek Road and Highway U.S. 40, drive north on the Currant Creek Road for 2.35 miles. Turn right and go east 0.75 miles to an intersection. Turn left and drive north for 0.25 miles to a "T" intersection. At the "T", turn left and go 0.2 miles to a fork. Stay right for another 0.35 miles to another fork. Turn left and drive to the fence. Cross the fence and walk to the end of the road (about a third of a mile) to the west. The 0-foot baseline is 100 feet west of the end of the road and about 30 feet northwest of a mature pinyon pine.

Map Name: Deep Creek Canyon



Township: 3S Range: 9W Section: 8

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 506921 E 4453859 N

CUTOFF - TREND STUDY NO. 17-52

Site Information

Site Description: The study is on private land about one-third of mile west of Utah Division of Wildlife Resources (UDWR) land, immediately north of Currant Creek Lodge. The area is comprised of a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community with a mixture of mountain brush. Pellet group transect data has indicated heavy use by deer, and light use by elk and cattle since 2000 (Table - Pellet Group Data).

Browse: The key browse species is mountain big sagebrush which provides the majority of the browse cover on the site (Table - Browse Trends). There are also a variety of other browse species present which include: serviceberry (*Amelanchier utahensis*), true mountain mahogany (*Cercocarpus montanus*), mountain low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*) and bitterbrush (*Purshia tridentata*). The mountain big sagebrush population is mostly mature with high amounts of decadence and moderate amounts of poor vigor. Utilization of sagebrush has been heavy over the course of the study. Recruitment of young sagebrush plants has been mostly poor, though recruitment of young was good in 1995 and 2010. Serviceberry and true mountain mahogany occur in small numbers, but provide additional forage. Serviceberry shows mostly light to moderate hedging, but some mature individuals have displayed heavy use. Mahogany has shown mostly moderate use from 1982 to 1995, but showed heavy utilization since 2000 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse, but only moderately abundant for this type of community. Thickspike wheatgrass (*Agropyron dasystachyum*), bluebunch wheatgrass (*A. spicatum*), needle-and-thread (*Stipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), Sandberg's bluegrass (*Poa secunda*) and mutton bluegrass (*P. fendleriana*) are the most abundant grass species. It appears that there may have been some identification problems between the two bluegrass species. Forbs are abundant, but few useful species are present. Timber poisonvetch (*Astragalus convallarius*), rose pussytoes (*Antennaria rosea*) and Hood's phlox (*Phlox hoodii*) are the most common perennial forbs (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam with a neutral soil reaction (pH 7.2). Phosphorus may have limited availability for plant growth and development at 5.9 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is fairly high for this type of community, with vegetation and litter cover lower than would be expected (Table - Basic Cover). There is evidence of past erosion in the form of soil pedestaling and gully formation; however, there appears to be sufficient protective ground cover to prevent serious erosion. On nearby steeper slopes, erosion is more serious and widespread than on the study site. The soil erosion condition was classified as stable in 2010, but was moderate in 2005 because of small but frequent pedestaling of shrubs and perennial grasses, small gullies covering between 10% and 50% of the site, some minor soil movement, moderate litter movement, many small rills and minor flow patterns between perennial species.

Trend Assessments

Browse:

- **1982 to 1988 - slightly down (-1):** There was a slight increase in the density of the primary browse species, mountain big sagebrush, but decadence increased from 21% to 70% of the population. Poor vigor also increased from 0% to 24% and recruitment of young sagebrush plants remained low.
- **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. The decadence of mountain big sagebrush decreased to 39%, but remained high. Recruitment of young plants increased slightly to 16% of the population.
- **1995 to 2000 - stable (0):** There was little change in the density of mountain big sagebrush, though cover decreased from 11% to 7%. Decadence increased slightly to 45%, but poor vigor decreased to 14%. Recruitment of young sagebrush plants decreased to 5%.

- **2000 to 2005 - slightly down (-1):** The density of mountain big sagebrush decreased by 19% from 2,980 plants/acre to 2,420 plants/acre, but cover remained similar. Decadence increased to 51% and poor vigor increased to 17%.
- **2005 to 2010 - up (+2):** The mountain big sagebrush density increased by 21% to 2,940 plants/acre and cover increased from 8% to 9%. Decadence of sagebrush decreased to 16%, though poor vigor increased slightly to 18%. Recruitment of young sagebrush plants increased to 23% of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial grasses increased by 22%.
- **1995 to 2000 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 10%, but cover increased from 10% to 14% due to a large increase in the cover of Sandberg’s bluegrass.
- **2000 to 2005 - up (+2):** The sum of nested frequency of perennial grasses increased by 21%, though cover decreased slightly to 11%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 15% and cover decreased to 8%.

Forb:

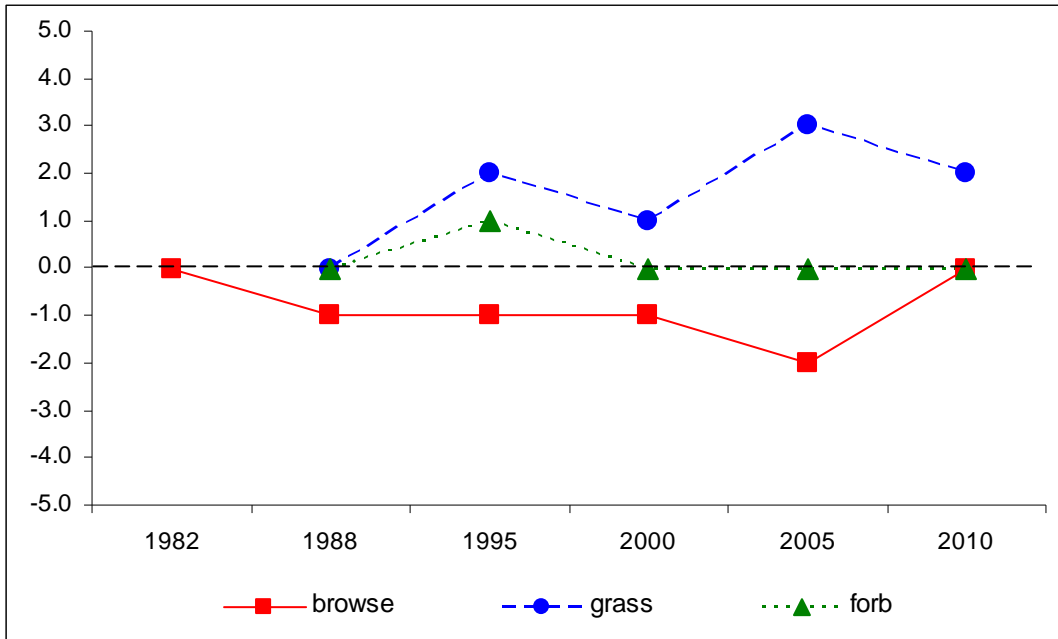
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 12%.
- **1995 to 2000 - slightly down (-1):** The perennial forb sum of nested frequency decreased by 15%, but cover increased from 9% to 11%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover decreased to 8%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial forbs remained similar, but cover increased to 15%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 17, study no: 52

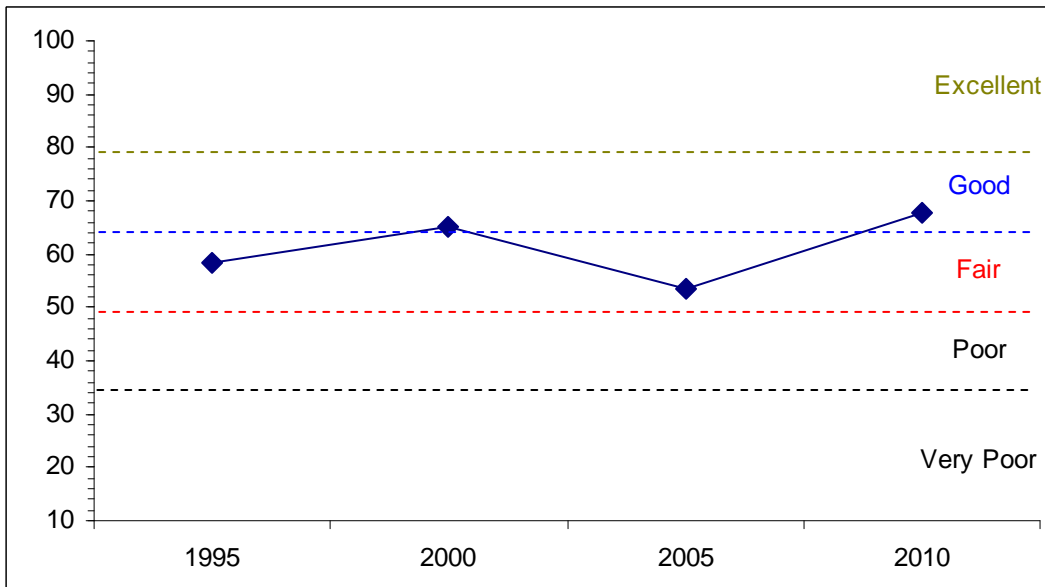
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	16.6	5.6	7.3	19.0	0.0	10.0	0.0	58.5	Fair
00	14.3	5.7	7.9	27.2	0.0	10.0	0.0	65.0	Fair-Good
05	14.4	3.6	3.8	21.8	-0.1	10.0	0.0	53.4	Fair
10	17.2	11.7	12.6	16.2	0.0	10.0	0.0	67.7	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 17, Study no: 52



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 17, Study no: 52



HERBACEOUS TRENDS--
Management unit 17, Study no: 52

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	b181	a203	bc163	c85	bc168	2.23	2.68	2.03	2.33
G	<i>Agropyron intermedium</i>	-	-	-	-	1	-	-	-	.03
G	<i>Agropyron spicatum</i>	a-	b32	b46	c148	b34	1.14	1.20	1.75	.48
G	<i>Bromus tectorum</i> (a)	-	3	3	11	5	.00	.00	.19	.01
G	<i>Carex</i> sp.	a3	c46	bc44	bc34	ab21	.27	.29	.13	.17
G	<i>Elymus salina</i>	a39	b67	a21	a12	a15	.99	.82	.07	.16
G	<i>Oryzopsis hymenoides</i>	c145	b79	b67	ab50	a20	1.20	1.80	1.12	.13
G	<i>Poa fendleriana</i>	c148	c118	a8	b66	a28	1.35	.21	1.34	.38
G	<i>Poa secunda</i>	a-	a7	b199	c171	c202	.01	6.15	2.21	3.01
G	<i>Sitanion hystrix</i>	-	1	-	-	2	.00	-	-	.00
G	<i>Stipa comata</i>	a-	c74	b14	d111	cd83	2.25	.42	2.20	1.37
Total for Annual Grasses		0	3	3	11	5	0.00	0.00	0.19	0.00
Total for Perennial Grasses		516	627	562	677	574	9.48	13.59	10.89	8.09
Total for Grasses		516	630	565	688	579	9.48	13.60	11.08	8.10
F	<i>Agoseris glauca</i>	a-	ab3	a-	b8	ab2	.01	-	.02	.01
F	<i>Allium</i> sp.	a-	c104	a-	b61	b47	.45	-	.24	.16
F	<i>Androsace septentrionalis</i> (a)	-	b35	a-	a-	a8	.14	-	-	.02
F	<i>Antennaria rosea</i>	bc68	b48	b60	a12	c98	.52	2.10	.33	3.54
F	<i>Arabis</i> sp.	ab6	b5	b9	c24	a-	.02	.22	.10	-
F	<i>Artemisia dracunculus</i>	-	-	2	-	-	-	.00	-	-
F	<i>Aster</i> sp.	-	-	-	-	3	-	-	-	.00
F	<i>Astragalus convallarius</i>	a83	b139	b122	b131	a83	3.79	3.19	2.83	2.34
F	<i>Astragalus</i> sp.	4	3	8	2	1	.62	.44	.01	.15
F	<i>Calochortus nuttallii</i>	a-	ab3	ab2	b8	ab4	.01	.00	.02	.02
F	<i>Castilleja chromosa</i>	a4	a4	b23	a3	a6	.07	.27	.00	.06
F	<i>Chaenactis douglasii</i>	b25	ab9	ab7	a1	a-	.02	.02	.00	-
F	<i>Chenopodium fremontii</i> (a)	-	6	-	-	1	.01	-	-	.00
F	<i>Chenopodium leptophyllum</i> (a)	-	b11	a-	ab6	b10	.03	-	.01	.05
F	<i>Cirsium</i> sp.	2	-	2	-	-	-	.00	-	-
F	<i>Collinsia parviflora</i> (a)	-	c62	a-	ab99	b11	.22	-	.57	.04
F	<i>Comandra pallida</i>	a-	a-	a-	a-	b12	-	-	-	.05
F	<i>Cordylanthus kingii</i> (a)	-	b81	a3	c119	c117	2.25	.00	2.91	2.28
F	<i>Crepis acuminata</i>	a-	b9	ab2	a-	ab6	.19	.00	-	.03
F	<i>Cryptantha</i> sp.	3	-	-	-	3	-	-	.00	.03
F	<i>Cymopterus</i> sp.	a-	b24	a4	ab14	b29	.07	.00	.05	.17
F	<i>Delphinium nuttallianum</i>	-	-	-	1	-	-	-	.00	-
F	<i>Descurainia pinnata</i> (a)	-	a10	a-	b25	a-	.07	-	.09	-
F	<i>Erigeron eatonii</i>	a-	a-	a-	b15	c19	-	-	.42	.19
F	<i>Erigeron pumilus</i>	a36	a27	b85	ab56	a42	.07	.51	.51	.54
F	<i>Eriogonum cernuum</i> (a)	-	3	-	1	1	.01	-	.00	.00
F	<i>Gayophytum ramosissimum</i> (a)	-	7	-	11	9	.06	-	.02	.04
F	<i>Hedysarum boreale</i>	a-	b30	a4	a-	a-	.61	.01	-	-
F	<i>Lappula occidentalis</i> (a)	-	bc19	a-	c24	b8	.05	-	.06	.02

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Lithospermum ruderales	1	3	2	2	3	.03	.03	.06	.03
F	Machaeranthera canescens	b151	a19	a12	a15	a7	.08	.08	.20	.04
F	Penstemon sp.	-	2	1	-	-	.00	.01	-	-
F	Phlox hoodii	b142	a108	ab131	a108	b142	1.58	3.62	2.79	5.92
F	Phlox longifolia	a-	b30	b15	b29	ab13	.12	.03	.21	.09
F	Polygonum douglasii (a)	-	bc53	a8	c61	b36	.13	.04	.14	.13
F	Ranunculus testiculatus (a)	-	-	-	4	3	-	-	.01	.01
F	Schoenocrambe linifolia	a-	ab5	ab3	ab1	b9	.01	.00	.03	.02
F	Senecio multilobatus	-	-	6	5	-	-	.03	.03	-
F	Sphaeralcea coccinea	b55	ab31	ab32	a31	a28	.45	.23	.15	.45
F	Trifolium gymnocarpon	a5	c50	ab29	bc30	c47	.24	.13	.22	.63
Total for Annual Forbs		0	287	11	350	204	3.00	0.04	3.84	2.62
Total for Perennial Forbs		585	656	561	557	604	9.00	10.99	8.29	14.54
Total for Forbs		585	943	572	907	808	12.00	11.04	12.13	17.16

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

BROWSE TRENDS--

Management unit 17, Study no: 52

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	16	19	20	18	.82	2.40	.91	2.40
B	Artemisia tridentata vaseyana	78	70	69	75	10.52	7.12	7.80	8.91
B	Ceratoides lanata	0	4	3	3	-	-	-	-
B	Cercocarpus montanus	7	8	8	9	.56	.68	.72	.30
B	Chrysothamnus depressus	28	29	32	29	1.13	.61	1.75	1.62
B	Chrysothamnus nauseosus	0	0	0	1	-	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	37	31	35	37	.31	.78	.87	.64
B	Eriogonum corymbosum	18	18	17	16	.30	.27	.45	.43
B	Juniperus osteosperma	0	0	1	1	-	-	-	-
B	Opuntia fragilis	15	8	15	10	.14	.19	.09	.06
B	Pediocactus simpsonii	0	5	8	2	-	-	.03	.03
B	Tetradymia canescens	6	4	4	3	.33	.76	.30	.30
Total for Browse		205	196	212	204	14.14	12.83	12.95	14.71

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 52

Species	Percent Cover	
	'05	'10
<i>Amelanchier utahensis</i>	3.34	3.48
<i>Artemisia tridentata vaseyana</i>	11.25	11.94
<i>Ceratoides lanata</i>	.03	-
<i>Cercocarpus montanus</i>	1.91	1.56
<i>Chrysothamnus depressus</i>	1.81	2.43
<i>Chrysothamnus viscidiflorus lanceolatus</i>	3.28	1.91
<i>Eriogonum corymbosum</i>	.86	.70
<i>Opuntia fragilis</i>	.11	.11
<i>Pediocactus simpsonii</i>	.06	.05
<i>Tetradymia canescens</i>	.11	.15

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 52

Species	Average leader growth (in)	
	'05	'10
<i>Amelanchier uthahensis</i>	3.2	2.7
<i>Artemisia tridentata vaseyana</i>	1.4	1.3
<i>Cercocarpus montanus</i>	3.8	3.1

BASIC COVER--

Management unit 17, Study no: 52

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	11.50	13.00	32.34	37.61	37.54	37.50
Rock	.75	1.25	.20	.89	.53	.50
Pavement	.75	.25	.26	.62	1.40	.12
Litter	45.00	38.50	35.52	40.88	30.97	31.01
Cryptogams	2.75	1.00	5.24	1.69	1.84	.17
Bare Ground	39.25	46.00	34.07	38.95	41.66	49.84

SOIL ANALYSIS DATA --

Management unit 17, Study no: 52, Study Name: Cutoff

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.8	7.2	61.4	19.0	19.6	1.8	5.9	131.2	0.7

PELLET GROUP DATA--

Management unit 17, Study no: 52

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	25	38	75	16
Elk	3	14	14	6
Deer	44	33	50	38
Cattle	-	-	3	2

Days use per acre (ha)		
'00	'05	'10
-	-	-
8 (20)	16 (40)	22 (55)
96 (236)	86 (212)	60 (147)
3 (7)	11 (27)	9 (22)

BROWSE CHARACTERISTICS--
Management unit 17, Study no: 52

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>Amelanchier utahensis</i>									
82	133	0	100	0	-	100	0	0	16/22
88	199	100	0	0	399	0	0	0	-/-
95	320	19	81	0	-	38	0	0	22/26
00	520	54	42	4	140	4	15	4	28/31
05	540	59	30	11	-	44	15	0	33/38
10	380	53	47	0	20	21	0	0	25/30
<i>Artemisia tridentata vaseyana</i>									
82	1864	4	75	21	-	46	0	0	18/26
88	2199	6	24	70	-	39	0	24	18/23
95	3000	16	45	39	20	28	47	21	20/34
00	2980	5	50	45	20	28	53	14	20/33
05	2420	4	45	51	2760	21	55	17	22/35
10	2940	23	61	16	2040	22	48	18	22/34
<i>Ceratoides lanata</i>									
82	66	0	100	0	-	0	0	0	14/9
88	0	0	0	0	-	0	0	0	-/-
95	0	0	0	0	-	0	0	0	6/8
00	120	0	83	17	-	83	0	17	7/6
05	80	0	100	0	-	75	25	0	13/12
10	80	0	100	0	-	25	50	0	6/9
<i>Cercocarpus montanus</i>									
82	199	0	100	0	-	100	0	0	20/19
88	399	100	0	0	66	100	0	0	-/-
95	260	8	92	0	-	38	0	0	22/31
00	260	8	85	8	-	23	77	8	32/32
05	240	0	92	8	-	0	100	8	41/45
10	260	0	100	0	40	46	54	0	36/35
<i>Chrysothamnus depressus</i>									
82	0	0	0	0	-	0	0	0	-/-
88	665	10	90	0	-	0	0	0	3/6
95	2520	2	98	0	-	0	0	0	6/11
00	2480	0	99	1	-	32	19	.80	5/10
05	2460	0	94	6	20	16	77	7	7/14
10	2240	1	98	1	-	51	6	.89	5/10

		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										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	7/15	
05	0	0	0	-	-	0	0	0	-/-	
10	20	0	100	-	-	0	0	0	5/10	
Chrysothamnus viscidiflorus lanceolatus										
82	1533	0	100	0	-	0	0	0	12/15	
88	3132	11	79	11	-	0	0	4	8/8	
95	1480	8	92	0	-	0	0	0	11/14	
00	1640	1	99	0	-	5	0	1	9/13	
05	1480	0	96	4	-	18	5	1	11/18	
10	1880	7	93	0	20	3	0	0	11/17	
Eriogonum corymbosum										
82	733	0	100	0	-	0	0	0	17/15	
88	732	45	18	36	-	0	0	0	13/11	
95	800	20	80	0	-	0	0	0	13/18	
00	720	14	53	33	40	11	0	3	11/15	
05	820	17	78	5	100	20	29	0	16/21	
10	640	3	94	3	20	0	0	3	14/18	
Juniperus osteosperma										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	20	100	0	-	-	0	0	0	-/-	
Opuntia fragilis										
82	199	0	100	0	-	0	0	0	3/5	
88	998	33	47	20	533	0	0	0	1/2	
95	340	18	76	6	-	0	0	6	4/11	
00	420	0	95	5	-	5	0	5	2/6	
05	440	5	82	14	-	0	0	5	3/8	
10	260	31	62	8	-	0	0	15	3/11	
Pediocactus simpsonii										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	140	0	100	-	-	0	0	0	1/2	
05	240	0	100	-	-	0	0	0	2/3	
10	60	0	100	-	-	0	0	0	1/3	

		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>Purshia tridentata</i>										
82	66	0	100	-	-	100	0	0	14/30	
88	133	0	100	-	-	50	0	0	19/39	
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	-/-	
<i>Quercus gambelii</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	51/16	
10	0	0	0	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	10/32	
05	0	0	0	-	-	0	0	0	13/30	
10	0	0	0	-	-	0	0	0	16/24	
<i>Tetradymia canescens</i>										
82	199	0	100	0	-	0	0	0	8/15	
88	66	0	100	0	-	0	0	0	6/6	
95	140	0	100	0	-	14	0	0	11/17	
00	80	0	100	0	-	25	0	0	11/17	
05	80	0	75	25	-	75	0	0	11/20	
10	100	0	100	0	20	20	20	0	9/14	

TWO BAR RANCH - TREND STUDY NO. 17-53-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 6665 ft. (2032 m)

Aspect: West

Slope: 4%

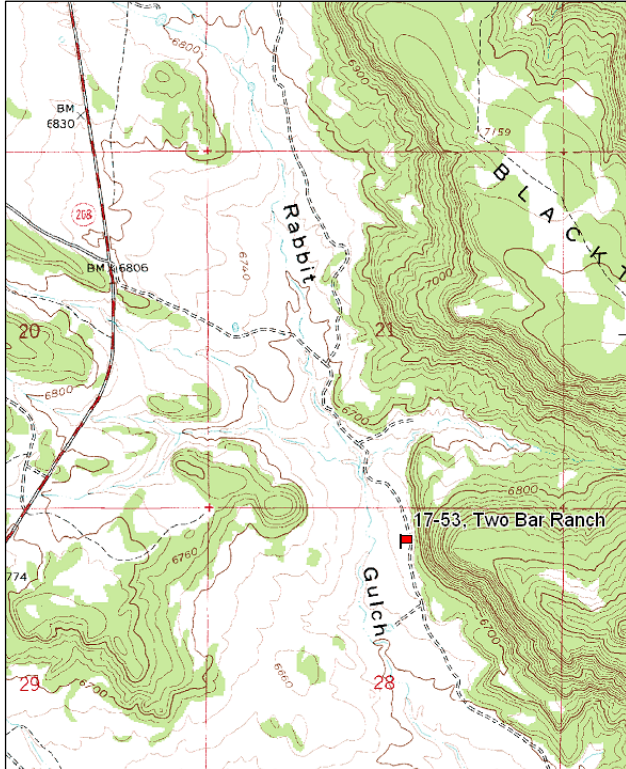
Transect bearing: 345° magnetic

Belt placement: line 1 (9 & 85ft), line 2 (26ft), line 3 (45ft), line 4 (60ft).

Directions:

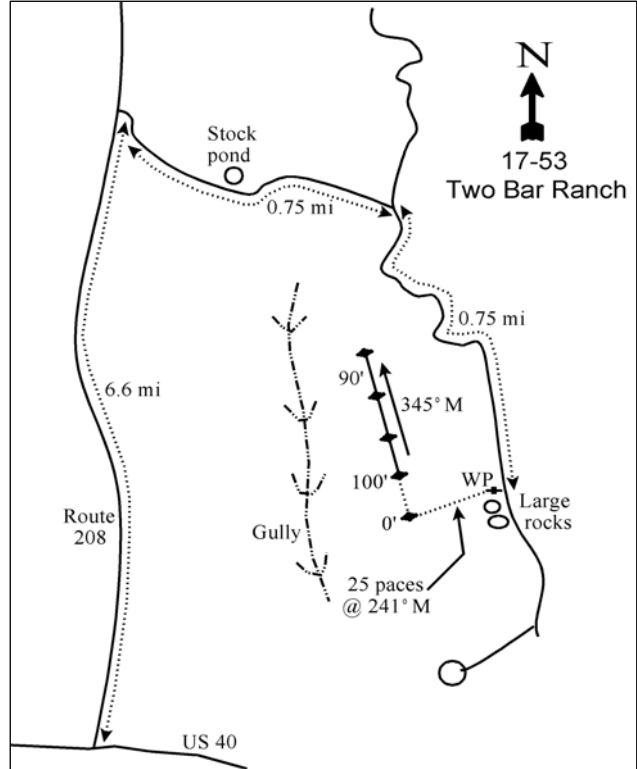
From U.S. 40 five miles east of Fruitland, take Rt. 208 north towards Tabiona for 6.6 miles. Just after a small road cut, there is a road on the right. Turn right towards Rabbit Gulch and go 0.75 miles to an intersection. Turn right (south) and go another 0.75 miles down a gully-ridden road to two large rocks on the west side of the road. From the highest point of the first rock, the 0-foot baseline stake is 25 paces away at 241°M.

Map Name: Tabiona



Township: 2S Range: 7W Section: 28

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 527226 E 4459218 N

TWO BAR RANCH - TREND STUDY NO. 17-53

Site Information

Site Description: The study is located on the upper part of Rabbit Gulch near the base of Blacktail Ridge within a large Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat. The area is administered by the Utah Division of Wildlife (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA). This is the lowest elevation study on the unit. Thermal and escape cover for big game is limited within the sagebrush flat, but good cover is available in the pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands along the ridge east of the site. There is evidence of substantial deer use during past readings. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. Pellet group transect data has indicated lightly moderate use by deer since 2000. Estimated use by elk was fairly moderate in 2000, with lighter use in 2005 and 2010. There has been minimal use by cattle since 2000 (Table - Pellet Group Data).

Browse: The key browse species is Wyoming big sagebrush, though there was a large decrease in the cover of Wyoming big sagebrush in 2005 and shadscale (*Atriplex confertifolia*) has increased steadily in cover since 1995 to become the co-dominant browse species (Table - Browse Trends). The Wyoming big sagebrush had a fairly dense population prior to 2005, but density decreased in relation to cover in that year. The population of Wyoming big sagebrush is comprised of mature plants with moderate decadence and fairly high amounts of poor vigor. Decadence and poor vigor were highest in 2005. Recruitment of young sagebrush plants has been mostly good over the course of the study. Utilization of Wyoming big sagebrush has been mostly moderate with very heavy use in 2005. Shadscale is comprised of a moderately dense stand of mostly mature plants that have low decadence and good vigor. Recruitment of young shadscale has been historically good and utilization mostly light. There is also a small population of black greasewood (*Sarcobatus vermiculatus*) found on the site (Table - Browse Characteristics).

Herbaceous Understory: Grasses are fairly diverse for a site such as this, and have steadily increased in cover since 1995. Needle-and-thread (*Stipa comata*) has been the main reason for the increase in cover and has been the dominant grass since 2005. Thickspike wheatgrass (*Agropyron dasystachyum*) was the co-dominant species prior to 2005, but decreased significantly in nested frequency in that year. Thickspike wheatgrass remains common on the site as do Indian ricegrass (*Oryzopsis hymenoides*) and bottlebrush squirreltail (*Sitanion hystrix*). Perennial forbs are scarce with scarlet globemallow (*Sphaeralcea coccinea*) providing the majority of the forb cover. Scarlet globemallow increased significantly in nested frequency in 2005 (Table - Herbaceous Trends).

Soil: Soils are an alluvial deposited sandy clay loam with a slightly alkaline soil reaction (pH 7.7). Phosphorus may have limited availability for plant growth and development at 1.5 ppm (Tiedemann and Lopez 2004). Exposed bare ground cover is high with vegetation and litter sparse and generally inadequate to prevent soil movement. Cryptogam cover is high and provides some extra protective ground cover (Table - Basic Cover). The soil erosion condition was classified as moderate to high in 2005 and slight in 2010 because of small frequent pedestals surrounding shrubs and perennial grasses, gullies covering over 50% of the site (two large gullies on the site), large amounts of soil movement, minor litter movement, many small rills, and moderate flow patterns between perennial species.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** There was a four-fold increase in the density of the primary browse species Wyoming big sagebrush, but most of the increase was due to a large increase in the recruitment of young plants as the density of mature plants changed little.
- **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 and vigor of Wyoming big

sagebrush remained similar. Recruitment of young plants decreased, but remained very good at 26% of the population.

- **1995 to 2000 - stable (0):** There was no change in the density of Wyoming big sagebrush, though the population appears to be maturing with a decrease in recruitment of young plants and an increase in the density of mature plants. This is also represented by an increase in cover from 11% to 13%. Decadence of Wyoming big sagebrush increased from 15% to 33% and poor vigor increased from 7% to 16%.
- **2000 to 2005 - down (-2):** The density of Wyoming big sagebrush decreased by 55% from 5,080 plants/acre to 2,280 plants/acre, with a corresponding decrease in cover to 4%. Decadence increased to 62% and poor vigor increased to 56% of the population. Recruitment of young sagebrush plants decreased to 3%. Shadscale also decreased in density from 4,020 plants/acre to 2,640 plants/acre, but increased in cover from 5% to 7%.
- **2005 to 2010 - slightly up (+1):** There was a slight decrease in the density of Wyoming big sagebrush to 2,080 plants/acre, but cover increased slightly to 5%. Decadence decreased to 23% and poor vigor decreased to 20%. Recruitment of young sagebrush plants increased to 13% of the population. Shadscale had a 14% increase in density to 3,020 plants/acre.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 18% with a significant increase in the nested frequency of thickspike wheatgrass.
- **1995 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased from 7% to 10% with a significant increase in the nested frequency of needle-and-thread.
- **2000 to 2005 - down (-2):** The sum of nested frequency of perennial grasses decreased by 23% with a significant decrease in the nested frequency of thickspike wheatgrass. Cover of perennial grasses increased to 12% primarily because of an increase in the cover of needle-and-thread.
- **2005 to 2010 - up (+2):** The perennial grass sum of nested frequency increased by 22% and cover increased to 18%, again primarily due to an increase in the cover of needle-and-thread.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** There was a three-fold increase in the sum of nested frequency of perennial forbs, but cover was only 1%.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs returned to 1988 levels.
- **2000 to 2005 - up (+2):** The perennial forb sum of nested frequency increased two-fold with a significant increase in the nested frequency of scarlet globemallow. Cover increased from less than 1% to 3% with an increase in cover of scarlet globemallow.
- **2005 to 2010 - slightly down (-1):** There was a slight decrease in the sum of nested frequency of perennial forbs, but cover remained similar.

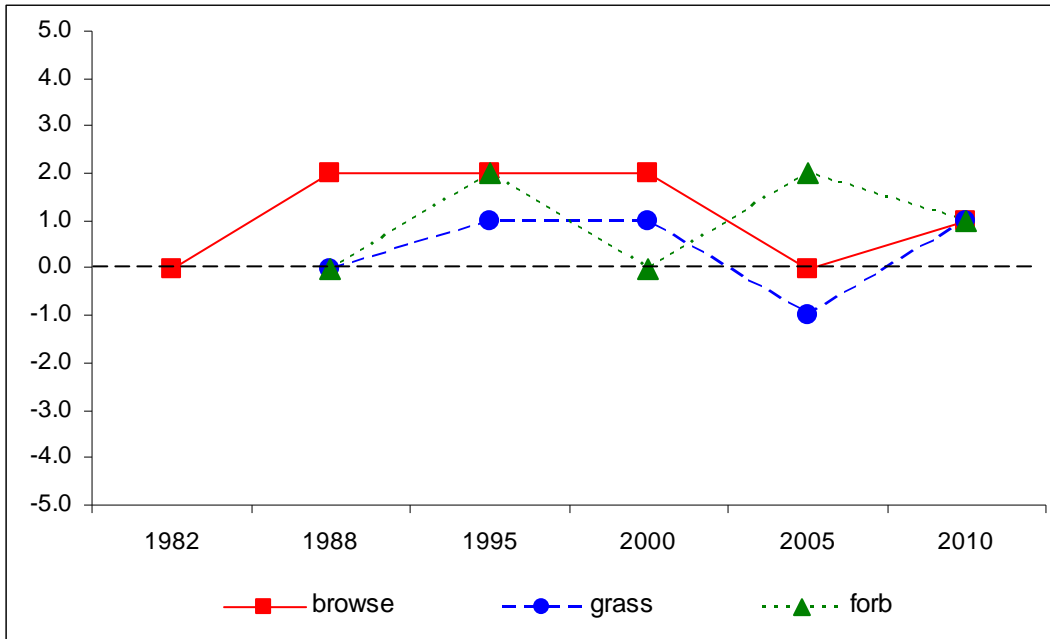
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17, study no: 53

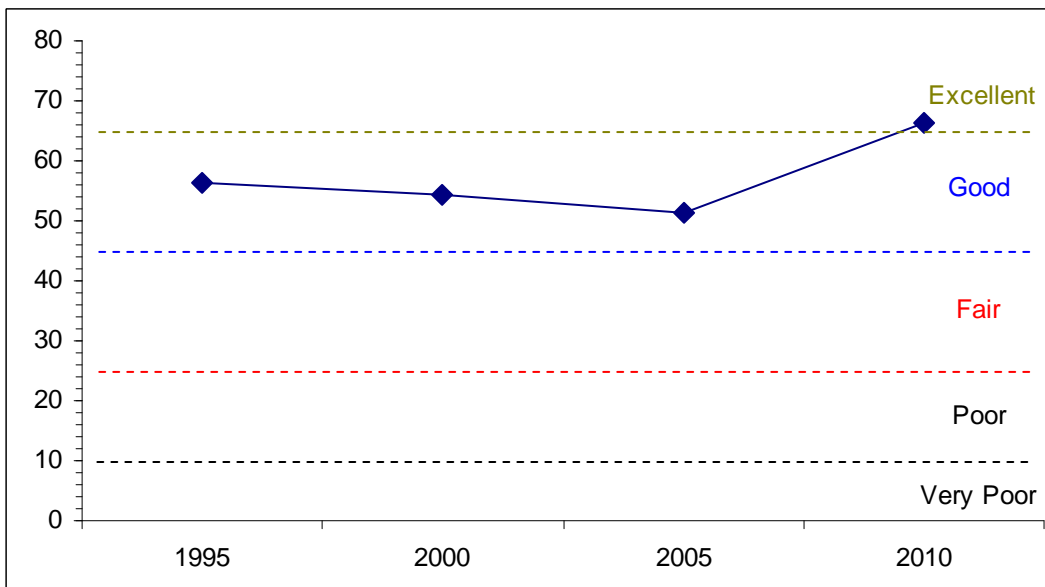
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	16.6	11.3	12.4	14.1	0.0	2.0	0.0	56.5	Good
00	21.0	6.7	5.6	19.9	0.0	1.2	0.0	54.5	Good
05	11.9	5.8	3.3	24.0	0.0	6.2	0.0	51.2	Good
10	13.2	11.2	6.5	30.0	0.0	5.3	0.0	66.2	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 53



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 17, Study no: 53



HERBACEOUS TRENDS--
Management unit 17, Study no: 53

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	bc132	d173	cd156	a62	ab96	2.55	3.42	1.81	3.50
G	<i>Bromus tectorum</i> (a)	-	1	-	-	6	.00	-	-	.01
G	<i>Carex</i> sp.	c73	abc38	a15	bc43	ab33	.23	.18	.46	.53
G	<i>Oryzopsis hymenoides</i>	40	65	31	39	46	1.10	.87	1.62	1.57
G	<i>Poa secunda</i>	-	-	-	-	3	-	-	-	.01
G	<i>Sitanion hystrix</i>	29	29	49	23	27	1.33	1.10	1.16	1.06
G	<i>Sporobolus cryptandrus</i>	-	2	-	-	-	.00	-	-	-
G	<i>Stipa comata</i>	a29	a51	b103	b106	b128	1.82	4.39	6.96	11.17
Total for Annual Grasses		0	1	0	0	6	0.00	0	0	0.01
Total for Perennial Grasses		303	358	354	273	333	7.06	9.97	12.02	17.85
Total for Grasses		303	359	354	273	339	7.07	9.97	12.02	17.87
F	<i>Arabis</i> sp.	-	7	3	5	-	.04	.00	.01	-
F	<i>Arenaria</i> sp.	-	-	-	-	3	-	-	-	.00
F	<i>Astragalus convallarius</i>	-	-	-	4	-	-	-	.01	-
F	<i>Calochortus nuttallii</i>	-	-	-	-	-	-	-	-	.00
F	<i>Chenopodium fremontii</i> (a)	-	3	-	6	-	.01	-	.01	-
F	<i>Chenopodium leptophyllum</i> (a)	-	bc6	a-	c18	ab4	.02	-	.05	.01
F	<i>Collinsia parviflora</i> (a)	-	-	-	1	-	-	-	.00	-
F	<i>Comandra pallida</i>	-	-	-	-	1	-	-	-	.00
F	<i>Descurainia pinnata</i> (a)	-	a1	a1	b49	a1	.00	.00	.60	.00
F	<i>Draba</i> sp. (a)	-	3	-	-	-	.00	-	-	-
F	<i>Eriogonum cernuum</i> (a)	-	2	-	8	3	.01	-	.02	.00
F	<i>Lappula occidentalis</i> (a)	-	b16	a-	d112	c48	.03	-	2.67	.14
F	<i>Lepidium</i> sp. (a)	-	b24	a-	ab5	a1	.12	-	.04	.00
F	<i>Lychnis drummondii</i> <i>drummondii</i>	1	-	-	-	-	-	-	-	-
F	<i>Machaeranthera canescens</i>	a6	b32	a1	a4	a1	.22	.03	.06	.00
F	<i>Phlox longifolia</i>	a3	c81	a7	b43	a8	.21	.06	.28	.02
F	<i>Plantago patagonica</i> (a)	-	ab9	a-	b18	b18	.07	-	.06	.10
F	<i>Schoenrambe linifolia</i>	a2	b10	a1	a3	a3	.03	.03	.00	.00
F	<i>Sphaeralcea coccinea</i>	a52	a65	a62	b103	b111	.45	.50	2.71	2.61
F	<i>Townsendia incana</i>	-	1	-	2	-	.03	-	.03	-
Total for Annual Forbs		0	64	1	217	75	0.28	0.00	3.46	0.27
Total for Perennial Forbs		64	196	74	164	127	0.99	0.62	3.12	2.65
Total for Forbs		64	260	75	381	202	1.28	0.63	6.59	2.93

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

BROWSE TRENDS--

Management unit 17, Study no: 53

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	93	82	57	58	11.23	13.25	4.33	5.19
B	Atriplex confertifolia	63	70	62	66	2.59	4.47	6.48	6.71
B	Ceratoides lanata	0	2	1	2	-	-	.00	.03
B	Chrysothamnus depressus	-	-	-	-	-	-	.03	-
B	Chrysothamnus viscidiflorus viscidiflorus	1	1	2	0	-	-	.00	-
B	Opuntia sp.	36	39	37	40	1.10	.97	1.02	1.37
B	Pediocactus simpsonii	0	0	1	0	-	-	.00	-
B	Pinus edulis	0	4	3	3	.15	.38	.38	.63
B	Sarcobatus vermiculatus	16	14	17	15	1.28	1.25	3.28	3.19
B	Tetradymia canescens	0	0	1	2	-	-	-	.00
Total for Browse		209	212	181	186	16.36	20.32	15.55	17.12

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 53

Species	'05	'10
Artemisia tridentata wyomingensis	4.13	5.21
Atriplex confertifolia	7.80	7.08
Ceratoides lanata	.13	.06
Juniperus osteosperma	.50	-
Opuntia sp.	.93	1.01
Pinus edulis	-	.53
Sarcobatus vermiculatus	4.09	5.50

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 53

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.9	1.2

BASIC COVER--

Management unit 17, Study no: 53

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	5.50	2.00	26.45	30.25	28.32	39.90
Rock	0	1.00	.06	.15	.01	0
Pavement	0	.50	.12	.09	.07	.03
Litter	45.25	31.50	29.09	27.65	34.43	42.75
Cryptogams	2.50	12.25	15.82	15.10	11.37	7.16
Bare Ground	46.75	52.75	33.79	45.52	43.01	35.70

SOIL ANALYSIS DATA --

Management unit 17, Study no: 53, Study Name: Two Bar Ranch

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.4	7.7	52.6	24.8	22.6	1.2	1.5	92.8	0.5

PELLET GROUP DATA--

Management unit 17, Study no: 53

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	2	3	18	18	-	-	-
Elk	17	11	18	20	35 (86)	17 (43)	14 (35)
Deer	28	9	28	12	38 (93)	23 (57)	21 (53)
Cattle	-	-	-	-	-	1 (2)	-

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 53

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia nova</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	11/23
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Artemisia tridentata wyomingensis</i>									
82	2531	13	79	8	1999	13	0	0	25/29
88	9865	66	21	14	1866	39	3	.67	22/21
95	5080	26	59	15	340	48	35	7	21/30
00	5080	11	56	33	180	40	28	16	17/25
05	2280	3	35	62	20	25	52	56	17/23
10	2080	13	63	23	40	32	6	20	16/22
<i>Atriplex confertifolia</i>									
82	2599	49	51	0	1133	18	0	0	12/20
88	3398	29	55	16	333	12	2	0	10/10
95	3080	20	79	1	-	7	3	1	12/19
00	4020	12	76	12	60	8	12	2	8/15
05	2640	9	81	10	680	2	0	9	14/22
10	3020	13	83	5	140	8	0	5	14/21

		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>Ceratoides lanata</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	6/7	
00	40	50	0	50	-	0	0	50	-/-	
05	20	0	100	0	-	100	0	0	13/14	
10	40	0	100	0	-	0	0	0	14/15	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	10/4	
00	20	0	100	-	-	0	0	0	9/18	
05	40	50	50	-	140	0	0	0	14/23	
10	0	0	0	-	-	0	0	0	15/28	
<i>Grayia spinosa</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	11/9	
<i>Opuntia sp.</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	2066	6	94	0	-	0	0	0	4/3	
95	1260	2	86	13	-	0	0	8	5/15	
00	1440	6	90	4	-	0	0	8	4/9	
05	1380	4	88	7	-	0	0	1	5/15	
10	1400	7	86	7	-	0	0	11	4/13	
<i>Pediocactus simpsonii</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	0/1	
10	0	0	0	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	80	75	25	-	-	0	0	0	-/-	
05	60	67	33	-	-	0	33	0	-/-	
10	60	100	0	-	-	33	0	100	-/-	

		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>Sarcobatus vermiculatus</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	1399	52	38	10	-	0	0	0	39/27	
95	700	54	46	0	20	0	0	0	47/38	
00	500	8	92	0	-	0	0	0	29/37	
05	560	29	61	11	-	0	0	0	28/43	
10	580	14	86	0	-	0	0	0	29/43	
<i>Tetradymia canescens</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	7/11	
10	40	100	0	-	-	0	0	0	11/18	

LOWER HORSE RIDGE - TREND STUDY NO. 17-55-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Year-Long (Calving habitat)

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 7360 ft. (2244 m)

Aspect: North-Northwest

Slope: 19%

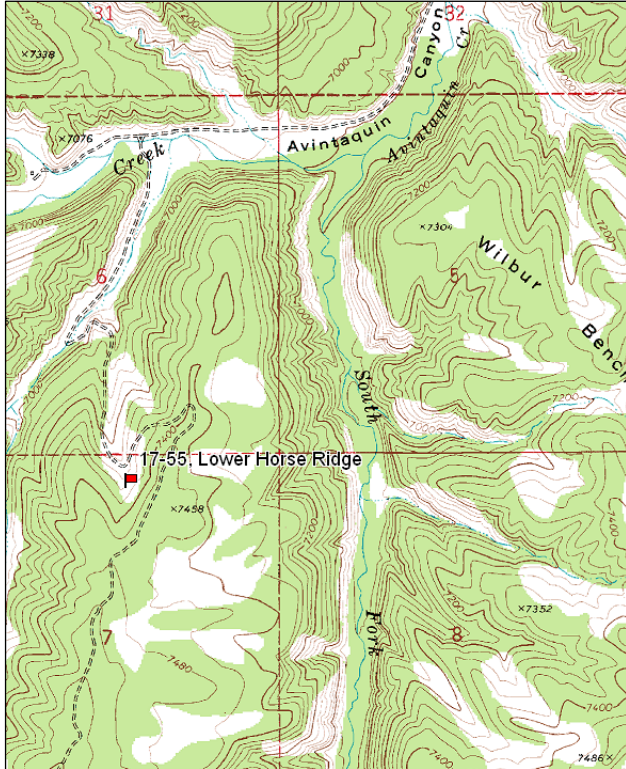
Transect bearing: 348° magnetic

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

Directions:

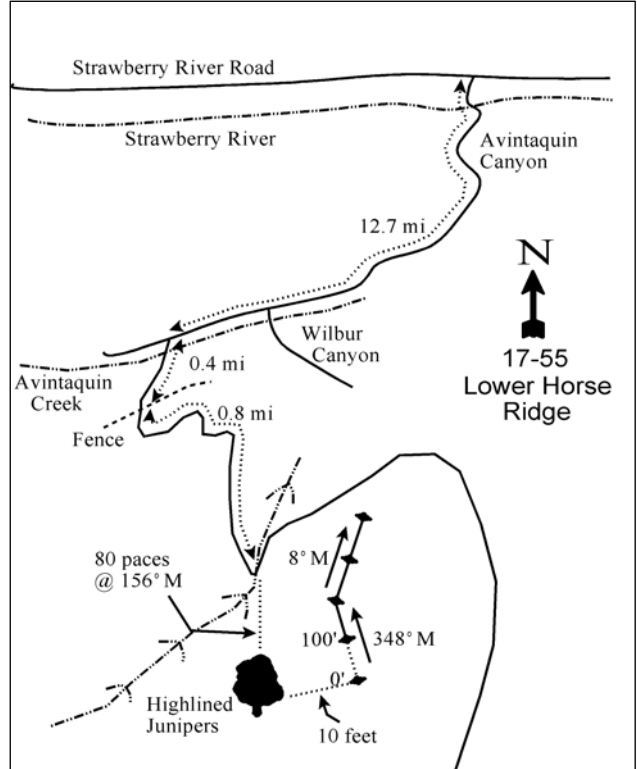
From the Strawberry River Road, proceed south up Avintaquin Canyon 12.7 miles. Turn left here onto a road hidden in the trees and cross Avintaquin Creek. Go up Horse Ridge Canyon 0.4 miles to a fence. Continue up the ridge 0.8 miles to a sharp left bend in the road. From the bend and the gully bottom, walk 80 paces bearing 156°M towards a couple of high-lined juniper trees. The 0-foot baseline stake is 10 feet away from one of the high-lined junipers.

Map Name: Gray Head Peak



Township: 6S Range: 8W Section: 7

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 514889 E 4425527 N

LOWER HORSE RIDGE - TREND STUDY NO. 17-55

Site Information

Site Description: The study is located on a steep side-hill near the north end of Horse Ridge within a mixed mountain brush community. The land is owned and managed by the Utah Division of Wildlife Resources (UDWR) in the Avintaquin Wildlife Management Area (WMA). The area has not been grazed by livestock for several decades. Pellet group transect data indicates light to moderate use by deer and elk since 2000, though use by elk has steadily increased over that time (Table - Pellet Group Data).

Browse: Several browse species occupy the site, but the key species consist of true mountain mahogany (*Cercocarpus montanus*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). True mountain mahogany provides the highest amount of cover of any browse species (Table - Browse Trends). Mahogany has been consistently heavily utilized since 1982, yet the population appears stable with good recruitment of young and low decadence. Mountain big sagebrush provides additional preferred forage and has had light to moderate use. Decadence and poor vigor of mountain big sagebrush has fluctuated over the sample years with high decadence and poor vigor in 1982 and 2005. Decadence and poor vigor have been moderate to low in all other sample years. Recruitment of young mountain big sagebrush plants has been mostly good over the course of the study. Several other browse species also occur including serviceberry (*Amelanchier utahensis*), dwarf rabbitbrush (*Chrysothamnus depressus*), mountain low rabbitbrush (*C. viscidiflorus* ssp. *lanceolatus*), white rubber rabbitbrush (*C. nauseosus* ssp. *hololeucus*), snowberry (*Symphoricarpos oreophilus*), gray horsebrush (*Tetradymia canescens*) and broom snakeweed (*Gutierrezia sarothrae*) (Table - Browse Characteristics). A few Rocky Mountain juniper (*Juniperus scopulorum*), Utah juniper (*J. osteosperma*) and pinyon pine (*Pinus edulis*) are also scattered throughout the area, but Utah juniper and Rocky Mountain juniper were not differentiated in density measurements (Table - Point-Quarter Tree Data).

Herbaceous Understory: Grasses are not overly diverse, but are fairly abundant. Bluebunch wheatgrass (*Agropyron spicatum*) dominates the grass component with other common grasses including sedge (*Carex* sp.), Salina wildrye (*Elymus salina*) and Indian ricegrass (*Oryzopsis hymenoides*). Forbs are diverse, but are only moderately abundant. The most common species is bastard toadflax (*Comandra pallida*) with other common species including Indian paintbrush (*Castilleja chromosa*), stemless goldenweed (*Haplopappus acaulis*) and wing eriogonum (*Eriogonum alatum*) (Table - Herbaceous Trends).

Soil: The soil texture is a loam with a considerable amount of surface limestone and neutral soil reactivity (pH 7.3). Organic matter is fairly high at 4.9%, but phosphorus may have limited availability for plant growth and development at 2.8 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderately low with a high amount of rock and pavement cover (Table - Basic Cover). Rock and pavement are concentrated on the surface between bunch grass and shrub interspaces. The soil erosion condition was classified as stable in 2005, but was slight in 2010 due to a large amount of soil and litter movement, flow patterns and a moderately active gully at the base of the hill.

Trend Assessments

Browse:

- **1982 to 1988 - up (+2):** There was a large increase in the density of true mountain mahogany and mountain big sagebrush. Poor vigor of true mountain mahogany decreased from 30% to 12%, and recruitment of young mahogany plants increased markedly. Decadence of mountain big sagebrush decreased from 50% to 14% and poor vigor decreased from 50% to 3%.
- **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 and poor vigor remained low for the two key species. Recruitment of young plants decreased for both true mountain mahogany and mountain big sagebrush, but remained very good for both species.

- **1995 to 2000 - slightly up (+1):** The density of true mountain mahogany increased 21% from 1,360 plants/acre to 1,640 plants/acre and cover increased from 6% to 8%. Decadence and poor vigor of mahogany remained low, and recruitment of young plants remained good. Mountain big sagebrush density and cover also increased slightly, but decadence increased from 8% to 25% and poor vigor increased from 2% to 16%.
- **2000 to 2005 - stable (0):** True mountain mahogany density remained similar, but cover increased slightly to 10%. Decadence of mahogany also increased slightly to 13%. Mountain big sagebrush density decreased by 13% from 1,120 plants/acre to 980 plants/acre, though cover remained similar. Much of the decrease in density was due to a decrease in the recruitment of young plants. Decadence of mountain big sagebrush increased to 45% and poor vigor increased to 31%.
- **2005 to 2010 - stable (0):** There was little change in the density or cover of the two key browse species. Decadence and poor vigor of mountain big sagebrush both decreased to 13%, and recruitment of young sagebrush plants increased to 10%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though there was a significant increase in the nested frequency of bluebunch wheatgrass and Salina wildrye and a significant decrease in the nested frequency of Sandberg's bluegrass (*Poa secunda*).
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 28%, but cover increased slightly from 14% to 16%.
- **2000 to 2005 - stable (0):** The perennial grass sum of nested frequency remained similar, though cover decreased to 11%.
- **2005 to 2010 - stable (0):** There was little change in the perennial grass sum of nested frequency, but cover increased to 17%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial forbs decreased by 26%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 35% and cover decreased from 5% to 3%.
- **2000 to 2005 - up (+2):** There was a 24% increase in the sum of nested frequency and cover increased to 5%.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 26% and cover decreased to 4%.

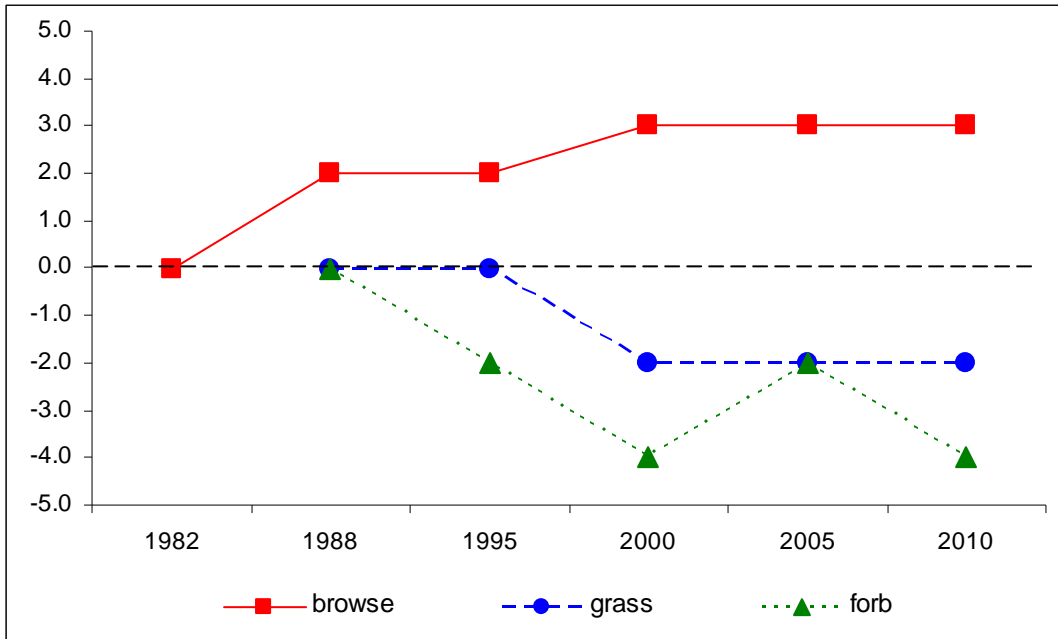
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 17, study no: 55

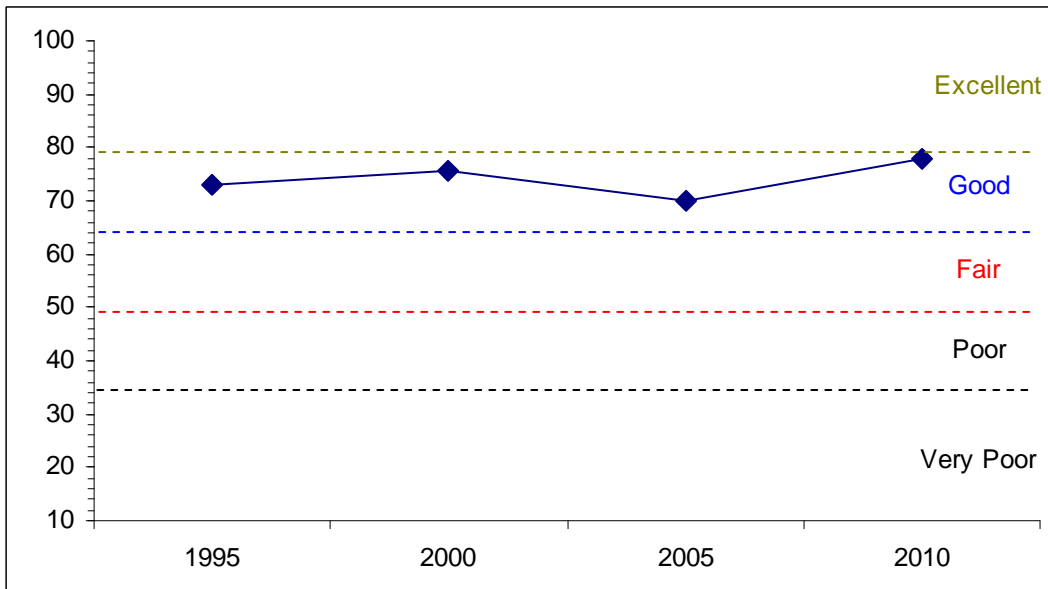
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	10.1	14.6	10.1	28.8	0.0	9.4	0.0	73.0	Good
00	17.1	13.3	8.9	30.0	0.0	6.3	0.0	75.5	Good
05	18.2	9.5	9.7	22.7	0.0	10.0	0.0	70.1	Good
10	20.1	13.2	7.3	30.0	0.0	7.1	0.0	77.8	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 55



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 17, Study no: 55



HERBACEOUS TRENDS--
Management unit 17, Study no: 55

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron spicatum	c219	c230	bc190	a173	bc202	7.10	11.46	6.67	13.76
G	Carex sp.	62	37	40	53	38	1.20	1.43	1.45	1.29
G	Elymus salina	a46	c140	b83	ab63	ab54	5.44	2.54	2.05	1.71
G	Oryzopsis hymenoides	b81	b49	a18	b48	a15	.58	.29	1.15	.11
G	Poa fendleriana	-	3	3	-	7	.03	.15	-	.21
G	Poa secunda	b68	a2	a-	a-	a2	.03	-	-	.00
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		476	461	334	337	318	14.40	15.88	11.35	17.09
Total for Grasses		476	461	334	337	318	14.40	15.88	11.35	17.09
F	Achillea millefolium	3	-	-	-	-	-	-	-	-
F	Androsace septentrionalis (a)	-	a2	a-	b15	a-	.00	-	.22	-
F	Arabis sp.	-	6	2	5	-	.06	.00	.01	-
F	Aster chilensis	b86	a26	a13	a13	a15	.31	.05	.07	.09
F	Astragalus convallarius	a2	b15	a-	a2	a-	.17	.00	.01	-
F	Astragalus purshii	1	3	-	2	3	.01	-	.00	.00
F	Astragalus tenellus	4	-	-	-	-	-	-	-	-
F	Castilleja chromosa	c33	bc33	c44	ab10	a4	.51	.44	.08	.06
F	Chenopodium leptophyllum(a)	-	b5	a-	ab1	ab1	.02	-	.00	.00
F	Comandra pallida	b196	a137	a126	a132	a112	1.49	1.00	2.45	1.88
F	Crepis acuminata	4	-	1	9	2	-	.00	.04	.06
F	Cryptantha sp.	a9	ab26	a4	b32	ab21	.08	.06	.17	.16
F	Cynoglossum officinale	-	-	-	2	-	-	-	.00	-
F	Delphinium nuttallianum	1	-	-	-	-	-	-	-	-
F	Descurainia pinnata (a)	-	b10	a-	ab1	a-	.08	-	.00	-
F	Erigeron sp.	a-	ab1	ab4	a-	b13	.00	.01	-	.02
F	Eriogonum alatum	ab6	a1	ab13	b20	b17	.03	.10	.58	.33
F	Eriogonum umbellatum	-	-	-	-	2	-	-	-	.01
F	Haplopappus acaulis	c51	ab16	b31	bc39	a2	.32	.92	.70	.03
F	Hymenoxys richardsonii	a-	a-	a-	a-	b14	-	-	-	.24
F	Ipomopsis aggregata	4	-	-	1	-	-	-	.00	-
F	Lesquerella sp.	-	-	-	3	-	-	-	.15	-
F	Linum lewisii	a4	b24	a4	ab14	ab20	.12	.01	.15	.20
F	Lithospermum sp.	c26	b18	ab7	a-	a-	.26	.21	-	-
F	Machaeranthera canescens	b37	a6	a-	a1	a-	.07	-	.00	-
F	Machaeranthera grindelioides	a14	b50	a17	a19	a15	.71	.14	.34	.15
F	Pedicularis centranthera	-	-	-	-	-	-	-	.03	-
F	Penstemon caespitosus	b15	ab4	ab4	ab7	a-	.02	.01	.02	-
F	Penstemon humilis	b25	b18	a2	ab9	a-	.07	.03	.04	-
F	Phlox austromontana	c62	bc43	a7	ab22	a13	.35	.09	.23	.11
F	Phlox longifolia	-	5	4	5	-	.01	.01	.01	-
F	Potentilla gracilis	-	2	1	6	6	.00	.00	.04	.19
F	Schoenocrambe linifolia	-	-	-	1	-	-	-	.00	-
F	Senecio multilobatus	b18	ab7	a4	a3	a1	.04	.01	.03	.00

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Taraxacum officinale	-	5	-	-	3	.03	-	-	.00
F	Viguiera multiflora	3	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	17	0	17	1	0.10	0	0.23	0.00
Total for Perennial Forbs		604	446	288	357	263	4.71	3.14	5.22	3.57
Total for Forbs		604	463	288	374	264	4.82	3.14	5.46	3.57

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

BROWSE TRENDS--

Management unit 17, Study no: 55

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	0	8	8	5	-	.48	.39	.63
B	Artemisia frigida	1	0	0	0	-	-	-	-
B	Artemisia tridentata vaseyana	34	34	31	32	1.06	2.26	2.27	2.16
B	Cercocarpus montanus	47	53	46	55	5.57	8.43	9.76	10.45
B	Chrysothamnus depressus	21	11	13	10	.36	.54	.10	.13
B	Chrysothamnus nauseosus hololeucus	1	3	3	0	-	-	.00	-
B	Chrysothamnus viscidiflorus lanceolatus	39	38	44	37	.84	1.58	.78	1.07
B	Eriogonum corymbosum	38	18	26	28	1.76	.53	.81	1.47
B	Gutierrezia sarothrae	56	18	63	30	1.14	.11	.84	.28
B	Juniperus osteosperma	0	3	4	3	.30	.30	.66	.78
B	Juniperus scopulorum	0	2	3	3	-	1.85	1.66	2.67
B	Pinus edulis	0	4	2	6	2.09	2.30	2.43	3.20
B	Rosa woodsii	0	4	2	2	-	.15	.03	.53
B	Symphoricarpos oreophilus	3	8	8	8	.03	.44	.56	.18
B	Tetradymia canescens	10	10	11	13	.09	.24	.18	.03
Total for Browse		250	214	264	232	13.26	19.25	20.49	23.62

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 55

Species	Percent Cover		
	'00	'05	'10
Amelanchier utahensis	-	.53	.26
Artemisia tridentata vaseyana	-	1.86	2.84
Cercocarpus montanus	-	12.13	15.28
Chrysothamnus depressus	-	.08	-
Chrysothamnus viscidiflorus lanceolatus	-	1.23	.63
Eriogonum corymbosum	-	1.13	1.20
Gutierrezia sarothrae	-	.31	.13
Juniperus osteosperma	1.60	.75	.83
Juniperus scopulorum	-	2.13	1.81
Pinus edulis	2.00	3.16	3.86
Ribes sp.	-	-	.28
Symphoricarpos oreophilus	-	.90	1.50
Tetradymia canescens	-	.43	.36

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 55

Species	Average leader growth (in)	
	'05	'10
Cercocarpus montanus	1.9	2.1

POINT-QUARTER TREE DATA--

Management unit 17, Study no: 55

Species	Trees per Acre			
	'95	'00	'05	'10
Juniperus osteosperma	8	62	90	61
Pinus edulis	10	20	41	40

Average diameter (in)			
'95	'00	'05	'10
3.7	5.0	6.0	3.0
1.9	4.7	4.6	3.1

BASIC COVER--

Management unit 17, Study no: 55

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	7.00	6.00	34.53	37.02	33.81	43.77
Rock	3.75	7.75	11.69	6.51	6.90	5.80
Pavement	19.50	21.25	4.91	18.27	16.18	16.28
Litter	41.50	43.50	32.45	36.79	29.86	40.77
Cryptogams	0	0	.39	.01	.15	.06
Bare Ground	28.25	21.50	18.20	16.13	25.62	20.32

SOIL ANALYSIS DATA --

Management unit 17, Study no: 55, Study Name: Lower Horse Ridge

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.3	7.3	27.3	46.2	26.6	4.9	2.8	336.0	1.8

PELLET GROUP DATA--

Management unit 17, Study no: 55

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	6	5	33	4
Elk	2	1	6	8
Deer	26	11	31	10
Cattle	-	-	1	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
3 (7)	11 (26)	25 (61)
23 (58)	34 (83)	14 (35)
-	-	-

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 55

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier utahensis									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	480	42	58	-	-	50	42	0	18/26
05	420	57	43	-	-	19	14	0	20/26
10	220	18	82	-	-	0	0	0	23/25
Artemisia frigida									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	100	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	-/-
Artemisia tridentata vaseyana									
82	531	12	37	50	799	38	63	50	22/25
88	1931	72	14	14	-	14	0	3	14/17
95	1040	46	46	8	20	13	6	2	11/16
00	1120	20	55	25	20	21	5	16	16/22
05	980	8	47	45	20	49	14	31	17/21
10	1040	10	77	13	40	27	0	13	17/22
Cercocarpus montanus									
82	666	0	100	0	-	0	100	30	20/17
88	1132	41	59	0	199	53	47	12	30/23
95	1360	16	84	0	120	28	65	0	30/33
00	1640	17	82	1	20	27	35	0	43/37
05	1600	21	66	13	2400	10	84	5	42/40
10	1640	16	79	5	540	44	24	5	43/38

		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 depressus										
82	0	0	0	0	-	0	0	0	-/-	
88	465	29	57	14	-	29	0	14	4/6	
95	900	9	87	4	20	0	0	4	6/8	
00	440	0	95	5	-	5	5	0	4/7	
05	660	0	88	12	-	24	30	9	3/8	
10	340	12	82	6	20	18	0	0	5/7	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	40	100	0	-	-	0	0	0	24/21	
00	60	33	67	-	-	0	0	0	7/10	
05	140	57	43	-	-	57	0	0	6/11	
10	0	0	0	-	-	0	0	0	-/-	
Chrysothamnus viscidiflorus lanceolatus										
82	2865	9	72	19	-	14	2	16	10/11	
88	5931	7	84	9	-	13	1	7	9/9	
95	2520	4	96	0	-	0	0	0	11/13	
00	2160	6	84	9	20	0	0	0	10/11	
05	2300	10	84	6	-	3	0	3	10/11	
10	1660	4	94	2	-	4	0	4	11/12	
Eriogonum corymbosum										
82	399	0	67	33	-	0	0	33	16/11	
88	932	36	36	29	66	7	0	14	11/11	
95	1140	26	72	2	-	12	0	0	12/16	
00	460	4	74	22	-	22	22	4	14/18	
05	740	5	76	19	160	5	3	11	11/15	
10	820	20	78	2	-	2	0	2	15/19	
Gutierrezia sarothrae										
82	2599	5	95	0	-	0	0	0	8/10	
88	6132	11	84	5	-	0	0	0	6/4	
95	3600	10	90	0	20	0	0	0	9/9	
00	940	23	77	0	-	0	0	0	4/4	
05	3960	12	86	2	60	2	0	0	6/6	
10	980	12	84	4	40	0	0	4	5/5	
Juniperus osteosperma										
82	66	100	0	-	-	0	0	0	-/-	
88	66	100	0	-	66	100	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	100	0	-	-	0	0	0	-/-	
05	80	25	75	-	-	0	0	0	-/-	
10	60	67	33	-	20	0	33	33	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Juniperus scopulorum										
82	66	0	100	-	-	0	0	0	67/45	
88	66	0	100	-	-	100	0	0	122/35	
95	0	0	0	-	-	0	0	0	-/-	
00	40	0	100	-	-	0	0	0	-/-	
05	80	25	75	-	-	0	0	0	-/-	
10	60	33	67	-	-	0	0	0	-/-	
Pinus edulis										
82	66	0	100	-	-	0	0	0	63/44	
88	66	0	100	-	-	0	0	0	79/55	
95	0	0	0	-	-	0	0	0	-/-	
00	80	50	50	-	-	0	0	0	-/-	
05	60	0	100	-	-	0	0	0	-/-	
10	120	67	33	-	-	0	0	0	-/-	
Ribes sp.										
82	0	0	0	-	-	0	0	0	-/-	
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	-	20	0	0	0	24/24	
10	0	0	0	-	-	0	0	0	37/58	
Rosa woodsii										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	180	11	89	0	-	0	0	0	19/29	
05	100	0	60	40	-	0	0	20	19/13	
10	40	0	100	0	-	0	0	0	34/14	
Symphoricarpos oreophilus										
82	199	67	33	0	-	0	33	0	7/9	
88	399	67	33	0	-	67	0	0	11/10	
95	60	0	100	0	-	0	0	0	12/17	
00	320	0	100	0	-	0	0	6	16/16	
05	400	40	55	5	-	0	0	5	14/37	
10	380	21	79	0	40	16	0	0	14/24	
Tetradymia canescens										
82	66	0	0	100	-	0	100	0	-/-	
88	332	80	20	0	-	20	0	0	6/10	
95	200	20	80	0	-	10	0	0	9/11	
00	300	27	47	27	-	0	13	7	10/9	
05	280	14	57	29	-	7	21	14	9/11	
10	340	12	88	0	-	0	0	12	9/12	

SAM'S CANYON - TREND STUDY NO. 17-56-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Ute Tribe

Elevation: 7940 ft. (2421 m)

Aspect: West

Slope: 30%

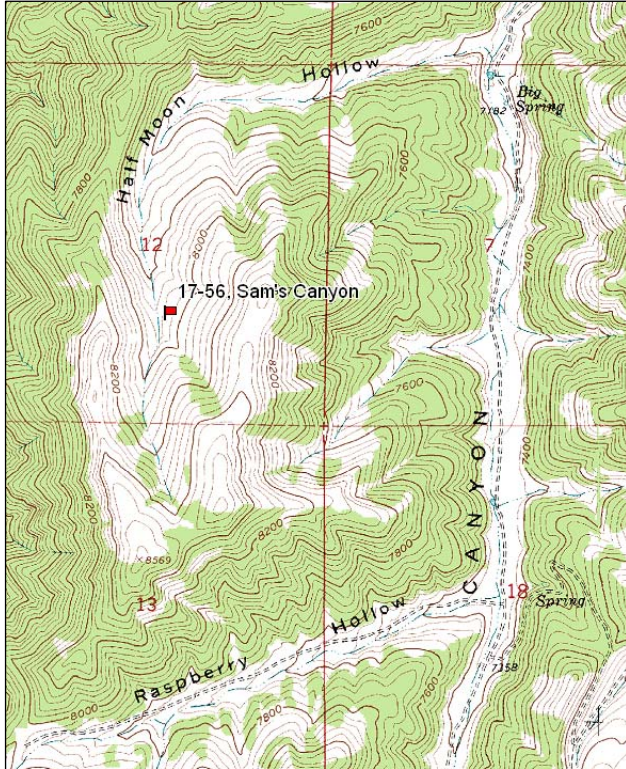
Transect bearing: 0° magnetic

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

Directions:

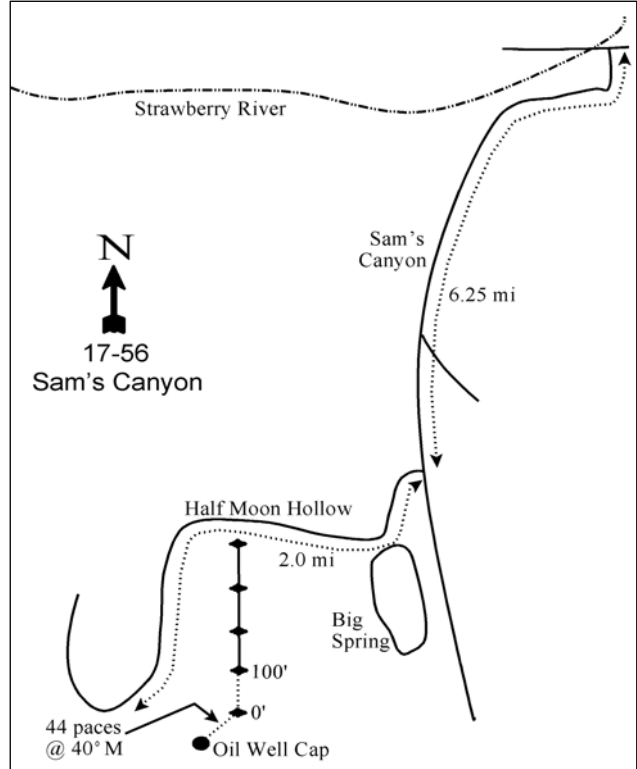
From the intersection of the Strawberry River Road and U.S. 40 near Starvation Reservoir, go west up the Strawberry River for 8.5 miles. Before the bridge, turn left. From the Strawberry River Road, go 6.25 miles up Sam's Canyon. Turn right into Half Moon Hollow (about 0.2 miles before Big Spring). Follow the old, rabbitbrush-covered road (which may be impassable to vehicles due to washouts and tall brush) about 2 miles up the canyon to when the road turns sharply right and goes up a dugway. The old drilling platform there is hardly noticeable, just a brush-covered flat spot in the bottom of the canyon. The well cap is 15" tall. From the capped well, the 0-foot baseline stake (marked with browse tag #7080) is 44 paces at 40°M.

Map Name: Sams Canyon



Township: 5S Range: 8W Section: 12

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 522860 E 4434220 N

SAM'S CANYON - TREND STUDY NO. 17-56

Site Information

Site Description: The study is located at the head of Half Moon Hollow, a tributary of Sam's Canyon, on Ute Reservation lands. This site was not read in 2000 because the access road was washed out. In 1995, deer pellet frequency was higher than in 2005. Elk frequencies were very low in 1995, but appeared to be higher in 2005. Pellet group transect data has estimated moderate use by elk and deer, and light use by cattle since 2005 (Table - Pellet Group Data).

Browse: Several species of browse offer forage for wildlife but true mountain mahogany (*Cercocarpus montanus*) is considered the key browse species on the site. Mahogany is in good condition with respect to age structure and vigor. The average mature shrub measures only 2.5 feet in height and is all available. Utilization has been extremely heavy in the past, with the exception of 1995 and 2010 when the majority of individuals were moderately browsed. Recruitment of young mahogany has been good over the sample years. Secondary browse species include serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*) and a small number of mountain big sagebrush (*A. tridentata* ssp. *vaseyana*). Mature serviceberry average about 3 feet in height with all of the plant considered available to wildlife and have exhibited heavy utilization in most sample years. A moderately dense stand of black sagebrush occupies the site, but there was a large decrease in the density of black sagebrush in 2005. Utilization of both sagebrush species has been moderate to heavy over the course of the study (Table - Browse Characteristics)

Herbaceous Understory: Grasses are fairly diverse and abundant, but almost all of the cover is provided by just one species, bluebunch wheatgrass (*Agropyron spicatum*). Other common grass species include sedge (*Carex* sp.), Salina wildrye (*Elymus salina*) and Indian ricegrass (*Oryzopsis hymenoides*). Forb production is sparse, even though diversity is moderately high. Most species are low-growing forms with low to medium forage value. The most common species include cryptantha (*Cryptantha* sp.) and sulfur eriogonum (*Eriogonum umbellatum*) (Table - Herbaceous Trends).

Soil: Soils are limestone derived with a loam texture and a slightly alkaline soil reaction (pH 7.7) (Table - Soil Analysis Data). Bare ground cover is low with a high amount of rock and pavement providing protective ground cover. Vegetation and litter cover are also high (Table - Basic Cover). The soil erosion condition was classified as slight in 2010 because of litter, rock and soil movement, and flow patterns around perennial plants.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** There was a slight increase in the density of true mountain mahogany due to a substantial increase in the recruitment of young plants. The density of mature mahogany plants actually decreased substantially. Decadence and poor vigor remained low in the mahogany population.
- **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. There was little change in the decadence or vigor of the key browse species, true mountain mahogany. Recruitment of young mahogany plants decreased, but remained good at 13% of the population. There was a large decrease in the decadence of black sagebrush from 41% to 12%.
- **1995 to 2005 - slightly down (-1):** There was little change in the true mountain mahogany population, though cover increased from 10% to 14%. Black sagebrush density decreased by 27% from 4,220 plants/acre to 3,060 plants/acre and cover decreased from 11% to 4%. Decadence of black sagebrush increased to 36% and poor vigor increased from 8% to 30%.
- **2005 to 2010 - stable (0):** The density of black sagebrush increased slightly to 3,340 plants/acre, but cover remained low at 3%. Decadence of black sagebrush decreased to 13% and poor vigor decreased

to 17%. There was little change in the true mountain mahogany population, though cover increased to 17%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though there was a significant decrease in the nested frequency of Sandberg's bluegrass (*Poa secunda*).
- **1995 to 2005 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 16% and cover decreased from 12% to 8%. There was a significant decrease in the nested frequency of sedge.
- **2005 to 2010 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 10%, but cover increased to 15%. Sedge decreased significantly in nested frequency. The increase in cover was due to a large increase in the cover of bluebunch wheatgrass.

Forb:

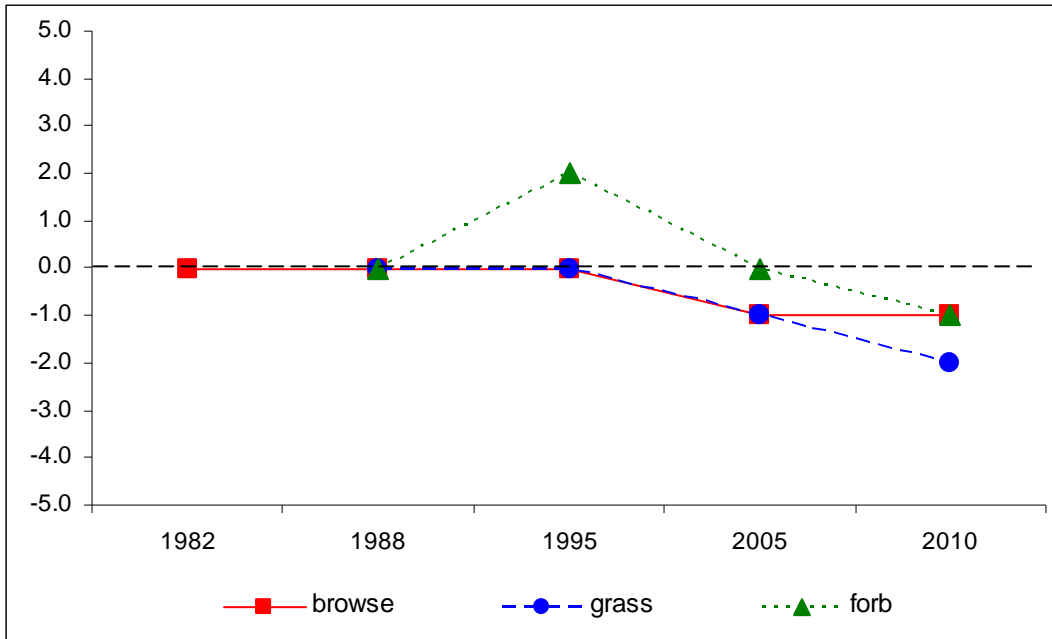
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 57%.
- **1995 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased to 1988 levels and cover decreased from 5% to 2%.
- **2005 to 2010 - slightly down (-1):** There was a 19% decrease in the sum of nested frequency, though cover increased to 4%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
Management unit 17, study no: 56

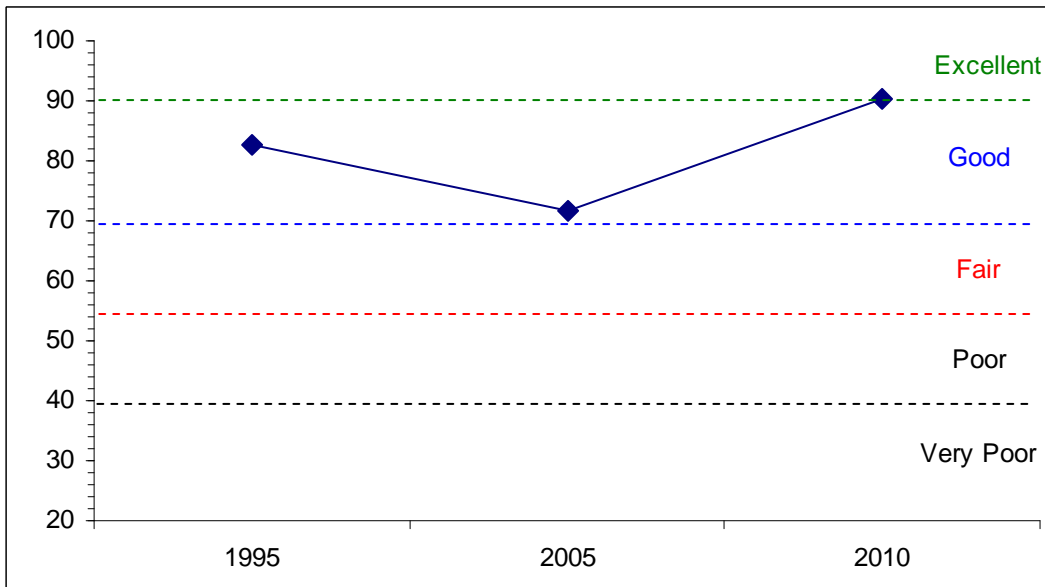
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	30.0	13.1	7.1	23.0	0.0	9.4	0.0	82.6	Good
05	30.0	11.3	10.1	15.7	0.0	4.7	0.0	71.8	Fair-Good
10	30.0	14.4	8.2	30.0	0.0	7.8	0.0	90.4	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 56



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 17, Study no: 56



HERBACEOUS TRENDS--
Management unit 17, Study no: 56

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'05	'10	'95	'05	'10
G	Agropyron spicatum	201	205	197	219	6.77	4.80	12.44
G	Carex sp.	bc64	c104	b63	a17	2.45	.92	.91
G	Elymus salina	b74	ab54	a40	a31	1.54	1.04	.99
G	Festuca ovina	1	-	-	-	-	-	-
G	Koeleria cristata	-	4	7	-	.06	.06	-
G	Oryzopsis hymenoides	ab16	b30	ab29	a11	.57	.92	.37
G	Poa fendleriana	18	11	9	19	.10	.05	.33
G	Poa secunda	b38	a6	a3	a15	.01	.03	.33
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		412	414	348	312	11.52	7.85	15.39
Total for Grasses		412	414	348	312	11.52	7.85	15.39
F	Androsace septentrionalis (a)	-	5	7	-	.01	.01	-
F	Antennaria rosea	2	-	5	-	-	.01	-
F	Arabis perennans	ab5	c23	b11	a-	.07	.02	-
F	Arenaria sp.	a-	b13	b16	a2	.06	.04	.03
F	Aster chilensis	-	-	8	5	-	.06	.09
F	Astragalus argophyllus	ab6	b15	a2	a3	.09	.00	.00
F	Astragalus convallarius	a2	ab5	b10	ab4	.01	.06	.06
F	Astragalus tenellus	5	4	3	-	.01	.00	-
F	Balsamorhiza sagittata	1	-	-	-	-	-	-
F	Calochortus nuttallii	-	9	-	-	.04	.00	-
F	Castilleja flava	a7	b54	a2	a8	.71	.03	.04
F	Caulanthus crassicaulis	-	2	-	-	.00	-	-
F	Chaenactis douglasii	-	3	-	-	.00	-	-
F	Chenopodium leptophyllum(a)	-	2	6	2	.00	.01	.00
F	Crepis acuminata	a-	b18	b12	b10	.14	.06	.18
F	Cryptantha sp.	a19	b66	ab37	b45	.94	.51	1.10
F	Cymopterus sp.	-	-	3	-	-	.00	-
F	Descurainia pinnata (a)	-	4	5	1	.01	.04	.00
F	Erigeron flagellaris	-	2	2	-	.03	.03	-
F	Eriogonum alatum	13	23	15	21	.30	.15	.34
F	Eriogonum umbellatum	56	68	54	55	1.33	.55	1.59
F	Hymenoxys acaulis	ab2	b10	a-	ab4	.24	-	.03
F	Lappula occidentalis (a)	-	3	3	-	.00	.00	-
F	Lesquerella sp.	3	-	7	-	-	.04	-
F	Lithospermum multiflorum	7	9	9	2	.18	.27	.00
F	Machaeranthera grindelioides	c24	bc14	ab4	a1	.34	.06	.03
F	Orobanche sp.	-	2	-	-	.00	-	-
F	Penstemon humilis	b92	a33	a29	a15	.10	.32	.12
F	Penstemon sp.	-	-	-	4	-	-	.06
F	Petradoria pumila	-	5	-	-	.01	-	-
F	Phlox austromontana	-	-	2	6	-	.03	.18
F	Schoenocrambe linifolia	-	4	3	-	.01	.03	-

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'05	'10	'95	'05	'10
F	Senecio multilobatus	-	2	-	4	.03	-	.01
F	Unknown forb-perennial	1	-	-	-	-	-	-
Total for Annual Forbs		0	14	21	3	0.02	0.07	0.00
Total for Perennial Forbs		245	384	234	189	4.71	2.33	3.89
Total for Forbs		245	398	255	192	4.74	2.41	3.90

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

BROWSE TRENDS--

Management unit 17, Study no: 56

Type	Species	Strip Frequency			Average Cover %		
		'95	'05	'10	'95	'05	'10
B	Amelanchier utahensis	31	27	28	5.11	5.82	6.08
B	Artemisia nova	76	47	52	10.60	3.90	2.69
B	Artemisia tridentata vaseyana	7	12	7	1.09	.04	.15
B	Cercocarpus montanus	76	80	78	9.68	14.12	17.37
B	Chrysothamnus depressus	44	31	22	.98	1.32	.66
B	Chrysothamnus viscidiflorus viscidiflorus	47	50	49	2.04	1.87	1.23
B	Eriogonum corymbosum	20	11	7	.31	.41	.38
B	Gutierrezia sarothrae	24	11	18	.24	.06	.24
B	Pinus edulis	0	1	2	.18	.15	1.00
B	Pseudotsuga menziesii	0	1	1	-	-	.15
B	Symphoricarpos oreophilus	54	55	60	3.04	6.15	7.14
B	Tetradymia canescens	12	2	2	.03	.03	.38
Total for Browse		391	328	326	33.34	33.90	37.52

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 56

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	7.19	9.30
Artemisia nova	3.23	5.96
Artemisia tridentata vaseyana	1.79	.01
Cercocarpus montanus	17.43	21.68
Chrysothamnus depressus	1.01	.38
Chrysothamnus viscidiflorus viscidiflorus	1.61	1.91
Eriogonum corymbosum	.28	-
Gutierrezia sarothrae	-	.36
Pinus edulis	.28	1.01
Pseudotsuga menziesii	.30	.26
Symphoricarpos oreophilus	5.03	6.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 56

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	5.0	4.1
Cercocarpus montanus	5.4	3.4

BASIC COVER--

Management unit 17, Study no: 56

Cover Type	Average Cover %				
	'82	'88	'95	'05	'10
Vegetation	6.25	6.50	45.45	37.96	48.37
Rock	1.25	1.00	10.33	3.13	1.21
Pavement	43.00	46.00	10.54	24.85	17.95
Litter	43.00	40.25	39.87	41.11	45.59
Cryptogams	0	0	.03	.10	.63
Bare Ground	6.50	6.25	9.88	7.67	11.63

SOIL ANALYSIS DATA --

Management unit 17, Study no: 56, Study Name: Sam's Canyon

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.1	7.7	38.1	35.4	26.6	4.5	6.9	163.2	0.7

PELLET GROUP DATA--

Management unit 17, Study no: 56

Type	Quadrat Frequency		Days use per acre (ha)	
	'05	'10	'05	'10
Rabbit	5	-	-	-
Elk	24	7	48 (119)	24 (60)
Deer	12	20	27 (68)	32 (78)
Cattle	3	1	7 (16)	1 (2)

BROWSE CHARACTERISTICS--
Management unit 17, Study no: 56

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier utahensis									
82	799	8	92	0	533	17	83	8	34/29
88	932	71	29	0	-	36	43	0	40/35
95	820	22	76	2	-	22	0	0	38/50
05	760	34	58	8	-	29	37	3	37/46
10	760	3	97	0	-	47	11	0	35/45
Artemisia nova									
82	3198	25	54	21	199	23	65	21	9/15
88	5798	18	40	41	133	48	1	1	10/15
95	4220	10	77	12	80	67	2	8	12/21
05	3060	15	49	36	680	20	4	30	11/15
10	3340	31	56	13	160	22	5	17	10/14
Artemisia tridentata vaseyana									
82	598	33	44	22	-	78	22	11	19/19
88	598	56	33	11	-	11	11	0	11/17
95	180	33	33	33	-	33	0	11	17/27
05	320	25	13	63	60	31	31	44	18/21
10	260	62	38	0	-	15	15	0	22/21
Cercocarpus montanus									
82	3464	40	58	2	466	19	69	2	23/23
88	4065	82	16	2	66	21	62	0	33/29
95	2920	13	87	0	20	55	16	0	27/31
05	3120	17	75	8	20	9	84	3	31/35
10	3040	18	81	1	200	40	29	0	31/35
Chrysothamnus depressus									
82	599	11	89	0	-	67	22	0	6/8
88	532	75	25	0	-	0	0	0	3/6
95	3080	8	90	1	-	0	0	1	6/9
05	2940	1	92	7	20	70	5	1	5/7
10	1280	27	72	2	20	0	0	2	5/10
Chrysothamnus viscidiflorus viscidiflorus									
82	3598	2	96	2	-	0	4	4	11/9
88	3664	35	60	5	-	0	0	18	12/12
95	2520	5	94	1	-	0	0	0	34/54
05	2520	13	87	1	160	0	0	0	10/11
10	2060	13	87	0	-	0	0	0	12/13

		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>Eriogonum corymbosum</i>										
82	265	0	75	25	-	50	0	25	12/12	
88	265	75	25	0	-	25	0	25	10/8	
95	540	4	96	0	-	0	4	0	10/13	
05	220	0	45	55	-	0	9	9	13/17	
10	140	14	86	0	-	0	0	0	11/13	
<i>Gutierrezia sarothrae</i>										
82	333	0	100	0	-	0	0	0	9/8	
88	599	0	100	0	-	0	0	0	6/3	
95	840	10	90	0	-	0	0	0	8/8	
05	300	13	87	0	20	0	0	0	6/6	
10	900	13	84	2	-	0	0	2	8/8	
<i>Leptodactylon pungens</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	5/6	
10	0	0	0	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	40	50	50	-	-	0	0	0	-/-	
<i>Pseudotsuga menziesii</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
05	20	0	0	100	-	0	100	100	-/-	
10	20	100	0	0	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
82	3265	39	59	2	-	6	0	0	11/17	
88	4332	82	15	3	399	11	2	14	12/16	
95	2500	25	75	0	40	2	0	0	11/16	
05	2420	12	82	6	40	5	0	.82	13/23	
10	2840	15	85	0	40	0	0	0	12/21	
<i>Tetradymia canescens</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	460	4	96	0	-	4	0	0	9/10	
05	40	0	50	50	-	100	0	0	8/11	
10	80	0	100	0	-	0	0	0	9/13	

SKITZY CANYON - TREND STUDY NO. 17-57-10

Vegetation Type: Chained, Seeded Pinyon-Juniper
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Not Available

Land Ownership: UDWR
Elevation: 7338 ft. (2237 m)

Aspect: North
Slope: 6%

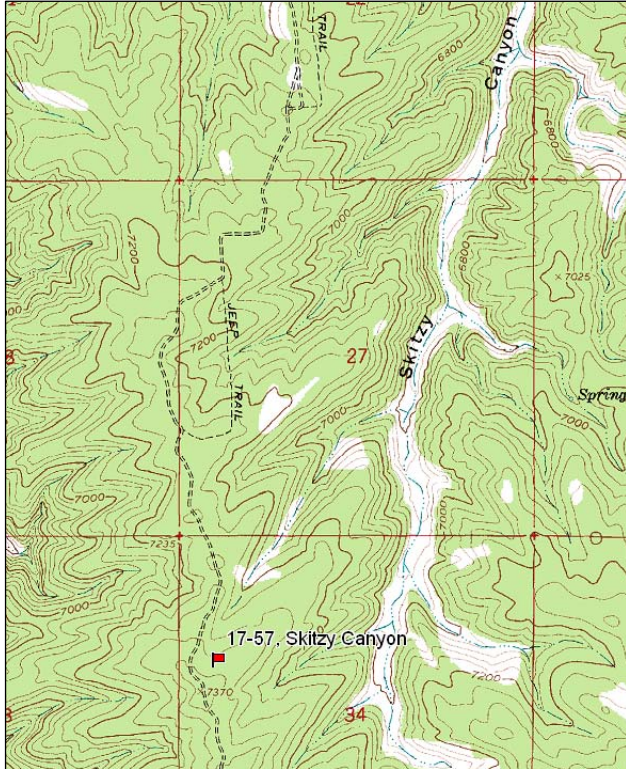
Transect bearing: 188° magnetic

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

Directions:

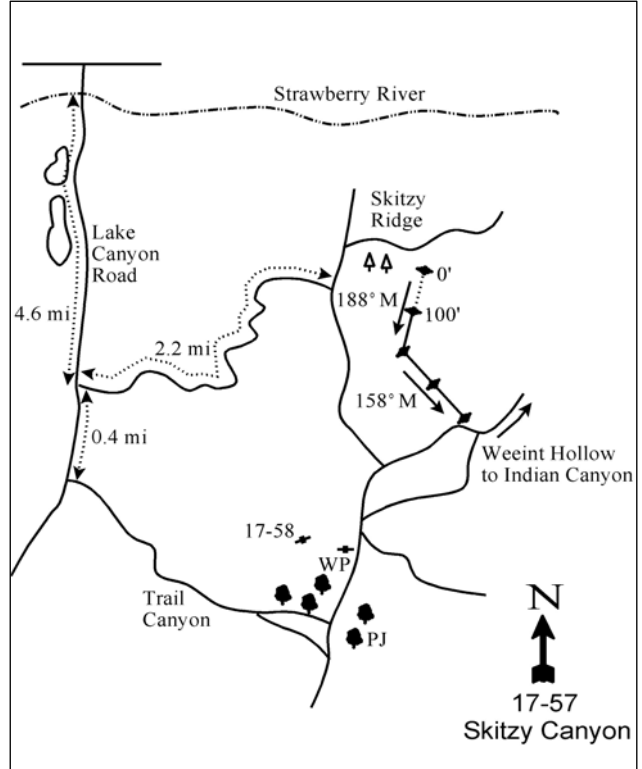
From the Strawberry River, take the Lake Canyon Road (3239 West) south for 4.6 miles to a road which goes up the canyon to the east. Turn left and drive approximately 2.2 miles up to a “T” intersection at the top of the ridge. [Skitzy Ridge can also be reached via Trail Canyon the next (south) side canyon of Lake Canyon, or from Indian Canyon along the Weeint Hollow road.] At the top, look east into the chaining for two large conifers (Douglas firs). The 0-foot baseline stake is located to the east of the two trees.

Map Name: Buck Knoll



Township: 4S Range: 6W Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 537786 E 4438017 N

SKITZY CANYON - TREND STUDY NO. 17-57

Site Information

Site Description: This study is located on a pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining in Skitzzy Canyon. The area is managed by the Utah Division of Wildlife Resources (UDWR) as part of the Skitzzy Canyon Wildlife Management Area (WMA). Prior to the chaining and seeding in 1977-78, the site was dominated by juniper and pinyon. There is a large amount of energy development in the area surrounding the WMA, with many new roads and heavy traffic. Limited spring cattle grazing has occurred in the area since 2009. Pellet group transect data estimated very heavy use by elk in 2000 and 2005, but more moderate use in 2010. Estimated use by deer was light in 2000 and 2010, but was heavy in 2005. Estimated cattle use has been light since 2000 (Table - Pellet Group Data).

Browse: Browse is a minor component of this chaining. No shrubs were encountered during the 1982 reading. Since 1988, black sagebrush (*Artemisia nova*) has been the dominant shrub species. Utilization of black sagebrush has been mostly moderate with heavy use in 2005 (Table - Browse Characteristics). Other preferred browse species occur, but did not fall within the shrub density strips. These include true mountain mahogany (*Cercocarpus montanus*) and antelope bitterbrush (*Purshia tridentata*). Some pinyon and juniper trees were released after the chaining and have been slowly increasing in size and density, though neither species is overly abundant on the site (Table - Point-Quarter Tree Data).

Herbaceous Understory: Grasses are diverse and abundant on the site, though crested wheatgrass (*Agropyron cristatum*) provides the majority of the grass cover on the site. Other common grass species include intermediate wheatgrass (*A. intermedium*), smooth brome (*Bromus inermis*) and Russian wildrye (*Elymus junceus*). Bottlebrush squirreltail (*Sitanion hystrix*) and Letterman's needlegrass (*Stipa lettermani*) were prevalent in 1988, but decreased significantly in 1995 and are now rare on the site. Forbs comprise only a small part of the vegetation. Prior to 2010, the only common forb was looseflower milkvetch (*Astragalus tenellus*), but it decreased substantially in cover and was rare in 2010. Seeded alfalfa (*Medicago sativa*) was sampled in 1995 and 2000, but not after 2005, which indicates that it persisted on the treatment for over 20 years (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam with a slightly alkaline soil reaction (pH of 7.8). Percent organic matter is very high at 8.4% (Table - Soil Analysis Data). Bare ground cover is low with a large amount of litter cover remaining from the chaining. However, bare ground cover has steadily increased since 2000 (Table - Basic Cover). Erosion and soil loss prior to treatment was heavy, which resulted in patchy areas of pavement and bare ground. Much of this has since filled in with herbaceous vegetation and the rate of erosion is being controlled. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** The chaining had removed nearly all of the browse from the site in 1982. Several browse species including black sagebrush, were sampled for the first time in 1988.
- **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. There was little change in the decadence or vigor of black sagebrush. Recruitment of young black sagebrush plants improved to over half of the population.
- **1995 to 2000 - slightly up (+1):** The density of black sagebrush increased 52% from 540 plants/acre to 820 plants/acre, but density is still considered low. Cover of black sagebrush increased from less than 1% to just over 1%. Decadence of black sagebrush increased from 0% to 29% and recruitment of young plants decreased from 52% to 12%, though recruitment is still considered good.

- **2000 to 2005 - slightly down (-1):** Black sagebrush density decreased by 20% to 660 plants/acre, but cover remained similar. Most of the decrease was in the recruitment of young black sagebrush plants, which decreased to 9%.
- **2005 to 2010 - stable (0):** There was little change in the density or cover of black sagebrush, though there was no new recruitment of young plants.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was no change in the sum of nested frequency of perennial grasses. However, composition changed with a significant increase in the nested frequency of crested wheatgrass and a significant decrease in the nested frequency of bottlebrush squirreltail and Letterman's needlegrass.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial grasses decreased by 8%, but cover increased from 18% to 21%.
- **2000 to 2005 - down (-2):** The perennial grass sum of nested frequency decreased by 24%, though cover remained similar.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover decreased slightly to 18%.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** Perennial forbs are rare and cover is provided almost exclusively by looseflower milkvetch.
- **1995 to 2000 - slightly down (-1):** There was a slight decrease in the sum of nested frequency of perennial forbs and cover decreased from 5% to 3%.
- **2000 to 2005 - stable (0):** The sum of nested frequency of perennial forbs continued to decrease and perennial forbs are very rare on the site, but cover remained similar.
- **2005 to 2010 - slightly down (-1):** The perennial forb sum of nested frequency decreased and cover decreased to less than 1%. Forbs were very rare on the site.

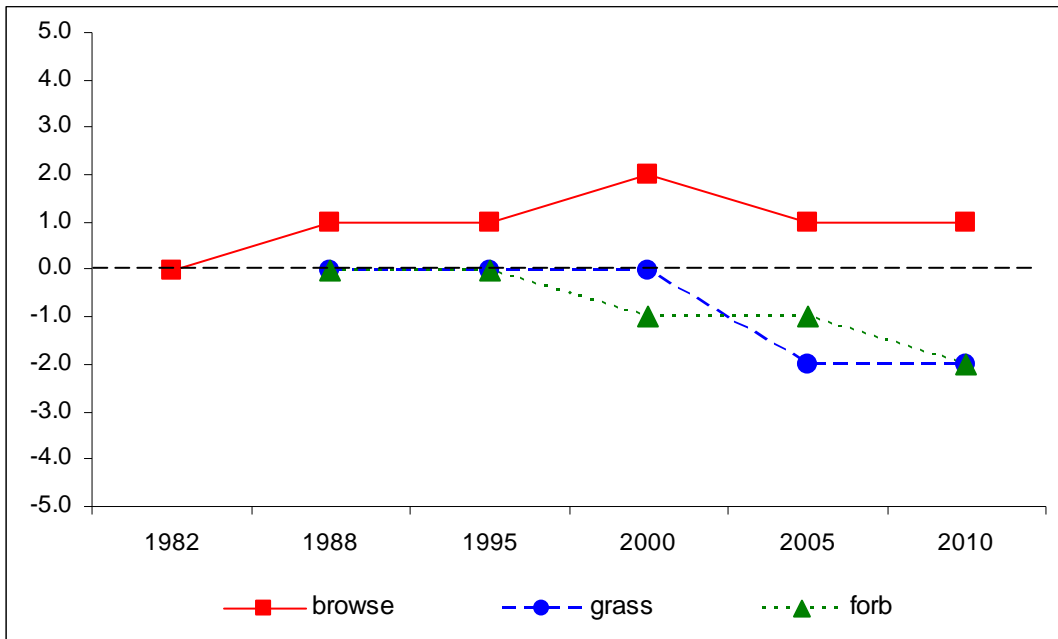
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17, study no: 57

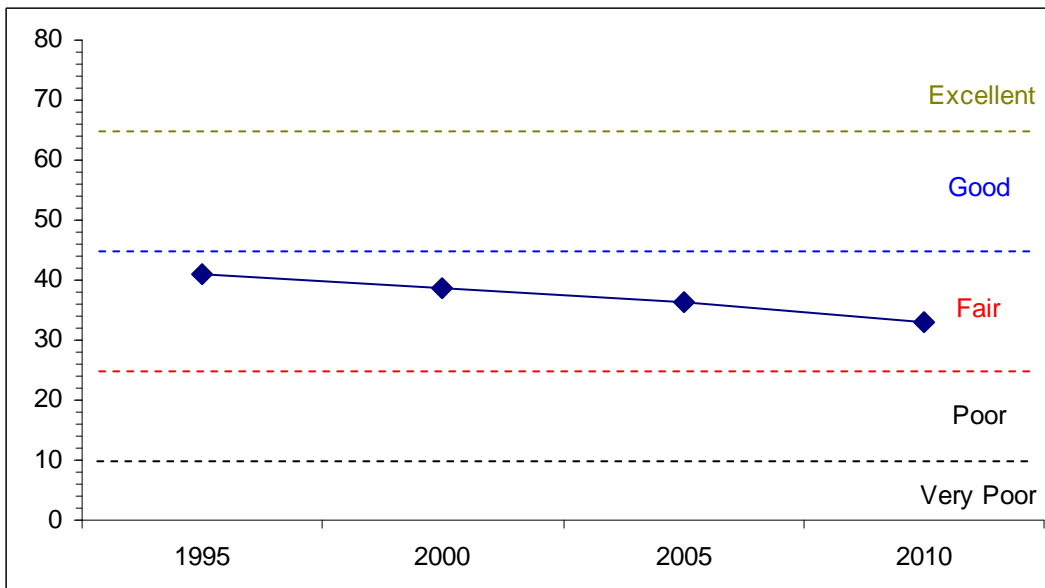
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	1.1	0.0	0.0	30.0	0.0	10.0	0.0	41.1	Fair
00	2.5	0.0	0.0	30.0	0.0	6.1	0.0	38.7	Fair
05	1.3	0.0	0.0	30.0	0.0	5.2	0.0	36.4	Fair
10	1.1	0.0	0.0	30.0	0.0	1.9	0.0	33.0	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 17, Study no: 57



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 17, Study no: 57



HERBACEOUS TRENDS--

Management unit 17, Study no: 57

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	_a 159	_b 259	_b 261	_b 257	_b 240	11.42	13.32	15.62	12.67
G	Agropyron intermedium	_{abc} 48	_{bc} 56	_c 61	_{ab} 28	_a 26	.61	1.12	2.25	.92

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron trachycaulum	7	16	4	11	5	.64	.00	.49	.06
G	Bouteloua gracilis	1	-	-	4	-	-	-	.01	-
G	Bromus inermis	b60	b74	b72	a11	a16	1.89	2.04	.23	.39
G	Bromus tectorum (a)	-	-	-	2	-	-	-	.00	-
G	Carex sp.	c40	b20	b8	ab2	a-	.13	.06	.03	-
G	Dactylis glomerata	-	1	-	-	-	.00	-	-	-
G	Elymus cinereus	4	17	9	8	9	.62	.74	.39	.09
G	Elymus junceus	23	19	38	25	43	1.10	1.44	1.47	3.24
G	Elymus salina	-	-	6	-	-	-	1.23	-	-
G	Festuca ovina	a-	a1	b20	ab8	a3	.03	.21	.10	.00
G	Oryzopsis hymenoides	-	4	-	4	-	.18	-	.02	-
G	Poa fendleriana	a-	ab3	ab2	b9	ab2	.03	.03	.13	.00
G	Poa secunda	a-	b36	a4	ab17	b40	.25	.04	.10	.25
G	Sitanion hystrix	c101	b12	a-	ab4	a1	.04	-	.06	.03
G	Stipa lettermani	d122	c47	bc34	ab8	a4	.58	.45	.07	.18
Total for Annual Grasses		0	0	0	2	0	0	0	0.00	0
Total for Perennial Grasses		565	565	519	396	389	17.56	20.72	21.01	17.85
Total for Grasses		565	565	519	398	389	17.56	20.72	21.01	17.85
F	Androsace septentrionalis (a)	-	b40	a2	a-	a-	.12	.00	-	-
F	Arabis sp.	a3	ab12	b19	a-	a-	.03	.04	-	-
F	Astragalus convallarius	b12	ab4	a-	ab3	ab4	.04	-	.01	.03
F	Astragalus miser	a-	b15	b17	b18	ab8	.57	.48	.80	.22
F	Astragalus tenellus	b45	a17	a16	a7	a3	3.78	2.28	1.16	.15
F	Chaenactis douglasii	-	5	3	2	-	.01	.00	.01	-
F	Descurainia pinnata (a)	-	ab8	a-	b8	a-	.02	-	.02	-
F	Erigeron eatonii	3	2	-	-	-	.00	-	-	-
F	Eriogonum alatum	b15	ab12	a3	a3	a3	.14	.03	.03	.03
F	Eriogonum umbellatum	-	-	4	2	3	-	.00	.00	.00
F	Gayophytum ramosissimum(a)	-	3	-	-	-	.01	-	-	-
F	Grindelia squarrosa	-	3	-	-	1	.00	-	-	.00
F	Hedysarum boreale	a-	ab1	a-	ab3	b9	.15	-	.53	.51
F	Ipomopsis aggregata	1	6	-	-	-	.01	-	-	-
F	Lappula occidentalis (a)	-	-	-	5	3	-	-	.01	.00
F	Linum lewisii	-	3	-	-	-	.00	-	-	-
F	Medicago sativa	-	7	3	-	-	.56	.21	-	-
F	Penstemon caespitosus	1	-	-	-	-	-	-	-	-
F	Penstemon pachyphyllus	-	5	-	3	-	.01	-	.03	-
F	Sisymbrium altissimum (a)	-	a3	a-	b13	a1	.00	-	.35	.00
Total for Annual Forbs		0	54	2	26	4	0.15	0.00	0.39	0.00
Total for Perennial Forbs		80	92	65	41	31	5.34	3.07	2.58	0.95
Total for Forbs		80	146	67	67	35	5.50	3.07	2.97	0.96

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

BROWSE TRENDS--

Management unit 17, Study no: 57

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	0	0	1	1	-	-	-	-
B	Artemisia nova	12	15	14	14	.64	1.18	1.03	.86
B	Artemisia tridentata vaseyana	5	4	1	1	.21	.84	.00	-
B	Chrysothamnus nauseosus	1	0	1	1	-	-	.00	-
B	Chrysothamnus viscidiflorus lanceolatus	0	1	0	0	-	-	-	-
B	Juniperus osteosperma	0	2	2	2	.03	.78	1.23	1.16
B	Pinus edulis	0	3	3	2	.03	.81	.66	1.00
Total for Browse		18	25	22	21	0.91	3.61	2.94	3.02

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 57

Species	Percent Cover		
	'00	'05	'10
Artemisia nova	-	1.33	1.45
Artemisia tridentata vaseyana	-	.08	.03
Juniperus osteosperma	-	.85	.96
Pinus edulis	.60	1.16	1.39

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 57

Species	Average leader growth (in)	
	'05	'10
Artemisia nova	1.7	.7
Artemisia tridentata vaseyana	3.0	1.2
Cercocarpus montanus	2.1	2.7
Cowania mexicana	2.0	2.3

POINT-QUARTER TREE DATA--

Management unit 17, Study no: 57

Species	Trees per Acre			
	'95	'00	'05	'10
Juniperus osteosperma	9	23	32	34
Pinus edulis	11	21	35	42

Average diameter (in)			
'95	'00	'05	'10
4.4	2.6	4.2	2.4
2.9	2.8	3.6	2.3

BASIC COVER--

Management unit 17, Study no: 57

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	7.50	4.75	26.94	29.00	26.73	21.53
Rock	3.25	4.50	12.60	5.57	6.23	5.36
Pavement	18.25	10.50	6.38	13.64	9.48	14.28
Litter	63.50	68.00	54.15	54.83	46.57	44.01
Cryptogams	.75	0	.05	.78	.01	.03
Bare Ground	6.75	12.25	6.84	7.07	18.72	25.20

SOIL ANALYSIS DATA --

Management unit 17, Study no: 57, Study Name: Skitzy Canyon

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.5	7.8	61.3	20.2	18.6	8.4	62.0	252.8	1.6

PELLET GROUP DATA--

Management unit 17, Study no: 57

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	7	6	27	13	-	-	-
Horse	3	1	-	-	-	-	-
Elk	42	57	68	58	90 (223)	195 (481)	32 (79)
Deer/Antelope	6	6	14	19	7 (17)	80 (198)	11 (26)
Cattle	1	2	-	5	9 (23)	2 (5)	4 (9)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 57

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 utahensis									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	20	100	0	-	-	0	100	0	12/12
10	20	0	100	-	-	0	100	0	40/44
Artemisia nova									
82	0	0	0	0	-	0	0	0	-/-
88	133	0	100	0	-	0	0	0	8/11
95	540	52	48	0	300	48	0	0	17/32
00	820	12	59	29	40	12	0	0	14/27
05	660	9	64	27	440	33	42	3	16/29
10	580	0	86	14	-	62	0	14	12/23

		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>Artemisia tridentata vaseyana</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	66	0	100	0	-	0	0	0	15/10	
95	100	40	60	0	-	20	0	0	27/42	
00	80	25	50	25	-	25	25	0	23/38	
05	20	0	100	0	-	0	100	0	29/52	
10	20	0	0	100	-	100	0	100	25/30	
<i>Atriplex canescens</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	31/46	
10	0	0	0	-	20	0	0	0	17/21	
<i>Ceratoides lanata</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	16/35	
10	0	0	0	-	-	0	0	0	-/-	
<i>Cercocarpus montanus</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	22/39	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	37/29	
10	0	0	0	-	-	0	0	0	35/35	
<i>Chrysothamnus nauseosus</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	20	0	100	0	-	0	0	0	31/33	
00	0	0	0	0	-	0	0	0	34/45	
05	20	0	0	100	40	0	0	0	32/44	
10	20	0	100	0	-	0	0	0	35/41	
<i>Chrysothamnus viscidiflorus lanceolatus</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	28/41	
00	20	0	0	100	-	0	0	0	36/58	
05	0	0	0	0	-	0	0	0	15/35	
10	0	0	0	0	-	0	0	0	22/30	

		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>Cowania mexicana stansburiana</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	23/37	
10	0	0	0	-	-	0	0	0	31/31	
<i>Ephedra viridis</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	25/20	
<i>Juniperus osteosperma</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	40	0	0	0	-/-	
00	40	100	0	-	-	0	0	0	-/-	
05	40	50	50	-	-	0	0	0	-/-	
10	60	33	67	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	5/15	
10	0	0	0	-	-	0	0	0	3/13	
<i>Pinus edulis</i>										
82	66	0	100	-	-	0	0	0	41/24	
88	66	100	0	-	66	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	67	33	-	-	0	0	0	-/-	
05	60	67	33	-	-	0	0	0	-/-	
10	40	50	50	-	-	0	0	0	-/-	
<i>Purshia tridentata</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	17/30	
00	0	0	0	-	-	0	0	0	39/36	
05	0	0	0	-	-	0	0	0	43/38	
10	0	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Sambucus sp.										
82	0	0	0	-	-	0	0	0	-/-	
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	35/45	
10	0	0	0	-	-	0	0	0	50/69	

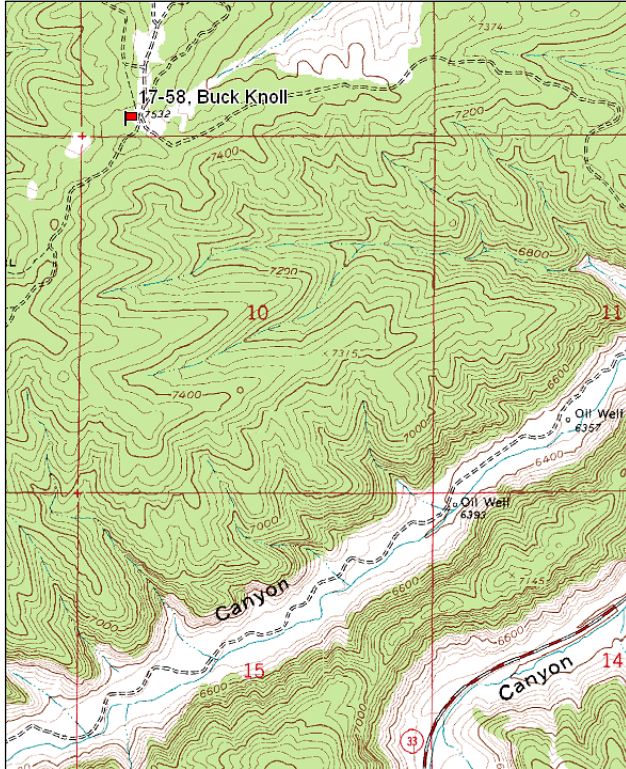
BUCK KNOLL - TREND STUDY NO. 17-58-10

Vegetation Type: Chained, Seeded Pinyon-Juniper
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: UDWR
Elevation: 7571 ft. (2308 m)
Aspect: North
Slope: 3%-5%
Transect bearing: 345° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

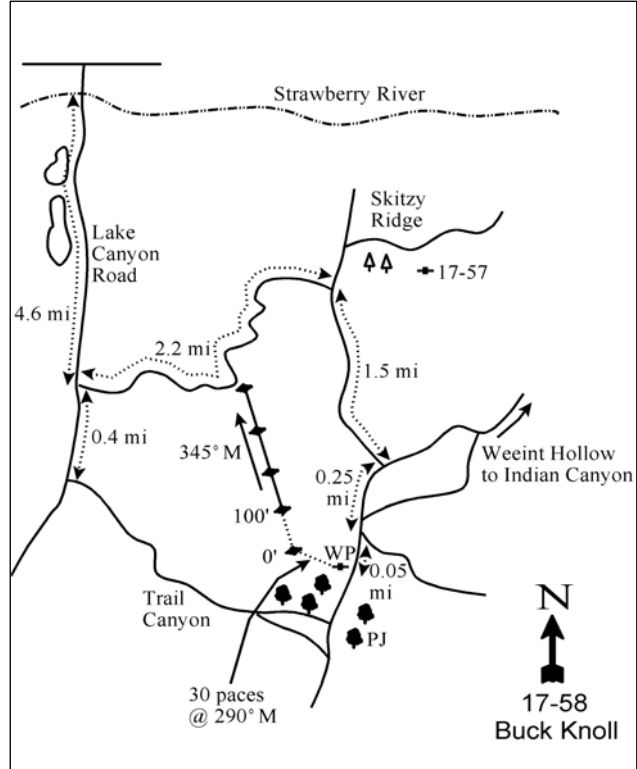
Directions:

From the Strawberry River, take the Lake Canyon Road (3239 West) south for 4.6 miles to a road which goes up the side canyon to the east. Turn left and go up the side canyon and switchbacks for 2.2 miles to an intersection at the top of the ridge. Turn right and drive south 1.5 miles to an intersection. Turn right and go 0.25 miles to a fork. Bear right and proceed up the hill 0.05 miles to the witness post, a short green fencepost on the right side of the road. From the witness post, the 0-foot baseline stake is 30 paces west (290°M) down the hill.

Map Name: Buck Knoll



Diagrammatic Sketch:



Township: 5S Range: 6W Section: 3

GPS: NAD 83, UTM 12T 538132 E 4435473 N

BUCK KNOLL - TREND STUDY NO. 17-58

Site Information

Site Description: The study is located in the Skitzzy Wildlife Management Area (WMA) on a Utah Division of Wildlife Resources (UDWR) chaining and seeding. The study is within 100 yards of an untreated pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands edge. There is a large amount of energy development in the area surrounding the WMA, with many new roads and heavy traffic. Limited spring cattle grazing has occurred in the area since 2009. Pellet group transect data has estimated light use by deer since 2000. Estimated use by elk has fluctuated from moderate use in 2000, heavy use in 2005 and light use in 2010. Estimated cattle use has been light since 2000 (Table - Pellet Group Data).

Browse: The browse is more abundant on this study area than at Skitzzy Canyon (17-57) study, but it is still well below optimum for a deer winter range. The key species consists of a small stand of true mountain mahogany (*Cercocarpus montanus*). Mahogany cover has gradually, but steadily increased since 1995 (Table - Browse Trends). The mahogany plants are about 4 to 6.5 feet in height and have exhibited light to heavy utilization, depending on the year. Decadence is low and vigor is good within the mahogany population. Recruitment of young mahogany plants has been mostly good over the course of the study, but there were no young plants sampled in 2010. Secondary browse species provide additional forage and include: black sagebrush (*Artemisia nova*), mountain big sagebrush (*A. tridentata* ssp. *vaseyana*), rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *graveolens* and *C. nauseosus* ssp. *hololeucus*), antelope bitterbrush (*Purshia tridentata*) and elderberry (*Sambucus cerulea*) (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory is dominated by an abundant and diverse variety of grasses. Crested wheatgrass (*Agropyron cristatum*) and Salina wildrye (*Elymus salina*) are the most abundant grass species, but other perennial species are prevalent including intermediate wheatgrass (*Agropyron intermedium*), Russian wildrye (*Elymus junceus*) and Indian ricegrass (*Oryzopsis hymenoides*). Forbs are diverse, but provide little cover. The more common species are native species like hoary aster (*Machaeranthera grindelioides*), mat penstemon (*Penstemon caespitosus*) and wing eriogonum (*Eriogonum alatum*) (Table - Herbaceous Trends).

Soil: The soil texture is a clay loam with a slightly alkaline soil reaction (pH 7.4). Phosphorus may have limited availability for plant growth and development at 5.1 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is low, but has increased since 1995 with a corresponding decrease in litter cover. Rock and pavement are common on the surface and provide additional protective ground cover (Table - Basic Cover). There is some localized soil movement, but erosion is not severe and the soil erosion condition is vastly better than in the nearby untreated juniper-pinyon woodlands. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** There was a 29% increase in the density of true mountain mahogany, but density remained low. Young mahogany plants comprise 78% of the population.
- **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. There was little change in vigor or decadence of true mountain mahogany. Recruitment of young mahogany plants decreased markedly, but was still good at 14% of the population.
- **1995 to 2000 - stable (0):** There was a 7% increase in the density of true mountain mahogany from 580 plants/acre to 620 plants/acre and cover increased from 3% to 5%. The slight increase in density was primarily due to an increase in the recruitment of young mahogany plants to 23%.

- **2000 to 2005 - up (+2):** Although densities remained low, the densities of the preferred browse species black sagebrush, mountain big sagebrush and true mountain mahogany all increased. Mahogany increased in density by 23% to 800 plants/acre.
- **2005 to 2010 - slightly down (-1):** The density of true mountain mahogany decreased by 20% to 640 plants/acre, though cover increased to 6%. The decrease in density was due to a decrease in the recruitment of young mahogany plants, with no young plants being sampled in 2010.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 24%, but cover increased slightly from 17% to 18%.
- **2000 to 2005 - stable (0):** The perennial grass sum of nested frequency remained similar, though cover increased to 20%.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover decreased to 16%.

Forb:

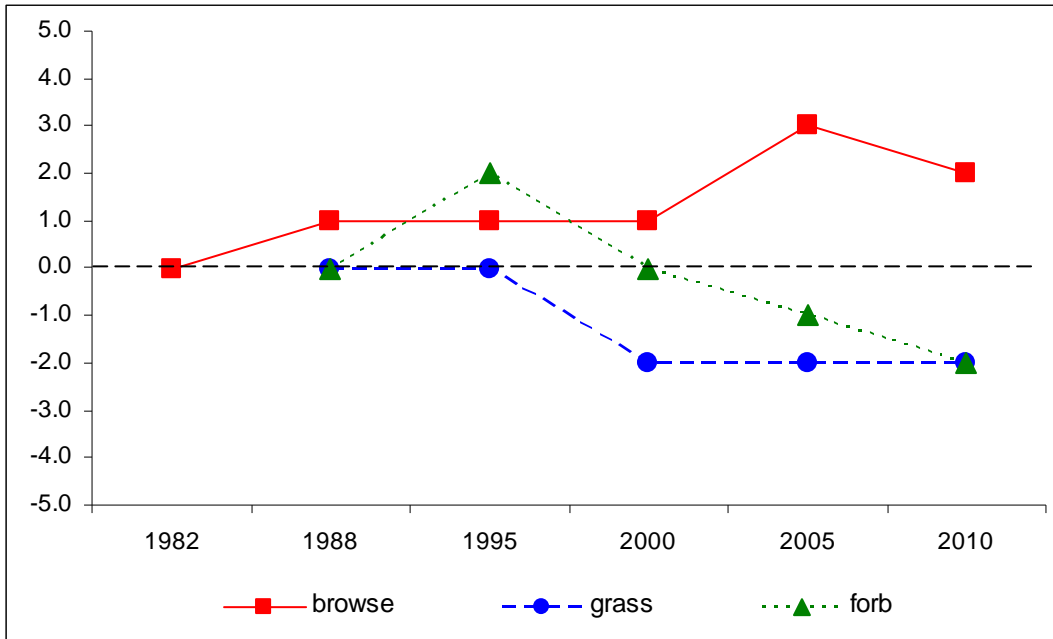
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 23%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 54% and cover decreased from 2% to less than 1%. Forbs were rare on the site.
- **2000 to 2005 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 29% and forbs remained rare on the site.
- **2005 to 2010 - slightly down (-1):** There was a 27% decrease in the sum of nested frequency of perennial forbs and forbs were very rare on the site.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 17, study no: 58

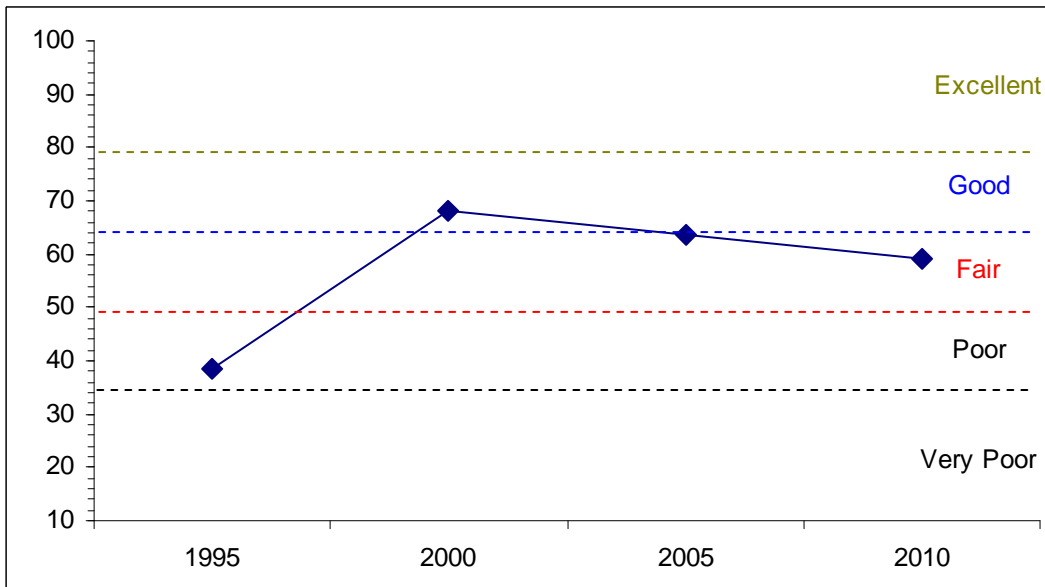
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	4.9	0.0	0.0	30.0	0.0	3.6	0.0	38.5	Poor
00	7.9	15.0	13.8	30.0	0.0	1.6	0.0	68.3	Good
05	8.4	15.0	8.3	30.0	0.0	2.0	0.0	63.6	Fair-Good
10	10.1	15.0	2.8	30.0	0.0	1.5	0.0	59.3	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 58



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 17, Study no: 58



HERBACEOUS TRENDS--
Management unit 17, Study no: 58

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	d217	c111	ab94	a71	ab96	5.14	3.99	4.88	3.06
G	Agropyron dasystachyum	8	11	16	5	3	.42	.25	.03	.41
G	Agropyron intermedium	c48	a7	abc29	bc39	ab22	.16	1.46	2.92	.78
G	Bromus inermis	b23	a3	a4	a-	a-	.03	.01	-	-
G	Carex sp.	18	24	6	8	7	.38	.21	.21	.07
G	Elymus cinereus	11	8	1	5	6	.41	.38	.53	.53
G	Elymus junceus	31	40	34	37	34	2.00	1.95	3.42	1.45
G	Elymus salina	a47	a38	b89	a35	a49	1.82	4.09	1.83	4.42
G	Oryzopsis hymenoides	a39	b89	a40	a49	a45	3.67	1.95	1.36	1.97
G	Poa fendleriana	b33	a9	a13	a11	a3	.07	.39	.13	.03
G	Poa pratensis	a-	b14	ab7	a-	a-	.17	1.70	-	-
G	Poa secunda	a-	b24	b12	b28	b34	.25	.07	.80	.23
G	Sitanion hystrix	ab43	c83	a28	bc61	a21	.61	.45	.99	.65
G	Sporobolus cryptandrus	-	3	-	-	-	.00	-	-	-
G	Stipa comata	a8	b44	a14	b51	b43	1.64	.65	2.33	2.20
G	Stipa lettermani	-	-	-	-	5	-	-	-	.53
G	Unknown grass - perennial	2	-	-	-	-	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		528	508	387	400	368	16.79	17.58	19.48	16.36
Total for Grasses		528	508	387	400	368	16.79	17.58	19.48	16.36
F	Agoseris glauca	-	-	-	-	-	.15	-	-	-
F	Androsace septentrionalis (a)	-	b23	a2	a1	a2	.10	.00	.00	.03
F	Antennaria rosea	-	-	7	2	3	-	.02	.01	.06
F	Arabis drummondii	ab6	b13	ab1	a-	a-	.02	.00	-	-
F	Arenaria fendleri	-	1	5	-	-	.00	.03	-	-
F	Astragalus argophyllus	13	8	2	3	2	.07	.00	.00	.00
F	Astragalus miser	b35	ab17	a-	a5	ab9	.24	-	.06	.22
F	Balsamorhiza sagittata	1	-	-	-	-	-	-	-	-
F	Calochortus nuttallii	-	2	-	-	-	.00	-	-	-
F	Caulanthus crassicaulis	-	2	-	6	-	.00	-	.01	-
F	Chaenactis douglasii	a-	b18	a3	ab5	a3	.04	.00	.05	.00
F	Chamaechaenactis scaposa	b6	a-	a-	a-	a-	-	-	-	-
F	Chenopodium fremontii (a)	-	b16	a-	b12	a-	.06	-	.08	-
F	Chenopodium leptophyllum(a)	-	b10	a-	a-	bc2	.05	-	-	.00
F	Cryptantha sp.	b8	b19	a-	a-	a-	.25	-	.00	-
F	Descurainia pinnata (a)	-	b29	a-	a5	a-	.22	-	.02	-
F	Erigeron eatonii	a-	a-	b10	a-	ab1	-	.07	-	.03
F	Eriogonum alatum	a-	b17	ab7	ab10	ab6	.22	.02	.09	.22
F	Gilia sp. (a)	-	1	1	-	-	.00	.00	-	-
F	Hedysarum boreale	-	1	6	1	-	.03	.04	.15	-
F	Hymenoxys acaulis	b33	ab15	a1	a9	a8	.08	.00	.05	.07
F	Ipomopsis aggregata	a-	b12	ab1	ab1	ab3	.02	.00	.03	.00
F	Lappula occidentalis (a)	-	c73	a3	b60	a5	.52	.01	.43	.01

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Lesquerella sp.	c18	bc12	ab3	a3	a1	.04	.01	.00	.00
F	Linum lewisii	b16	b14	b11	a-	a-	.08	.10	-	-
F	Machaeranthera grindelioides	17	18	15	10	7	.32	.11	.24	.09
F	Penstemon caespitosus	ab13	b31	a10	a3	a-	.06	.10	.01	-
F	Penstemon sp.	-	-	-	-	1	-	-	-	.00
F	Phlox sp.	b11	a-	a-	a-	a-	-	-	-	-
F	Physaria acutifolia	a-	ab10	b15	ab8	a-	.04	.04	.16	-
F	Schoenocrambe linifolia	-	4	-	-	-	.01	-	-	-
F	Senecio canus	b11	ab4	ab3	ab2	a-	.03	.01	.03	-
F	Sphaeralcea coccinea	-	1	4	-	-	.00	.15	-	-
F	Taraxacum officinale	a-	b13	ab3	ab2	a-	.02	.01	.03	-
F	Townsendia incana	4	-	3	5	11	-	.03	.03	.02
F	Tragopogon dubius	a-	b9	a-	a-	ab2	.02	-	-	.00
F	Trifolium sp.	4	-	-	3	-	-	-	.00	-
Total for Annual Forbs		0	152	6	78	9	0.96	0.01	0.53	0.04
Total for Perennial Forbs		196	241	110	78	57	1.82	0.79	0.98	0.74
Total for Forbs		196	393	116	156	66	2.79	0.81	1.52	0.79

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

BROWSE TRENDS--

Management unit 17, Study no: 58

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia frigida	0	0	0	1	-	-	-	-
B	Artemisia nova	1	0	7	3	-	-	.04	.18
B	Artemisia tridentata vaseyana	2	3	4	4	.18	.76	.79	.93
B	Cercocarpus montanus	22	22	23	21	3.10	4.49	4.90	5.80
B	Chrysothamnus nauseosus graveolens	16	16	12	2	2.04	1.63	1.86	-
B	Chrysothamnus nauseosus hololeucus	1	10	0	15	.56	1.12	-	2.12
B	Chrysothamnus viscidiflorus lanceolatus	3	4	0	3	-	.18	-	.15
B	Cowania mexicana stansburiana	0	0	0	1	-	-	-	-
B	Eriogonum corymbosum	2	1	3	2	.15	.38	.38	-
B	Gutierrezia sarothrae	28	18	25	7	.53	.63	.42	.09
B	Juniperus osteosperma	0	6	3	5	.56	.53	.78	.44
B	Leptodactylon pungens	0	1	0	0	-	.03	-	-
B	Pinus edulis	0	5	5	4	1.16	3.05	.81	1.78
B	Purshia tridentata	0	1	1	0	-	.15	-	-
Total for Browse		75	87	83	68	8.31	12.97	9.98	11.51

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 58

Species	Percent Cover		
	'00	'05	'10
Artemisia nova	-	.63	.11
Artemisia tridentata vaseyana	-	1.13	.86
Cercocarpus montanus	.80	10.31	10.16
Chrysothamnus nauseosus graveolens	-	2.93	-
Chrysothamnus nauseosus hololeucus	-	-	2.16
Chrysothamnus viscidiflorus lanceolatus	-	-	.30
Eriogonum corymbosum	-	-	.26
Gutierrezia sarothrae	-	.35	.03
Juniperus osteosperma	1.20	.36	2.70
Pinus edulis	2.79	3.00	2.98

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 58

Species	Average leader growth (in)	
	'05	'10
Artemisia nova	1.6	.7
Artemisia tridentata vaseyana	2.8	1.5
Cercocarpus montanus	3.6	4.0
Cowania mexicana	2.1	2.2

BASIC COVER--

Management unit 17, Study no: 58

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.25	8.50	25.78	33.96	28.21	29.07
Rock	2.25	2.50	7.89	2.73	1.60	2.05
Pavement	18.00	18.25	8.38	11.82	11.38	14.03
Litter	57.50	59.00	55.12	54.79	45.62	50.52
Cryptogams	0	.25	.24	.22	.03	.04
Bare Ground	14.00	11.50	10.93	14.94	26.13	23.21

SOIL ANALYSIS DATA --

Management unit 17, Study no: 58, Study Name: Buck Knoll

Effective rooting depth (in)	pH	caly loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.9	7.4	24.9	47.8	28.3	5.3	5.1	92.8	0.9

PELLET GROUP DATA--

Management unit 17, Study no: 58

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	5	16	13	3
Horse	5	1	-	-
Elk	12	18	27	36
Deer	7	9	9	9
Cattle	-	-	1	3

Days use per acre (ha)		
'00	'05	'10
-	-	-
-	-	-
26 (65)	64 (157)	14 (35)
6 (15)	19 (46)	7 (17)
3 (7)	5 (13)	4 (11)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 58

		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>Amelanchier utahensis</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	63/63	
<i>Artemisia frigida</i>										
82	0	0	0	-	-	0	0	0	-/-	
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	20	0	100	-	-	100	0	0	6/12	
<i>Artemisia nova</i>										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	40	50	50	0	-	50	0	0	11/20	
00	0	0	0	0	-	0	0	0	7/11	
05	320	50	44	6	20	31	19	0	12/21	
10	260	15	85	0	-	100	0	15	11/22	
<i>Artemisia tridentata vaseyana</i>										
82	66	0	100	-	-	100	0	0	12/6	
88	66	0	100	-	-	0	0	0	31/24	
95	40	0	100	-	-	0	0	0	30/46	
00	100	60	40	-	-	0	0	0	33/46	
05	160	25	75	-	120	38	38	0	30/44	
10	160	38	63	-	20	38	0	0	28/47	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Atriplex canescens										
82	0	0	0	-	-	0	0	0	-/-	
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	11/29	
10	0	0	0	-	-	0	0	0	16/32	
Cercocarpus montanus										
82	465	72	14	14	66	29	71	14	25/33	
88	599	78	22	0	-	0	0	0	44/53	
95	580	14	86	0	-	62	17	0	47/49	
00	620	23	77	0	1080	35	0	0	45/47	
05	800	15	85	0	40	25	65	0	55/50	
10	640	0	100	0	180	16	81	0	50/56	
Chrysothamnus nauseosus graveolens										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	780	3	97	0	-	31	0	0	31/42	
00	1200	30	48	22	20	0	0	10	23/29	
05	760	11	79	11	20	0	0	5	29/36	
10	40	0	100	0	-	0	0	0	21/24	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	20	0	100	0	-	0	0	0	28/26	
00	940	32	66	2	-	0	0	0	4/5	
05	0	0	0	0	-	0	0	0	32/29	
10	680	12	50	38	-	59	0	38	28/29	
Chrysothamnus viscidiflorus lanceolatus										
82	0	0	0	-	-	0	0	0	-/-	
88	133	0	100	-	-	0	0	0	6/4	
95	120	17	83	-	-	0	0	0	10/15	
00	180	0	100	-	-	11	0	0	12/22	
05	0	0	0	-	-	0	0	0	17/22	
10	60	33	67	-	-	0	0	0	13/16	
Cowania mexicana stansburiana										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	0	0	0	0	-	0	0	0	-/-	
05	0	0	0	0	-	0	0	0	13/17	
10	20	0	0	100	-	0	0	100	23/23	

		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>Ephedra viridis</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	21/40	
05	0	0	0	-	-	0	0	0	14/22	
10	0	0	0	-	-	0	0	0	23/21	
<i>Eriogonum corymbosum</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	60	67	33	-	-	0	0	0	16/21	
00	40	0	100	-	-	100	0	0	15/20	
05	60	0	100	-	-	0	0	0	18/27	
10	40	0	100	-	-	50	0	0	14/20	
<i>Gutierrezia sarothrae</i>										
82	599	0	100	0	-	0	0	0	11/19	
88	2332	0	86	14	-	0	0	0	7/4	
95	1820	43	56	1	280	0	0	1	8/8	
00	2760	7	93	0	20	0	0	0	5/4	
05	2240	25	75	0	160	0	0	0	6/7	
10	220	9	73	18	-	0	0	18	7/6	
<i>Juniperus osteosperma</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	120	83	17	-	-	0	0	0	-/-	
05	60	67	33	-	-	0	0	0	-/-	
10	120	67	33	-	-	0	0	17	-/-	
<i>Leptodactylon pungens</i>										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	100	0	0	5/7	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
82	66	100	0	-	-	0	0	100	-/-	
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	120	50	50	-	40	0	0	0	-/-	
05	120	100	0	-	-	0	0	0	-/-	
10	80	100	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Purshia tridentata										
82	66	100	0	-	-	0	0	0	-/-	
88	66	0	100	-	-	100	0	0	8/6	
95	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	100	0	0	42/23	
05	20	0	100	-	-	0	100	0	25/22	
10	0	0	0	-	-	0	0	0	-/-	
Sambucus cerulea										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	61/64	
00	0	0	0	-	-	0	0	0	46/53	
05	0	0	0	-	-	0	0	0	58/67	
10	0	0	0	-	-	0	0	0	46/64	

EMMA PARK - TREND STUDY NO. 17-59-10

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer

NRCS Ecological Site Description: [Mountain Shallow Loam \(Mountain Big Sagebrush\), R047XA446UT](#)

Land Ownership: Private

Elevation: 7470 ft. (2277 m)

Aspect: North

Slope: 8%

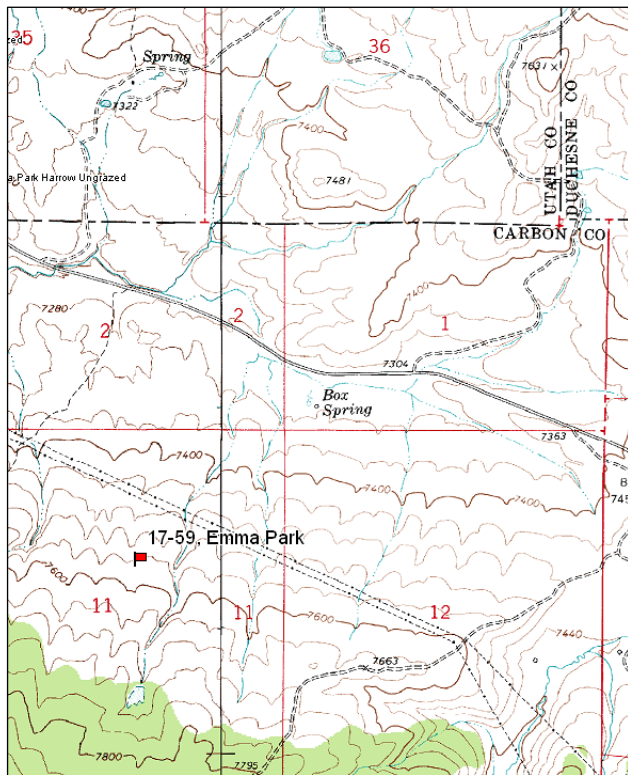
Transect bearing: 186° magnetic

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

Directions:

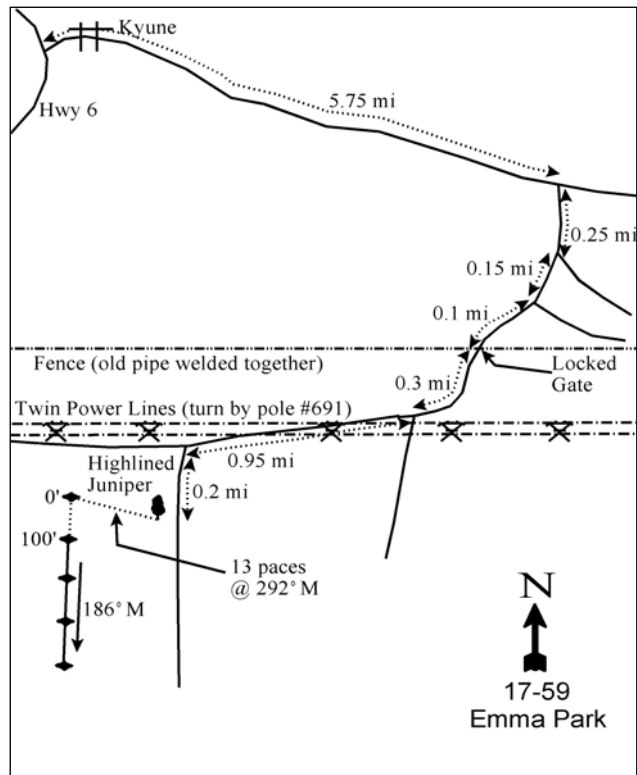
Traveling south on Highway 6 take a left on the road that leads to Kyune and travel 5.75 miles. Turn right and go 0.25 miles. Veer right for 0.15 miles to a fork. Continue right for 0.1 miles to a locked gate. Go through the gate for 0.3 miles. Veer right and go 0.95 miles following the power lines. Turn left for 0.2 miles to a high lined juniper. The 0-foot stake is 13 paces away at 292°M.

Map Name: Kyune



Township: 12S Range: 9E Section: 11

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 510257 E 4405484 N

Site Information

Site Description: The study is located on private land on one of the many moderately north sloping ridges in the area that drain into Horse Creek, which in turn drains southwest into the Price River. The study is within a big sagebrush (*Artemisia tridentata*) and grass community with high species diversity. Deer appear to be using this area as transitional and summer range. Deer were seen on site during the 2000 reading. Pellet group transect data has estimated use by deer, elk and cattle to be light since 2000 (Table - Pellet Group Data).

Browse: A mixture of a dense stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and a small population of basin big sagebrush (*A. tridentata* ssp. *tridentata*) are the key browse species. Most of the sagebrush sampled is considered to be mountain big sagebrush, although there appears to be some hybridizing between the two subspecies. Mountain big sagebrush provides most of the browse cover on the site (Table - Browse Trends). The mountain big sagebrush population is primarily comprised of large mature plants that have exhibited mostly light to moderate use. Decadence and poor vigor of mountain big sagebrush have been moderate, but both were high in 2005. Recruitment of young mountain big sagebrush plants was good at the outset of the study in 1994, but has been low since 2005. Other desirable shrubs include some moderate to heavily browsed serviceberry (*Amelanchier utahensis*) and a few scattered heavily hedged antelope bitterbrush (*Purshia tridentata*). Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and Oregon grape (*Mahonia repens*) are abundant understory shrubs. They are not utilized and appear to have stable mature populations (Table - Browse Characteristics).

Herbaceous Understory: Grasses on the site are diverse and fairly abundant, but are likely limited due to the high browse cover. Salina wildrye (*Elymus salina*) is the most abundant grass species, but other prevalent species include thickspike wheatgrass (*Agropyron dasystachyum*), Kentucky bluegrass (*Poa pratensis*), mutton bluegrass (*P. fendleriana*) and Letterman needlegrass (*Stipa lettermani*). Forbs are diverse and abundant, with several preferred species sampled. The most common species is desert phlox (*Phlox austromontana*) which dominates the forb composition in cover. Other abundant forb species include dandelion (*Taraxacum officinale*), silver lupine (*Lupinus argenteus*) and lobeleaf groundsel (*Senecio multilobatus*) (Table - Herbaceous Trends).

Soil: The soil has a clay loam texture and a neutral soil reaction (pH 7.0) (Table - Soil Analysis Data). Bare ground cover is low with high amounts of vegetation and litter cover. Small rocks are common on the surface and rock and pavement cover are moderate on the site (Table - Basic Cover). Rocky areas support far fewer and smaller shrubs, while the deeper soil along the end of the baseline supports very large and robust sagebrush. There is little current evidence of erosion, but historically the area exhibits signs of heavy soil loss. The soil erosion condition was classified as slight in 2005 and 2010 because of moderate and frequent pedestals around shrubs and perennial grasses, soil, litter and surface rock movement, and flow patterns between perennial species.

Trend Assessments

Browse:

- **1994 to 2000 - stable (0):** There was little change in the density or cover of the primary browse species, mountain big sagebrush. Decadence of mountain big sagebrush decreased from 25% to 11%.
- **2000 to 2005 - down (-2):** The density of mountain big sagebrush decreased by 17% from 4,600 plants/acre to 3,820 plants/acre and cover decreased from 19% to 13%. There was an increase in decadence to 41% and poor vigor increased from 4% to 25%. Recruitment of young mountain big sagebrush plants decreased from 17% to 2% of the population.
- **2005 to 2010 - slightly up (+1):** Mountain big sagebrush density and cover remained similar, but decadence decreased to 13% and poor vigor decreased to 18%. Recruitment of young mountain big sagebrush increased slightly, but remained poor at 7% of the population.

Grass:

- **1994 to 2000 - up (+2):** The sum of nested frequency of perennial grasses increased by 21% and cover increased from 7% to 10%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.
- **2005 to 2010 - stable (0):** The perennial grass sum of nested frequency remained similar, but cover increased from 9% to 15%.

Forb:

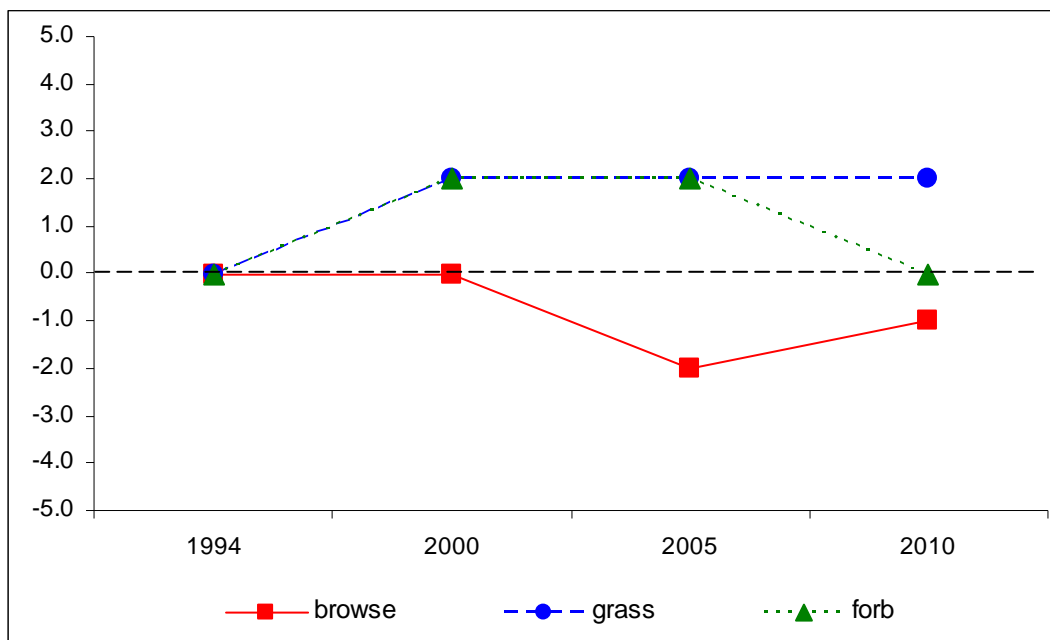
- **1994 to 2000 - up (+2):** The perennial forb sum of nested frequency increased by 31% and cover increased from 8% to 11%.
- **2000 to 2005 - stable (0):** The sum of nested frequency and cover of perennial forbs remained similar.
- **2005 to 2010 - down (-2):** There was a 22% decrease in the sum of nested frequency of perennial forbs. Cover of perennial forbs increased from 12% to 17%, but most of the increase was due to a large increase in the cover of desert phlox, which provides little forage value.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 17, study no: 59

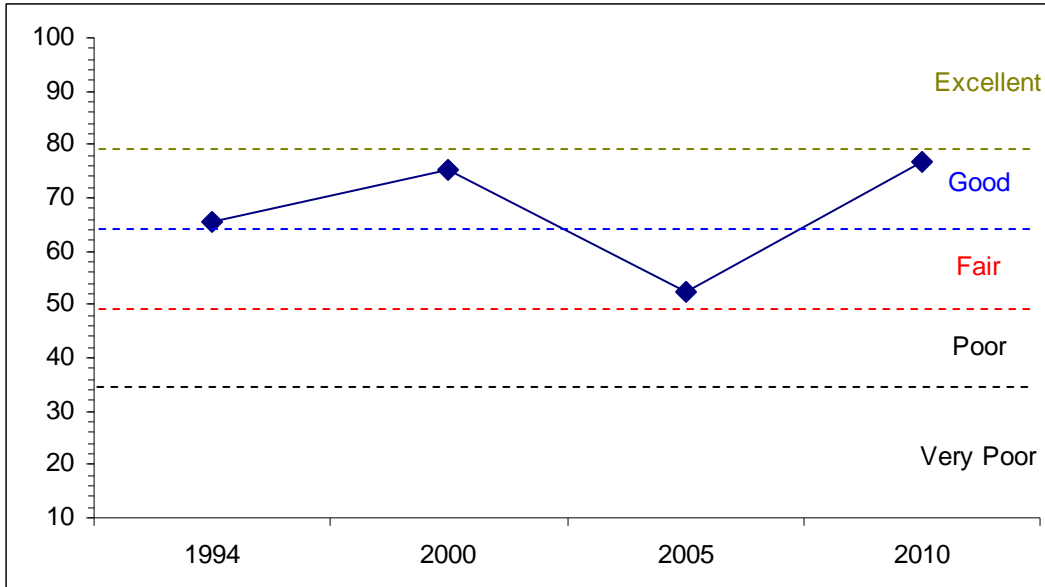
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	27.9	7.6	5.4	14.6	0.0	10.0	0.0	65.6	Fair-Good
00	25.7	11.9	8.4	19.3	-0.1	10.0	0.0	75.2	Good
05	19.7	4.2	1.0	17.6	0.0	10.0	0.0	52.5	Fair
10	21.5	11.9	3.6	29.7	0.0	10.0	0.0	76.7	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 59



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 17, Study no: 59



HERBACEOUS TRENDS--
 Management unit 17, Study no: 59

Type	Species	Nested Frequency				Average Cover %			
		'94	'00	'05	'10	'94	'00	'05	'10
G	Agropyron dasystachyum	a8	c101	b48	a144	.21	1.11	.38	2.40
G	Agropyron trachycaulum	a-	a-	b14	ab2	-	-	.10	.06
G	Bromus anomalus	ab6	ab7	b11	a-	.01	.04	.06	-
G	Bromus tectorum (a)	3	9	-	3	.00	.09	.00	.00
G	Carex sp.	a9	c46	ab20	bc31	.18	.72	.21	.42
G	Elymus salina	c242	a86	ab207	b159	5.72	2.36	4.31	8.52
G	Koeleria cristata	a-	a1	b54	a9	-	.03	.32	.16
G	Poa fendleriana	b132	a85	a41	a39	.90	1.50	.26	.29
G	Poa pratensis	a-	b111	b78	b86	-	2.58	2.38	2.42
G	Poa secunda	a-	ab12	b25	b20	-	.07	.28	.26
G	Stipa columbiana	-	-	4	-	-	-	.18	-
G	Stipa lettermani	a32	b70	a27	a14	.28	1.19	.29	.30
Total for Annual Grasses		3	9	0	3	0.00	0.08	0.00	0.00
Total for Perennial Grasses		429	519	529	504	7.31	9.63	8.80	14.86
Total for Grasses		432	528	529	507	7.32	9.72	8.80	14.87
F	Achillea millefolium	a34	b61	a24	a16	.17	.73	.33	.11
F	Agoseris glauca	-	-	3	-	-	-	.00	-
F	Allium sp.	-	-	4	-	-	-	.01	-
F	Androsace septentrionalis (a)	a2	a6	b46	a8	.00	.01	.12	.02
F	Antennaria parvifolia	a3	b23	b27	ab19	.06	.32	.20	.14
F	Arabis drummondii	b12	ab3	c48	a-	.03	.00	.14	-
F	Aster chilensis	b33	ab15	ab15	a4	.14	.19	.25	.30
F	Astragalus convallarius	b25	a5	ab23	a11	.26	.07	.11	.10
F	Astragalus sp.	ab9	a-	b9	a-	.06	-	.07	-

Type	Species	Nested Frequency				Average Cover %			
		'94	'00	'05	'10	'94	'00	'05	'10
F	<i>Astragalus tenellus</i>	b60	b77	a25	a13	1.14	.57	.11	.09
F	<i>Astragalus utahensis</i>	a-	ab6	b12	b16	-	.07	.05	.52
F	<i>Calochortus nuttallii</i>	a3	a-	b26	a-	.00	-	.07	-
F	<i>Castilleja linariaefolia</i>	7	3	5	1	.16	.00	.04	.00
F	<i>Chaenactis douglasii</i>	7	6	2	3	.01	.05	.00	.00
F	<i>Chenopodium album</i> (a)	1	-	1	-	.00	-	.00	-
F	<i>Cirsium</i> sp.	-	2	-	-	-	.00	-	-
F	<i>Collinsia parviflora</i> (a)	b44	a-	a5	a1	.19	-	.01	.00
F	<i>Comandra pallida</i>	a14	bc39	ab20	c53	.03	.25	.08	.59
F	<i>Crepis acuminata</i>	ab3	a-	b8	ab5	.41	-	.05	.04
F	<i>Descurainia pinnata</i> (a)	-	-	-	2	-	-	-	.01
F	<i>Erigeron eatonii</i>	ab65	a34	b72	ab45	.42	.14	.26	.32
F	<i>Erigeron flagellaris</i>	a1	a4	b22	b24	.00	.01	.14	.17
F	<i>Eriogonum umbellatum</i>	3	4	4	2	.03	.06	.15	.03
F	<i>Gayophytum ramosissimum</i> (a)	3	2	-	-	.00	.00	-	-
F	<i>Gilia</i> sp. (a)	2	-	-	-	.01	-	-	-
F	<i>Hedysarum boreale</i>	a-	a3	a1	b44	-	.03	.03	.36
F	<i>Helianthella uniflora</i>	a1	b24	a3	a-	.00	.37	.41	-
F	<i>Ipomopsis aggregata</i>	-	2	5	-	-	.00	.03	-
F	<i>Lomatium</i> sp.	-	2	-	3	-	.00	-	.00
F	<i>Lupinus argenteus</i>	35	35	23	31	.21	.59	1.14	.51
F	<i>Lychnis drummondii</i>	1	6	-	2	.00	.41	-	.00
F	<i>Machaeranthera canescens</i>	5	-	9	3	.01	-	.05	.03
F	<i>Orthocarpus tolmiei</i> (a)	a-	a1	c110	b26	-	.00	1.21	.27
F	<i>Penstemon caespitosus</i>	13	24	6	16	.07	.19	.01	.07
F	<i>Penstemon humilis</i>	b11	ab13	a-	a-	.10	.04	-	-
F	<i>Penstemon watsonii</i>	23	19	7	14	.41	.20	.23	.14
F	<i>Phlox austromontana</i>	a142	ab156	b199	b199	3.72	5.16	6.25	12.26
F	<i>Phlox longifolia</i>	3	1	3	4	.00	.00	.00	.04
F	<i>Polygonum douglasii</i> (a)	b10	a-	ab5	ab6	.02	-	.02	.01
F	<i>Potentilla gracilis</i>	a4	ab11	bc25	c29	.01	.08	.09	.33
F	<i>Schoenocrambe linifolia</i>	2	2	3	6	.00	.01	.03	.01
F	<i>Senecio integerrimus</i>	9	8	6	3	.03	.07	.04	.00
F	<i>Senecio multilobatus</i>	a15	b103	b77	a20	.04	1.37	.55	.26
F	<i>Sphaeralcea coccinea</i>	3	-	-	1	.00	-	-	.00
F	<i>Taraxacum officinale</i>	a6	bc31	c42	ab16	.01	.18	1.23	.14
F	<i>Thalictrum fendleri</i>	3	8	3	-	.06	.06	.15	-
F	<i>Zigadenus paniculatus</i>	a1	a-	b9	a-	.00	-	.03	-
Total for Annual Forbs		62	9	167	43	0.24	0.02	1.37	0.31
Total for Perennial Forbs		556	730	770	603	7.70	11.31	12.43	16.64
Total for Forbs		618	739	937	646	7.94	11.34	13.80	16.96

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

BROWSE TRENDS--

Management unit 17, Study no: 59

Type	Species	Strip Frequency				Average Cover %			
		'94	'00	'05	'10	'94	'00	'05	'10
B	Amelanchier utahensis	9	8	12	14	.18	.33	.21	.62
B	Artemisia tridentata tridentata	0	3	11	12	-	.68	2.20	2.57
B	Artemisia tridentata vaseyana	88	93	85	85	21.89	19.21	12.86	13.38
B	Cercocarpus montanus	1	0	0	2	.03	-	-	.15
B	Chrysothamnus depressus	4	8	14	4	.19	.27	.45	.18
B	Chrysothamnus viscidiflorus viscidiflorus	74	64	60	67	3.73	4.61	3.49	4.63
B	Gutierrezia sarothrae	3	4	4	0	.00	.03	.03	-
B	Mahonia repens	22	23	15	12	.65	1.06	.85	.51
B	Opuntia sp.	0	0	0	1	-	-	-	-
B	Purshia tridentata	0	1	1	1	-	-	-	.00
B	Ribes sp.	0	1	0	1	-	-	-	.15
B	Rosa woodsii	3	3	0	2	.00	.03	-	.00
B	Symphoricarpos oreophilus	28	24	7	12	2.66	2.14	.24	.48
B	Tetradymia canescens	1	2	2	2	-	.00	-	-
Total for Browse		233	234	211	215	29.34	28.37	20.36	22.70

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 59

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	.91	.36
Artemisia tridentata tridentata	4.51	3.68
Artemisia tridentata vaseyana	17.75	20.38
Chrysothamnus depressus	.53	.41
Chrysothamnus viscidiflorus viscidiflorus	5.33	5.11
Gutierrezia sarothrae	.01	-
Mahonia repens	.30	.08
Purshia tridentata	.08	.21
Ribes sp.	-	.11
Rosa woodsii	-	.11
Symphoricarpos oreophilus	.48	.91
Tetradymia canescens	.08	.05

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 59

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	1.6	1.3
Purshia tridentata	4.0	-

BASIC COVER--

Management unit 17, Study no: 59

Cover Type	Average Cover %			
	'94	'00	'05	'10
Vegetation	43.04	50.81	37.15	48.68
Rock	5.51	6.91	4.99	6.34
Pavement	1.48	7.57	4.17	3.91
Litter	47.61	59.09	41.79	47.73
Cryptogams	.60	1.20	.35	.15
Bare Ground	14.02	18.48	21.44	15.73

SOIL ANALYSIS DATA --

Management unit 17, Study no: 59, Study Name: Emma Park

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.4	7.0	29.4	31.1	39.3	4.0	10.6	137.6	0.8

PELLET GROUP DATA--

Management unit 17, Study no: 59

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'00	'05	'10	'00	'05	'10
Rabbit	16	24	10	4	-	-	-
Moose	2	2	-	-	-	-	-
Grouse	-	-	-	1	-	-	-
Elk	25	6	13	1	13 (31)	24 (60)	9 (23)
Deer	19	8	6	11	15 (36)	11 (28)	19 (46)
Cattle	6	2	3	2	20 (50)	19 (47)	11 (27)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 59

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 utahensis									
94	200	10	70	20	-	10	40	20	16/11
00	200	50	40	10	-	40	10	30	15/17
05	260	23	69	8	20	38	54	0	15/17
10	320	31	63	6	20	6	50	13	14/16
Artemisia tridentata tridentata									
94	0	0	0	0	-	0	0	0	-/-
00	60	0	100	0	-	0	0	0	61/45
05	380	0	84	16	-	21	11	5	58/54
10	280	0	100	0	-	50	0	0	59/75
Artemisia tridentata vaseyana									
94	4640	11	64	25	40	8	1	5	28/34
00	4600	17	72	11	80	17	0	4	28/35
05	3820	2	57	41	-	28	7	25	24/31
10	4000	7	81	13	20	46	4	18	25/33

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Cercocarpus montanus										
94	20	0	100	-	-	100	0	100	9/12	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	40	50	50	-	-	50	50	0	20/24	
Chrysothamnus depressus										
94	180	0	100	0	-	11	0	0	4/10	
00	300	0	100	0	-	7	0	0	3/7	
05	880	0	95	5	-	18	0	5	6/12	
10	360	6	94	0	-	0	0	0	6/13	
Chrysothamnus viscidiflorus viscidiflorus										
94	4800	0	99	1	-	0	0	.83	11/13	
00	4000	4	93	4	-	.50	0	.50	9/13	
05	3540	0	98	2	80	0	0	1	11/18	
10	3740	1	99	0	-	5	1	0	11/16	
Gutierrezia sarothrae										
94	120	33	67	-	-	0	0	0	6/9	
00	240	0	100	-	-	0	0	0	4/7	
05	260	0	100	-	-	0	0	0	6/10	
10	0	0	0	-	-	0	0	0	-/-	
Mahonia repens										
94	4260	16	84	-	-	0	0	0	3/4	
00	6380	15	85	-	-	0	0	0	3/4	
05	4000	0	100	-	-	0	0	0	2/3	
10	920	70	30	-	60	0	0	0	3/6	
Opuntia sp.										
94	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	60	0	100	-	-	0	0	0	-/-	
Purshia tridentata										
94	0	0	0	-	-	0	0	0	17/30	
00	40	0	100	-	-	0	100	0	20/50	
05	40	0	100	-	-	0	100	0	-/-	
10	20	0	100	-	-	0	100	0	11/19	
Ribes sp.										
94	0	0	0	-	-	0	0	0	-/-	
00	20	100	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	80	0	100	-	-	0	0	0	10/9	

		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>Rosa woodsii</i>										
94	140	0	100	-	-	0	0	0	7/7	
00	80	50	50	-	-	0	0	0	19/8	
05	0	0	0	-	-	0	0	0	-/-	
10	60	0	100	-	-	0	0	0	9/14	
<i>Symphoricarpos oreophilus</i>										
94	1420	8	90	1	-	6	1	0	18/25	
00	920	20	80	0	-	2	0	2	15/17	
05	200	0	50	50	-	0	0	50	23/24	
10	520	42	58	0	-	0	0	8	12/14	
<i>Tetradymia canescens</i>										
94	40	0	0	100	-	100	0	100	4/4	
00	80	50	50	0	-	0	0	0	-/-	
05	60	0	100	0	-	0	0	0	6/10	
10	60	0	100	0	-	0	0	0	9/12	

LITTLE HORSE RIDGE - TREND STUDY NO. 17-65-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Year-Long (Calving habitat)

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 7610 ft. (2320 m)

Aspect: North-Northwest

Slope: 15%

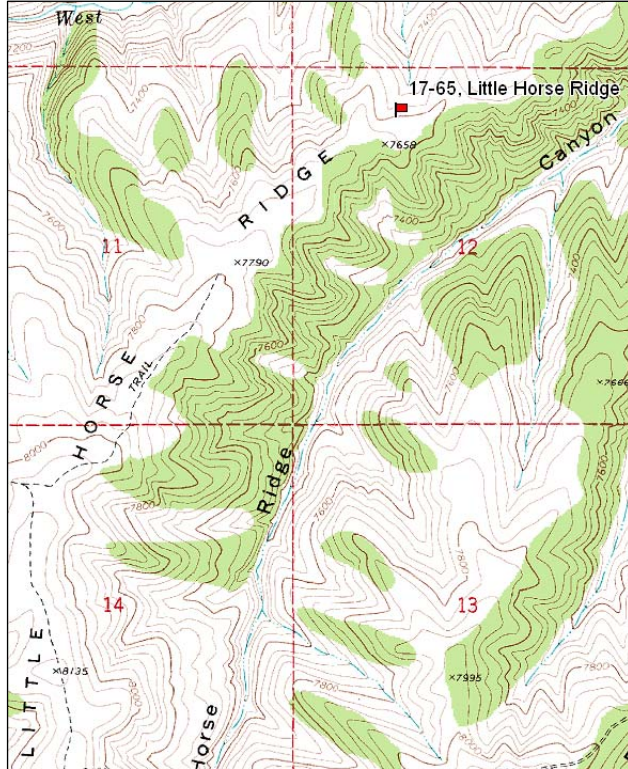
Transect bearing: 60° magnetic

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

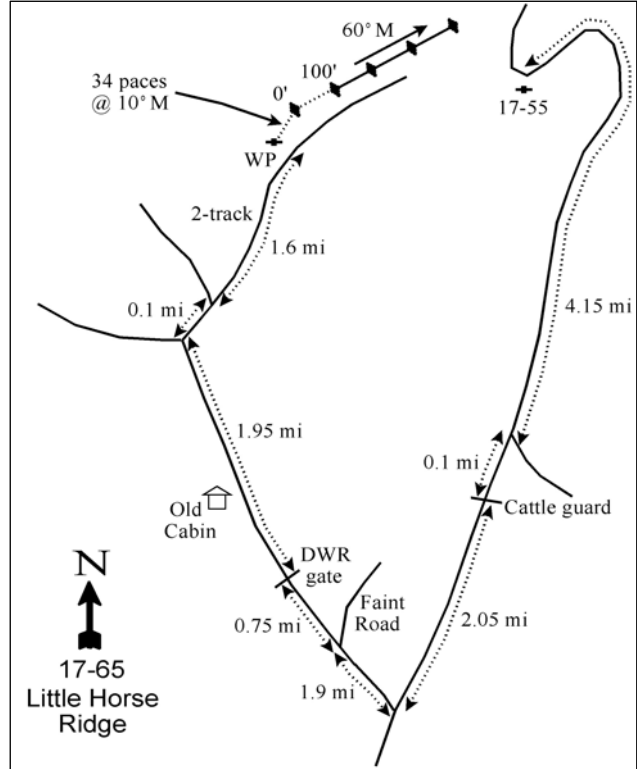
Directions:

From the Strawberry River Road, proceed south up Avintaquin Canyon 12.7 miles. Turn left onto a road hidden in the trees and cross Avintaquin Creek. Go up Horse Ridge Canyon 0.4 miles to a fence. Continue up the ridge 0.8 miles to a sharp left bend in the road by trend study 17-55. Continue south 4.15 miles to a fork in the road. Stay right and continue 0.1 miles to a cattle guard. After the cattle guard travel 2.05 miles and take a right. Travel 1.9 miles to a faint fork in the road. Stay to the left and continue another 0.75 miles to a DWR gate. Pass through the gate and drive 1.95 miles, passing an old cabin on the left, to a fork in the road. Stay right and travel 0.1 miles to another fork. Take the two-track to the right and follow it for 1.6 miles to a witness post on the left hand side of the road. The 0-foot stake is 34 paces from the witness post at 10°M.

Map Name: Gray Head Peak



Diagrammatic Sketch:



Township: 6S Range: 9W Section: 12

GPS: NAD 83, UTM 12S 512912 E 4425446 N

LITTLE HORSE RIDGE - TREND STUDY NO. 17-65

Site Information

Site Description: The study is located on big game winter range near the north end of Horse Ridge. The land is owned and managed by the Utah Division of Wildlife Resources (UDWR) within the Avintaquin Wildlife Management Area (WMA). This area is on the border of crucial summer and crucial winter range for deer. This study was established in 2005 to monitor deer that are staying in the high country during winter, instead of migrating lower. This herd has a high mortality rate for not only fawns, but adults as well. Grazing has not occurred on the WMA for several decades. Pellet group transect data has indicated moderate use by deer and light use by elk since 2005. Moose occasionally use the site as well and some moose pellets may have been misidentified as elk in 2010 (Table - Pellet Group Data).

Browse: Several browse species occupy the site, but the key species consist of true mountain mahogany (*Cercocarpus montanus*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). The true mountain mahogany population is a mixture of healthy young and mature plants that have been moderately or heavily used. The mountain big sagebrush population is a mostly mature population with moderate to high decadence and poor vigor. Utilization has been mostly moderate and recruitment of young plants has been good. There is also a small population of large, moderately used Utah serviceberry (*Amelanchier utahensis*) on the site. Other browse species include several rabbitbrush species (*Chrysothamnus* spp.) and snowberry (*Symphoricarpos oreophilus*) (Table - Browse Characteristics). Pinyon pine (*Pinus edulis*) occurs at moderately high density (Table - Point-Quarter Tree Data) and cover (Table - Canopy Cover).

Herbaceous Understory: The grass component is fairly abundant, but is not overly diverse. Two species, Salina wildrye (*Elymus salina*) and bluebunch wheatgrass (*Agropyron spicatum*), dominate the grass component. Forbs are diverse, but are only moderately abundant. Common species include tapertip hawksbeard (*Crepis acuminata*), gumweed aster (*Machaeranthera grindelioides*) and desert phlox (*Phlox austromontana*) (Table - Herbaceous Trends).

Soil: The soil has a clay loam texture with a slightly alkaline soil reaction (pH 7.4). Phosphorus may have limited availability for plant growth and development at 5.2 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is low with a high amount of vegetation, litter, rock and pavement cover (Table - Basic Cover). Rock and pavement are concentrated on the surface between bunch grass and shrub interspaces. The soil erosion condition was classified as stable in 2005, but was slight in 2010 due to pedestals around perennial plants, litter, rock and soil movement, and flow patterns.

Trend Assessments

Browse:

- **2005 to 2010 - stable (0):** There was little change in the density or cover of mountain big sagebrush, but decadence decreased from 41% to 26%. There was a 17% decrease in the density of true mountain mahogany from 2,600 plants/acre to 2,160 plants/acre, but cover remained similar. Most of the decrease in density of mahogany was due to a decrease in the recruitment of young plants from 45% to 29%, but recruitment was still considered excellent.

Grass:

- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial grasses decreased by 20% with a significant decrease in the nested frequency of bluebunch wheatgrass. Cover of perennial grasses increased slightly from 16% to 17%.

Forb:

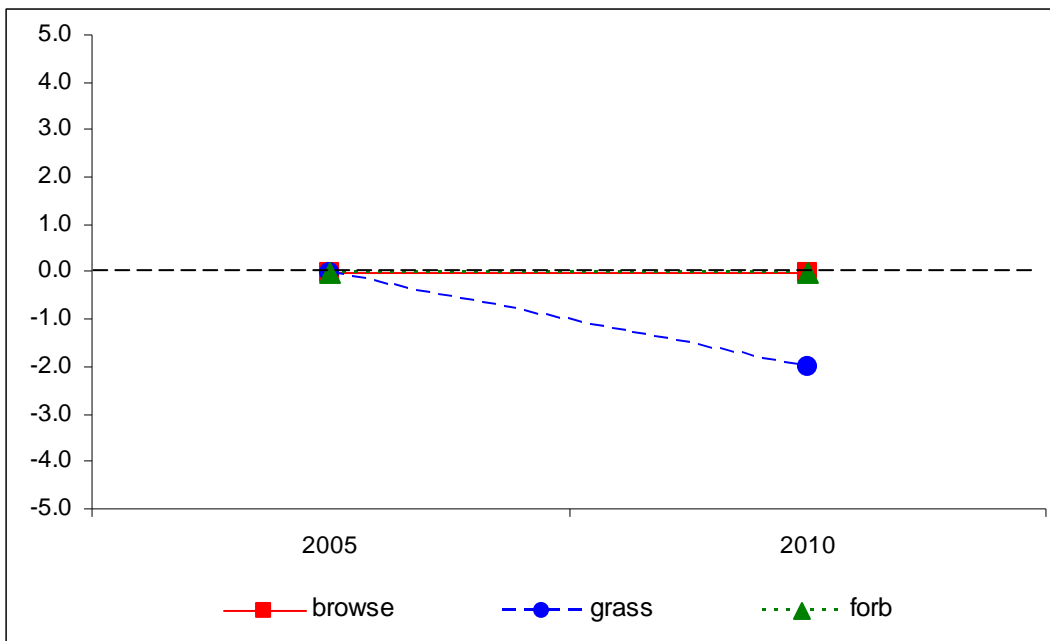
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency of perennial forbs and cover increased slightly from 3% to 4%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 17, study no: 65

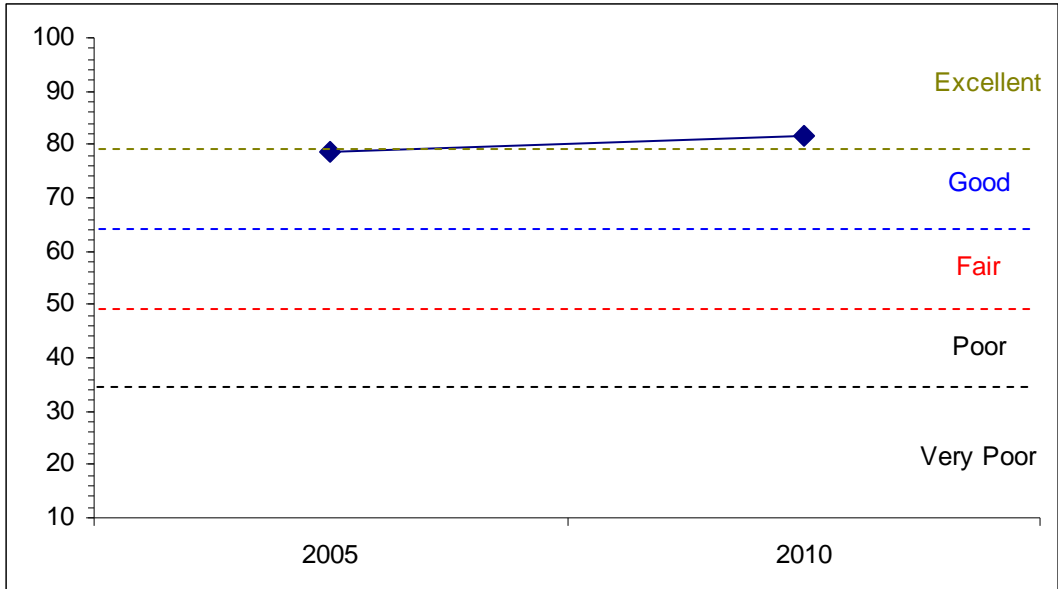
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
05	18.8	9.9	15.0	30.0	0.0	4.9	0.0	78.6	Good-Excellent
10	18.3	12.3	13.2	30.0	0.0	7.6	0.0	81.5	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 17, Study no: 65



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 17, Study no: 65



HERBACEOUS TRENDS--
 Management unit 17, Study no: 65

Type	Species	Nested Frequency		Average Cover %	
		'05	'10	'05	'10
G	<i>Agropyron spicatum</i>	_b 168	_a 98	6.82	4.63
G	<i>Elymus salina</i>	247	251	9.00	12.26
G	<i>Oryzopsis hymenoides</i>	_b 10	_a -	.08	.00
G	<i>Poa fendleriana</i>	41	25	.40	.45
G	<i>Poa secunda</i>	6	2	.06	.01
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		472	376	16.36	17.36
Total for Grasses		472	376	16.36	17.36
F	<i>Androsace septentrionalis</i> (a)	_b 15	_a -	.08	-
F	<i>Antennaria rosea</i>	-	1	-	.03
F	<i>Aster chilensis</i>	2	12	.01	.24
F	<i>Astragalus convallarius</i>	_b 10	_a -	.10	-
F	<i>Astragalus</i> sp.	7	-	.07	-
F	<i>Calochortus nuttallii</i>	11	5	.03	.01
F	<i>Castilleja chromosa</i>	_b 13	_a 3	.04	.03
F	<i>Castilleja flava</i>	_a -	_b 19	-	.45
F	<i>Chenopodium leptophyllum</i> (a)	2	-	.00	-
F	<i>Crepis acuminata</i>	72	71	.70	.91
F	<i>Cymopterus</i> sp.	3	9	.01	.02
F	<i>Erigeron</i> sp.	_a -	_b 7	-	.05
F	<i>Eriogonum umbellatum</i>	-	1	-	.03
F	<i>Ipomopsis aggregata</i>	4	-	.01	-
F	<i>Machaeranthera canescens</i>	1	-	.00	-
F	<i>Machaeranthera grindelioides</i>	30	28	.71	.26

Type	Species	Nested Frequency		Average Cover %	
		'05	'10	'05	'10
F	Penstemon caespitosus	8	9	.02	.01
F	Phlox austromontana	59	60	.62	1.56
F	Senecio multilobatus	8	12	.02	.07
F	Taraxacum officinale	9	6	.09	.09
Total for Annual Forbs		17	0	0.09	0
Total for Perennial Forbs		237	243	2.46	3.81
Total for Forbs		254	243	2.54	3.81

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

BROWSE TRENDS--

Management unit 17, Study no: 65

Type	Species	Strip Frequency		Average Cover %	
		'05	'10	'05	'10
B	Amelanchier utahensis	11	14	1.68	1.81
B	Artemisia tridentata vaseyana	50	54	5.24	4.01
B	Cercocarpus montanus	54	52	6.47	6.90
B	Chrysothamnus depressus	2	5	-	.21
B	Chrysothamnus nauseosus hololeucus	1	0	.03	-
B	Chrysothamnus viscidiflorus viscidiflorus	56	52	1.83	1.70
B	Gutierrezia sarothrae	11	11	.21	.36
B	Pediocactus simpsonii	1	1	-	.00
B	Pinus edulis	12	11	5.48	6.18
B	Symphoricarpos oreophilus	21	19	1.03	1.28
B	Tetradymia canescens	28	19	.40	.39
Total for Browse		247	238	22.40	22.88

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 65

Species	Percent Cover	
	'05	'10
Amelanchier utahensis	2.68	1.71
Artemisia tridentata vaseyana	4.50	3.71
Cercocarpus montanus	10.38	10.75
Chrysothamnus viscidiflorus viscidiflorus	1.58	2.28
Gutierrezia sarothrae	-	.35
Pinus edulis	7.40	13.31
Symphoricarpos oreophilus	1.01	.90
Tetradymia canescens	.25	.35

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 65

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	3.2	2.1
Cercocarpus montanus	3.6	2.5

POINT-QUARTER TREE DATA--

Management unit 17, Study no: 65

Species	Trees per Acre		Average diameter (in)	
	'05	'10	'05	'10
Pinus edulis	233	193	2.7	3.1

BASIC COVER--

Management unit 17, Study no: 65

Cover Type	Nested Frequency		Average Cover %	
	'05	'10	'05	'10
Vegetation	390	362	39.93	42.47
Rock	169	102	3.64	3.45
Pavement	277	231	16.93	16.52
Litter	432	456	35.96	52.31
Cryptogams	34	2	1.19	.03
Bare Ground	270	192	15.76	13.15

SOIL ANALYSIS DATA --

Management unit 17, Study no: 65, Study Name: Little Horse Ridge

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.0	7.4	25.1	41.7	33.2	3.5	5.2	220.8	0.7

PELLET GROUP DATA--

Management unit 17, Study no: 65

Type	Quadrat Frequency		Days use per acre (ha)	
	'05	'10	'05	'10
Rabbit	53	8	-	-
Moose	2	-	1 (2)	-
Horse	3	-	6 (16)	-
Elk	-	7	3 (7)	11 (28)
Deer	17	14	34 (83)	35 (86)
Cattle	-	-	2 (6)	-

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 65

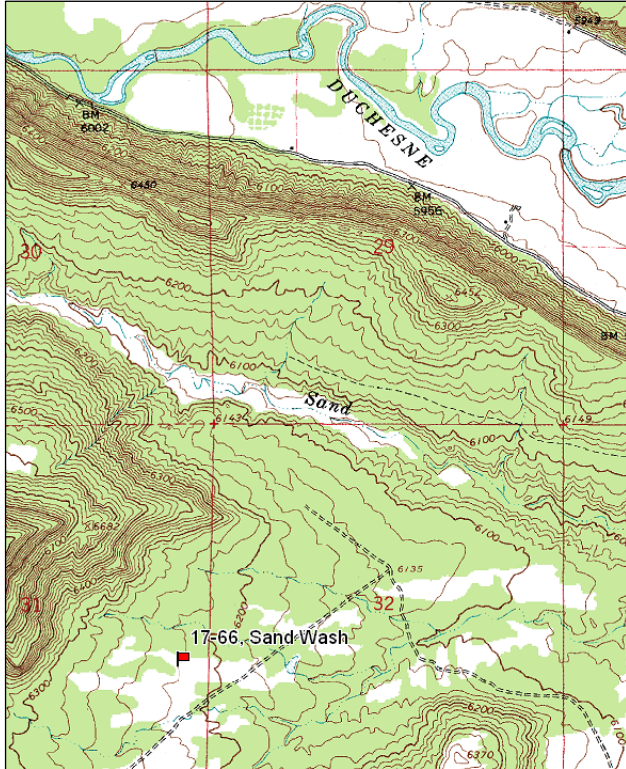
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
05	400	40	60	-	20	25	20	0	50/48
10	400	25	75	-	20	40	5	0	48/51
<i>Artemisia tridentata vaseyana</i>									
05	1460	16	42	41	460	41	10	21	25/32
10	1480	23	51	26	340	26	11	24	23/30
<i>Cercocarpus montanus</i>									
05	2600	45	54	2	1280	17	65	.76	43/41
10	2160	29	70	1	5500	26	29	.92	43/40
<i>Chrysothamnus depressus</i>									
05	140	0	100	0	-	57	0	0	4/5
10	120	17	67	17	-	0	0	17	7/12
<i>Chrysothamnus nauseosus hololeucus</i>									
05	20	0	100	-	-	0	0	0	8/4
10	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
05	2400	8	93	-	40	3	0	0	10/11
10	2060	10	90	-	20	0	0	0	12/14
<i>Gutierrezia sarothrae</i>									
05	300	27	73	-	-	0	0	0	6/6
10	900	9	91	-	-	0	0	0	5/7
<i>Juniperus osteosperma</i>									
05	0	0	0	-	40	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Pediocactus simpsonii</i>									
05	20	0	100	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	0/2
<i>Pinus edulis</i>									
05	240	33	67	-	20	0	0	0	-/-
10	220	27	73	-	20	0	0	18	-/-
<i>Purshia tridentata</i>									
05	0	0	0	-	-	0	0	0	9/11
10	0	0	0	-	-	0	0	0	15/27
<i>Symphoricarpos oreophilus</i>									
05	720	25	72	3	20	3	3	3	15/21
10	680	32	68	0	140	3	0	0	16/26
<i>Tetradymia canescens</i>									
05	720	8	72	19	20	19	6	14	9/9
10	460	17	74	9	80	0	0	9	10/10

SAND WASH - TREND STUDY NO. 17-66-10

Vegetation Type: Wyoming Big Sagebrush
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: UDWR
Elevation: 6230 ft. (1899 m)
Aspect: Northeast
Slope: 4%
Transect bearing: 85° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

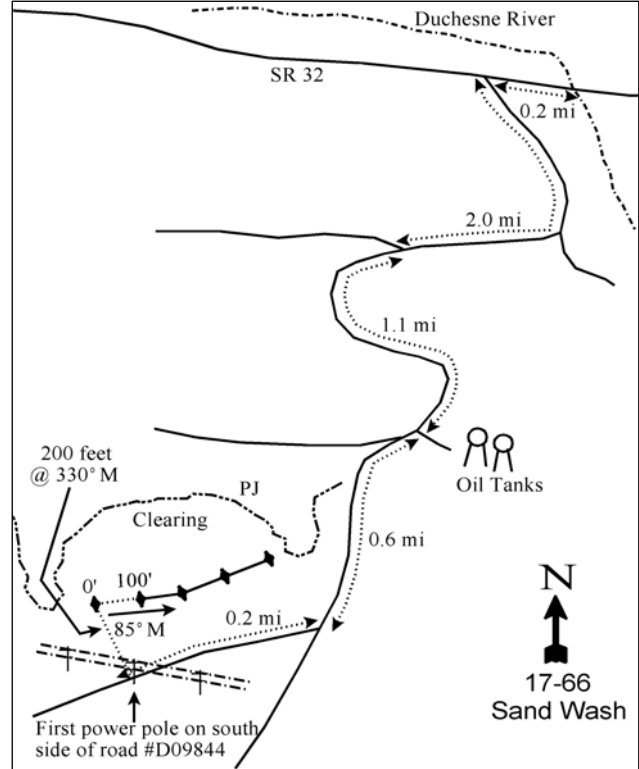
Directions:
 From State Route 87, turn onto State Route 32 and go west toward the Duchesne River. Turn left onto a road heading south 0.2 miles after crossing the Duchesne River. Travel 2.0 miles to a fork in the road and stay to the left. Continue another 1.1 miles to a fork that goes to some oil tanks. Drive straight for 0.6 miles to another fork. Go to the right and drive 0.2 miles to the first power pole on the south side of the road, #D09844. From here walk 200 feet at 330°M to the 0-foot stake.

Map Name: Talmage



Township: 2S Range: 5W Section: 31

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 543761 E 4456848 N

SAND WASH - TREND STUDY NO. 17-66

Site Information

Site Description: The study is located within a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) community. The study is on land owned and managed by the Utah Division of Wildlife Resources (UDWR) as part of the Rabbit Gulch Wildlife Management Area (WMA). Grazing has not been permitted on the WMA for many years. Pellet group transect data has estimated light to moderate use by deer and elk, and very light use by cattle since 2005 (Table - Pellet Group Data).

Browse: Browse species are not abundant, but the key browse species is Wyoming big sagebrush which provides the only notable cover of preferred browse (Table - Canopy Cover). Wyoming big sagebrush consists of a small population of mature plants with high decadence and poor vigor. Utilization of sagebrush has been light to moderate with a few plants displaying heavy use. There was no new recruitment of young sagebrush plants in 2005, but recruitment was good in 2010. Other shrubs include small populations of winter fat (*Ceratoides lanata*), broom snakeweed (*Gutierrezia sarothrae*) and yucca (*Yucca* sp.) (Table - Browse Characteristics). Pinyon and juniper are very abundant surrounding the site, but are found in fairly low density on the study site (Table - Point-Quarter Data).

Herbaceous Understory: Perennial grasses are diverse and abundant, but are dominated by just a few species. Needle-and-thread (*Stipa comata*) provides the majority of the vegetation cover on the site, but galleta (*Hilaria jamesii*) is also very common. Other perennial grasses include blue grama (*Bouteloua gracilis*), Indian ricegrass (*Oryzopsis hymenoides*) and Salina wildrye (*Elymus salina*). Forbs are very limited on the site and are comprised of a mixture of annual and perennial species (Table - Herbaceous Trends)

Soil: The soil has a sandy loam texture with a slightly alkaline soil reaction (pH 7.7). Bare ground cover is high with vegetation and litter cover provided almost exclusively by the few perennial grass species (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **2005 to 2010 - up (+2):** The density of Wyoming big sagebrush increased by 38% from 1,120 plants/acre to 1,540 plants/acre with an increase in the recruitment of young plants from 0% to 17% of the population. Decadence of sagebrush decreased from 77%, but remained high at 45%. Poor vigor of sagebrush remained high at 47%.

Grass:

- **2005 to 2010 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial grasses, but cover increased from 17% to 27%. There was a significant decrease in the nested frequency of needle-and-thread and Salina wildrye.

Forb:

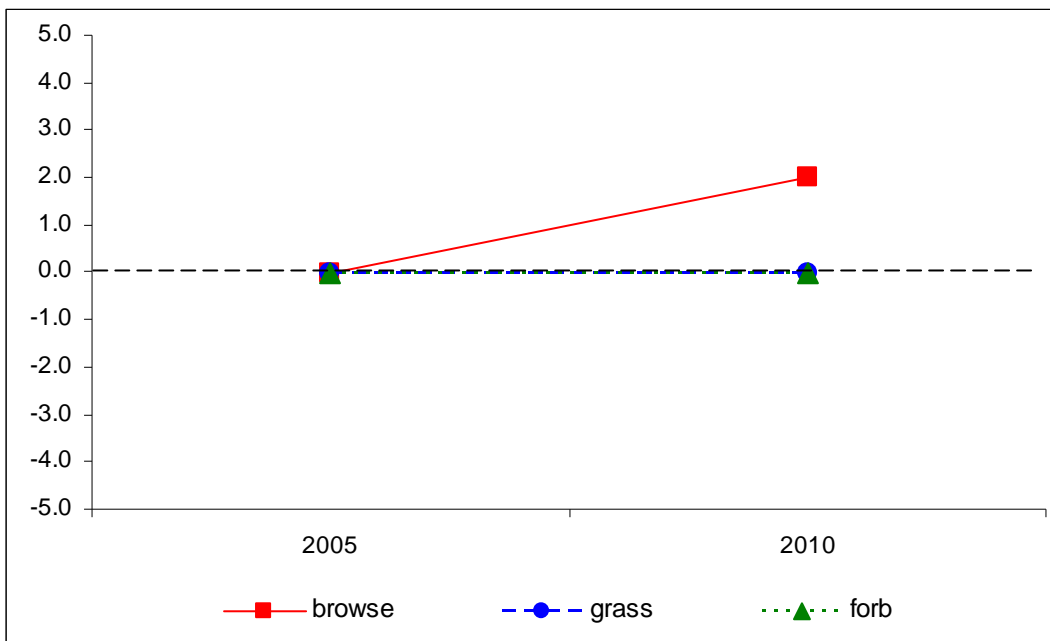
- **2005 to 2010 - stable (0):** Perennial forbs are very rare on the site and cover was less than 1%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
 Management unit 17, study no: 66

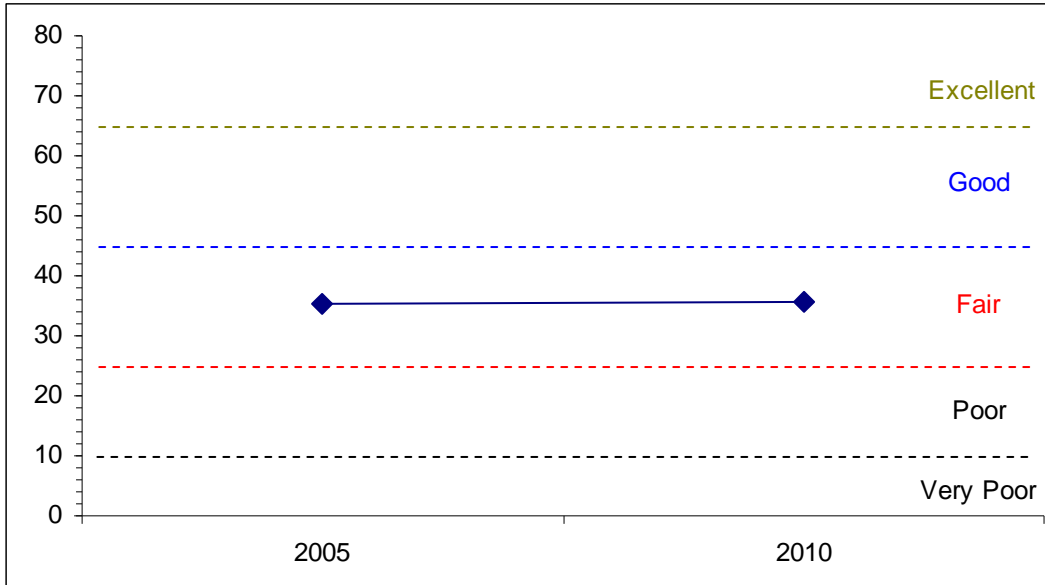
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
05	4.4	0.0	0.0	30.0	0.0	1.1	0.0	35.5	Fair
10	4.9	0.0	0.0	30.0	0.0	0.9	0.0	35.7	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 17, Study no: 66



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 17, Study no: 66



HERBACEOUS TRENDS--
 Management unit 17, Study no: 66

Type	Species	Nested Frequency		Average Cover %	
		'05	'10	'05	'10
G	<i>Bouteloua gracilis</i>	8	26	.11	.67
G	<i>Elymus salina</i>	_b 71	_a 23	.67	.71
G	<i>Hilaria jamesii</i>	134	154	3.61	5.25
G	<i>Oryzopsis hymenoides</i>	4	4	.03	.18
G	<i>Sitanion hystrix</i>	1	8	.00	.07
G	<i>Stipa comata</i>	_b 319	_a 283	12.82	19.95
G	<i>Vulpia octoflora</i> (a)	3	2	.01	.03
Total for Annual Grasses		3	2	0.00	0.03
Total for Perennial Grasses		537	498	17.27	26.85
Total for Grasses		540	500	17.28	26.88
F	<i>Allium</i> sp.	-	4	-	.01
F	<i>Chaenactis douglasii</i>	-	2	-	.01
F	<i>Chenopodium album</i> (a)	7	7	.01	.02
F	<i>Chenopodium leptophyllum</i> (a)	2	3	.00	.01
F	<i>Collinsia parviflora</i> (a)	3	1	.01	.00
F	<i>Cryptantha</i> sp.	1	2	.00	.07
F	<i>Descurainia pinnata</i> (a)	_b 10	_a 1	.03	.03
F	<i>Eriogonum cernuum</i> (a)	_b 57	_a 16	.21	.04
F	<i>Eriogonum</i> sp.	-	1	-	.00
F	<i>Haplopappus acaulis</i>	_b 14	_a -	.31	-
F	<i>Hymenoxys acaulis</i>	_b 11	_a -	.06	-
F	<i>Lappula occidentalis</i> (a)	17	15	.50	.27
F	<i>Navarretia intertexta</i> (a)	11	30	.05	.11
F	<i>Phlox austromontana</i>	2	2	.03	.03

Type	Species	Nested Frequency		Average Cover %	
		'05	'10	'05	'10
F	<i>Sphaeralcea coccinea</i>	11	15	.13	.22
F	<i>Townsendia incana</i>	8	5	.02	.04
F	<i>Tragopogon dubius</i>	-	5	-	.03
Total for Annual Forbs		107	73	0.82	0.50
Total for Perennial Forbs		47	36	0.56	0.44
Total for Forbs		154	109	1.38	0.94

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

BROWSE TRENDS--

Management unit 17, Study no: 66

Type	Species	Strip Frequency		Average Cover %	
		'05	'10	'05	'10
B	<i>Artemisia tridentata wyomingensis</i>	39	53	3.38	3.90
B	<i>Ceratoides lanata</i>	2	1	.15	-
B	<i>Gutierrezia sarothrae</i>	0	3	-	-
B	<i>Juniperus osteosperma</i>	4	5	1.83	2.50
B	<i>Leptodactylon pungens</i>	1	1	.00	.00
B	<i>Opuntia sp.</i>	13	17	.15	.09
B	<i>Sclerocactus sp.</i>	1	1	.03	-
B	<i>Yucca sp.</i>	1	2	.15	-
Total for Browse		61	83	5.72	6.51

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 66

Species	Percent Cover	
	'05	'10
<i>Artemisia tridentata wyomingensis</i>	4.80	5.80
<i>Gutierrezia sarothrae</i>	-	.11
<i>Juniperus osteosperma</i>	4.46	3.91
<i>Opuntia sp.</i>	.21	.41
<i>Yucca sp.</i>	-	.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 66

Species	Average leader growth (in)	
	'05	'10
<i>Artemisia tridentata wyomingensis</i>	2.1	1.4

POINT-QUARTER TREE DATA--
Management unit 17, Study no: 66

Species	Trees per Acre	
	'05	'10
Juniperus osteosperma	45	46
Pinus edulis	21	24

Average diameter (in)	
'05	'10
7.0	5.8
1.9	1.6

BASIC COVER--
Management unit 17, Study no: 66

Cover Type	Average Cover %	
	'05	'10
Vegetation	25.61	37.04
Rock	.06	0
Pavement	.16	.07
Litter	27.84	38.26
Cryptogams	2.95	2.10
Bare Ground	51.04	45.13

SOIL ANALYSIS DATA --
Management unit 17, Study no: 66, Study Name: Sand Wash

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.8	7.7	64.7	17.1	18.2	0.6	6.4	64.0	0.5

PELLET GROUP DATA--
Management unit 17, Study no: 66

Type	Quadrat Frequency		Days use per acre (ha)	
	'05	'10	'05	'10
Rabbit	50	40	-	-
Elk	26	29	19 (48)	34 (84)
Deer	19	29	21 (51)	45 (101)
Cattle	1	4	-	3 (7)

BROWSE CHARACTERISTICS--
Management unit 17, Study no: 66

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>									
05	1120	0	23	77	-	43	20	48	16/28
10	1540	17	38	45	40	39	10	47	16/26
<i>Ceratoides lanata</i>									
05	40	0	100	-	-	0	50	0	9/13
10	20	0	100	-	-	0	100	0	6/7
<i>Grayia spinosa</i>									
05	0	0	0	-	-	0	0	0	23/30
10	0	0	0	-	-	0	0	0	22/28
<i>Gutierrezia sarothrae</i>									
05	0	0	0	-	-	0	0	0	-/-
10	100	20	80	-	-	0	0	0	8/11
<i>Juniperus osteosperma</i>									
05	100	20	80	-	-	0	0	0	-/-
10	100	40	60	-	-	0	0	0	-/-
<i>Leptodactylon pungens</i>									
05	20	0	0	100	-	100	0	100	-/-
10	20	0	100	0	20	0	0	0	3/5
<i>Opuntia sp.</i>									
05	400	5	95	-	-	0	0	0	4/14
10	380	0	100	-	-	0	0	0	5/15
<i>Sclerocactus sp.</i>									
05	60	100	0	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	1/2
<i>Yucca sp.</i>									
05	80	100	0	-	-	0	0	0	10/15
10	100	60	40	-	-	0	0	0	9/22

RABBIT GULCH - TREND STUDY NO. 17-67-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 5960 ft. (1817 m)

Aspect: East

Slope: 3%

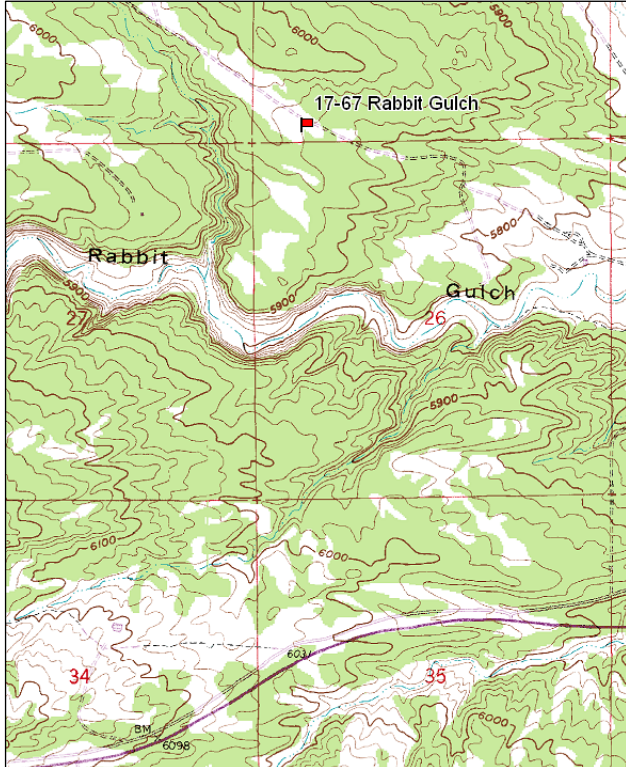
Transect bearing: 275° magnetic

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

Directions:

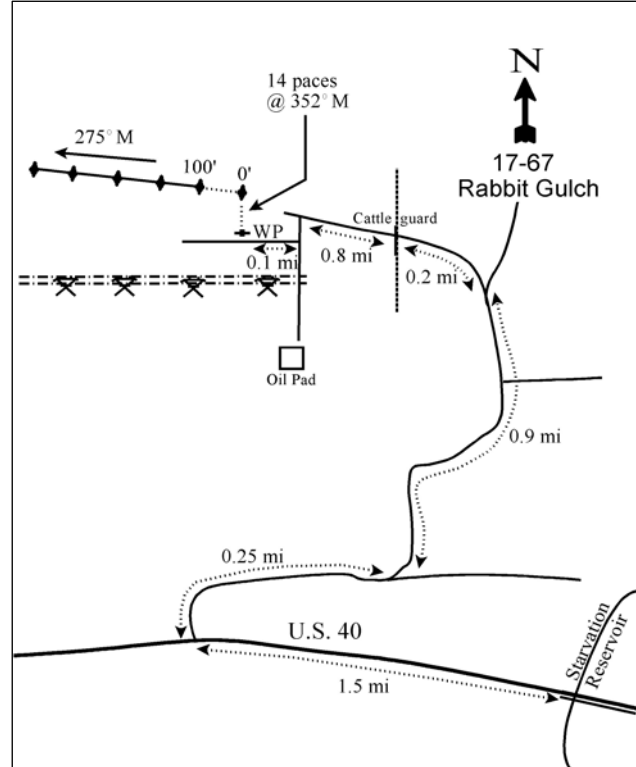
From the Starvation Bridge on U.S. 40, travel west 1.5 miles to a turnoff (28000 West) on the north side of the road. Follow this road 0.25 miles to a fork. Continue left 0.9 miles and staying left. Continue 0.2 miles to a cattleguard and fence. After the cattleguard proceed 0.8 miles to a turn off onto an oil pad. Turn left and immediately turn onto a two-track powerline road. Go 0.1 miles to a witness post on the right side of the road. From the witness post walk 14 paces at 352°M to the 0-foot stake, which is marked by browse tag #94.

Map Name: Rabbit Gulch



Township: 3S Range: 6W Section: 23

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 539370 E 4449884 N

RABBIT GULCH - TREND STUDY NO. 17-67

Site Information

Site Description: The study is located in an old chaining on the south side of the Uintah Mountains. The land is managed by the Utah Division of Wildlife Resources (UDWR) as part of the Rabbit Gulch Wildlife Management Area (WMA). The area was hand treated as part of a Dedicated Hunter program area to remove pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees. Cutting occurred from the fall of 2004 to 2007 over approximately 1,250 acres. Grazing is managed by the UDWR on a Spring (April/May) system to promote browse. Pellet group transect data has estimated very heavy use by deer and moderate use by elk since 2001. Estimated use by cattle has been light over the same period (Table - Pellet Group Data).

Browse: The key browse species consist of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) hybridized with black sagebrush (*A. nova*). Both species were classified as Wyoming big sagebrush due to difficulties in differentiating between the two species. The sagebrush consists of a small population of mostly mature plants with heavy utilization and low recruitment of young plants. In 2005, there was a substantial decrease in the density of sagebrush and a large increase in decadence. Decadence of sagebrush has been low to moderate in all other sample years. Other less abundant browse species include fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), winterfat (*Ceratoides lanata*) and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) (Table - Browse Characteristics). Prior to the treatment, pinyon and juniper trees had begun to invade the old chaining at low density (Table - Point-Quarter Tree Data) and cover. Following the treatment, there was no notable cover of either species (Table - Browse Trends).

Herbaceous Understory: The herbaceous component is comprised primarily of perennial grasses. Crested wheatgrass (*Agropyron cristatum*) was seeded sometime in the past and was the most abundant species prior to the tree removal treatment. Following the treatment, needle-and-thread (*Stipa comata*) has provided the most grass cover, though crested wheatgrass is still common. The warm season native grass, blue grama (*Bouteloua gracilis*), is also fairly common. Six weeks fescue (*Vulpia octoflora*) was fairly abundant from 1997 to 2005, but was rare in 2010. Forbs are rare and provide little forage value, especially perennial species (Table - Herbaceous Trends).

Soil: The soils have a sandy loam texture with a moderately alkaline soil reaction (pH 8.0). Phosphorus may have limited availability for plant growth and development at 5.1 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Nearly half of the soil surface is covered by bare ground, while vegetation and litter cover have only moderate values. Cryptogam cover was high in 1997, but has been low in each subsequent reading (Table - Basic Cover). The soil erosion condition was classified stable in 2005, but was slight in 2010 due to the formation of pedestals around shrubs, flow patterns, gullies, and litter and soil movement.

Trend Assessments

Browse:

- **1997 to 2001 - stable (0):** There was little change in the density or cover of Wyoming big sagebrush on the site. Decadence of sagebrush increased from 11% to 27%, but poor vigor decreased from 42% to 20%. Recruitment of young sagebrush plants decreased from 28% to 7% of the population.
- **2001 to 2005 - down (-2):** The density of sagebrush decreased 40% from 3,080 plants/acre to 1,840 plants/acre and cover decreased from 4% to 2%. Decadence of sagebrush increased to 46% and poor vigor increased to 36%.
- **2005 to 2010 - slightly up (+1):** The sagebrush density and cover remained similar, but the population is healthier. Decadence of sagebrush decreased to 18% and poor vigor decreased to 2%.

Grass:

- **1997 to 2001 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, but cover increased from 11% to 26%.

- **2001 to 2005 - stable (0):** The sum of nested frequency of perennial grasses remained similar, but there was a large change in composition. The nested frequency of crested wheatgrass decreased significantly and needle-and-thread increased significantly in nested frequency. Cover of crested wheatgrass decreased from 15% to 3% and cover of needle-and-thread increased from 4% to 17%.
- **2005 to 2010 - stable (0):** The perennial grass sum of nested frequency and cover remained similar, though crested wheatgrass increased in nested frequency and cover and needle-and-thread has decreased. Crested wheatgrass was co-dominant on the site.

Forb:

- **1997 to 2001 - stable (0):** Perennial forbs are extremely rare on the site.
- **2001 to 2005 - slightly up (+1):** There was a slight increase in the sum of nested frequency and cover of perennial forbs, but they remain rare and provide less than 1% cover.
- **2005 to 2010 - slightly down (-1):** The perennial forb sum of nested frequency decreased to 2001 levels.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

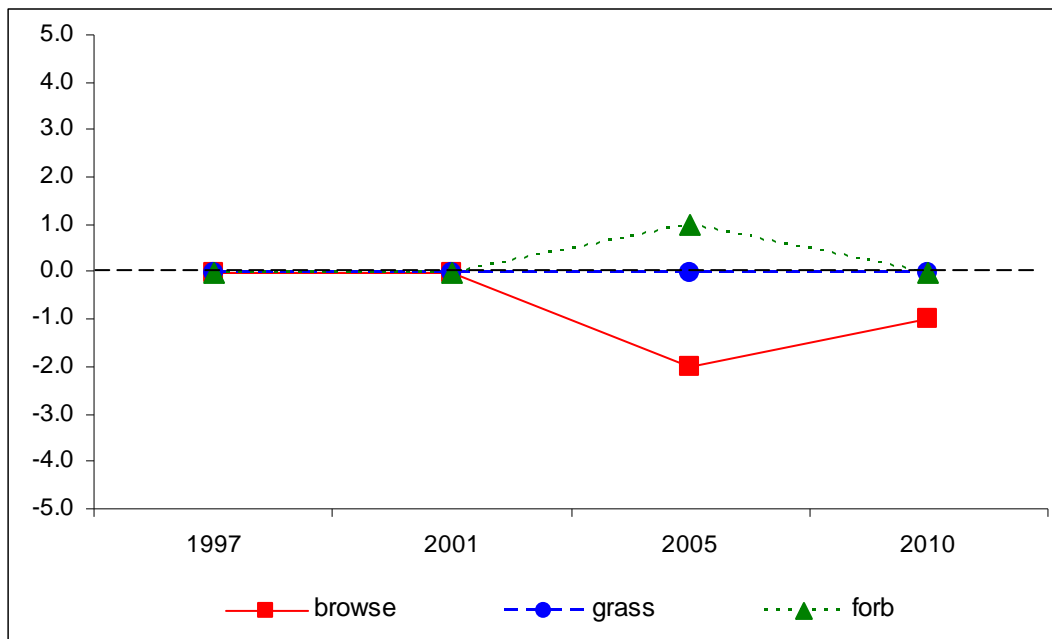
Management unit 17, study no: 67

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
97	5.4	0.0	0.0	21.4	-0.5	0.1	0.0	26.5	Poor-Fair
01	5.6	0.0	0.0	30.0	-0.1	0.1	0.0	35.6	Fair
05	3.2	0.0	0.0	30.0	-1.8	1.8	0.0	33.2	Fair
10	3.6	0.0	0.0	30.0	0.0	0.7	0.0	34.3	Fair

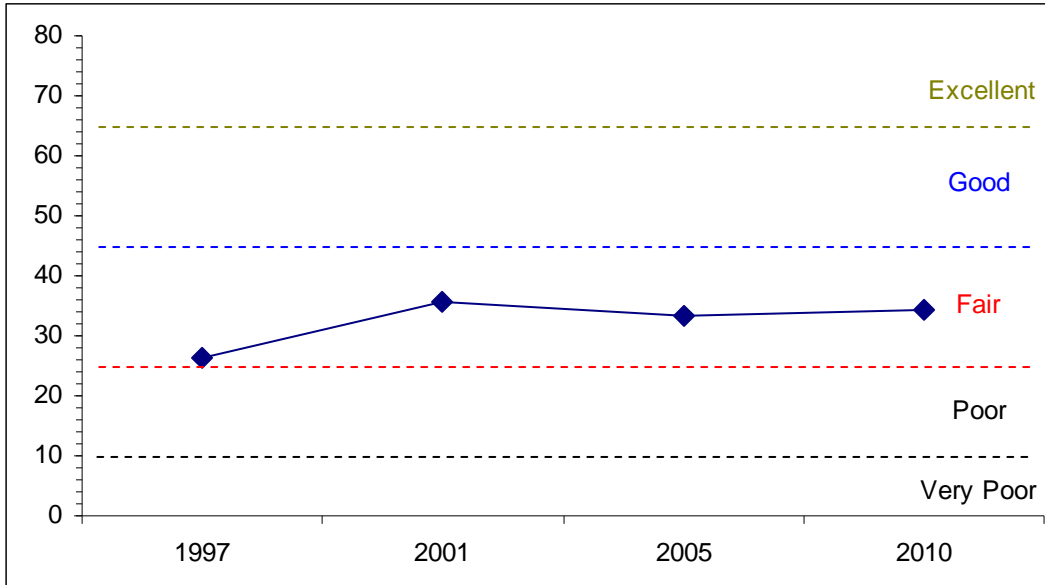
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 17, Study no: 67



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 17, Study no: 67



HERBACEOUS TRENDS--
 Management unit 17, Study no: 67

Type	Species	Nested Frequency				Average Cover %			
		'97	'01	'05	'10	'97	'01	'05	'10
G	<i>Agropyron cristatum</i>	c347	c312	a153	b230	8.44	15.27	3.39	8.28
G	<i>Agropyron dasystachyum</i>	b22	a1	a-	a-	.16	.00	-	-
G	<i>Bouteloua gracilis</i>	a71	b141	a58	a54	.85	6.03	1.25	1.58
G	<i>Bromus tectorum</i> (a)	-	-	-	-	.00	-	-	-
G	<i>Elymus junceus</i>	a3	b22	ab10	ab11	.03	.43	.21	.33
G	<i>Hilaria jamesii</i>	-	-	8	8	-	-	.18	.33
G	<i>Oryzopsis hymenoides</i>	13	15	15	13	.17	.25	.26	.33
G	<i>Poa fendleriana</i>	-	-	-	1	-	-	-	.00
G	<i>Poa secunda</i>	-	-	-	3	-	-	-	.00
G	<i>Stipa comata</i>	a76	a75	c295	b229	1.03	3.54	17.02	13.74
G	<i>Vulpia octoflora</i> (a)	c127	b44	d192	a1	.61	.15	2.36	.00
Total for Annual Grasses		127	44	192	1	0.62	0.15	2.36	0.00
Total for Perennial Grasses		532	566	539	549	10.71	25.53	22.32	24.63
Total for Grasses		659	610	731	550	11.33	25.68	24.69	24.63
F	<i>Alyssum alyssoides</i> (a)	4	-	2	-	.00	-	.01	-
F	<i>Chenopodium fremontii</i> (a)	a2	a2	b21	a1	.01	.01	.25	.00
F	<i>Chenopodium leptophyllum</i> (a)	a-	a-	b27	a-	-	-	.22	-
F	<i>Collinsia parviflora</i> (a)	a-	ab6	b12	a1	-	.01	.05	.03
F	<i>Collomia linearis</i> (a)	3	-	-	-	.00	-	-	-
F	<i>Crepis acuminata</i>	-	-	-	2	-	-	-	.03
F	<i>Cryptantha</i> sp.	3	-	-	-	.00	-	-	-
F	<i>Descurainia pinnata</i> (a)	a-	a6	b43	a4	-	.42	.35	.00
F	<i>Draba</i> sp. (a)	-	-	1	-	-	-	.00	-
F	<i>Eriogonum cernuum</i> (a)	5	6	-	1	.01	.04	-	.00

Type	Species	Nested Frequency				Average Cover %			
		'97	'01	'05	'10	'97	'01	'05	'10
F	<i>Gilia</i> sp. (a)	-	-	2	-	-	-	.00	-
F	<i>Hymenoxys richardsonii</i>	-	4	9	-	-	.06	.23	-
F	<i>Lappula occidentalis</i> (a)	a-	b33	c91	a4	-	.51	.91	.06
F	<i>Machaeranthera grindelioides</i>	1	-	1	-	.00	-	.00	-
F	<i>Phlox longifolia</i>	-	6	-	-	-	.01	-	-
F	<i>Plantago patagonica</i> (a)	-	-	3	-	-	-	.03	-
F	<i>Schoenrambe linifolia</i>	-	-	-	1	-	-	-	.03
F	<i>Sphaeralcea coccinea</i>	a4	a6	b23	ab14	.01	.01	.38	.31
F	<i>Townsendia incana</i>	ab6	a-	b14	a1	.01	-	.28	.00
Total for Annual Forbs		14	53	202	11	0.03	1.00	1.84	0.10
Total for Perennial Forbs		14	16	47	18	0.03	0.07	0.90	0.37
Total for Forbs		28	69	249	29	0.07	1.07	2.75	0.48

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

BROWSE TRENDS--

Management unit 17, Study no: 67

Type	Species	Strip Frequency				Average Cover %			
		'97	'01	'05	'10	'97	'01	'05	'10
B	<i>Artemisia tridentata wyomingensis</i>	70	62	50	51	4.35	4.43	2.42	2.60
B	<i>Atriplex canescens</i>	0	0	1	2	-	-	-	.15
B	<i>Atriplex confertifolia</i>	0	1	1	2	-	.03	.15	.15
B	<i>Ceratoides lanata</i>	1	2	0	0	-	-	-	-
B	<i>Chrysothamnus nauseosus consimilis</i>	0	2	0	0	-	.60	-	.15
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	15	12	4	2	.61	.84	.53	.00
B	<i>Eriogonum microthecum</i>	0	1	0	0	-	-	-	-
B	<i>Gutierrezia sarothrae</i>	25	24	30	18	.16	.98	.64	.25
B	<i>Juniperus osteosperma</i>	1	1	0	2	1.03	.76	-	-
B	<i>Opuntia</i> sp.	24	22	28	27	.27	.36	.78	.77
B	<i>Sclerocactus</i> sp.	1	2	1	0	.03	.06	.03	-
Total for Browse		137	129	115	104	6.47	8.07	4.56	4.09

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 67

Species	Percent Cover		
	'01	'05	'10
Artemisia tridentata wyomingensis	-	2.31	3.68
Atriplex confertifolia	-	.28	.01
Chrysothamnus viscidiflorus viscidiflorus	-	.20	-
Gutierrezia sarothrae	-	.90	.76
Juniperus osteosperma	.20	-	-
Opuntia sp.	-	.25	.63
Sclerocactus sp.	-	.08	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 67

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.8	1.6

POINT-QUARTER TREE DATA--

Management unit 17, Study no: 67

Species	Trees per Acre			
	'97	'01	'05	'10
Juniperus osteosperma	27	68	-	-
Pinus edulis	9	29	-	-

Average diameter (in)			
'97	'01	'05	'10
5.5	2.8	-	-
3.2	2.9	-	-

BASIC COVER--

Management unit 17, Study no: 67

Cover Type	Average Cover %			
	'97	'01	'05	'10
Vegetation	14.82	33.59	29.00	32.35
Rock	.01	0	0	0
Pavement	.08	0	.15	0
Litter	23.74	27.52	24.78	37.34
Cryptogams	5.82	.94	.72	.20
Bare Ground	47.28	48.83	54.71	44.58

SOIL ANALYSIS DATA --

Management unit 17, Study no: 67, Study Name: Rabbit Gulch

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.3	8.0	78.6	10.8	10.6	0.6	5.1	96.0	0.4

PELLET GROUP DATA--

Management unit 17, Study no: 67

Type	Quadrat Frequency			
	'97	'01	'05	'10
Rabbit	16	31	42	24
Elk	3	22	10	8
Deer	72	85	53	49
Cattle	3	1	5	6

Days use per acre (ha)			
'97	'01	'05	'10
-	-	-	-
15 (38)	26 (65)	17 (43)	42 (104)
121 (298)	171 (423)	94 (231)	64 (157)
12 (29)	2 (5)	12 (31)	4 (11)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 67

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata wyomingensis</i>									
97	3060	28	61	11	60	63	22	42	19/31
01	3080	7	66	27	-	37	42	20	11/19
05	1840	1	53	46	2980	29	63	36	17/24
10	1800	6	77	18	-	11	47	2	14/24
<i>Atriplex canescens</i>									
97	0	0	0	-	-	0	0	0	-/-
01	0	0	0	-	-	0	0	0	43/62
05	60	100	0	-	-	0	0	0	26/37
10	40	0	100	-	-	0	0	0	34/44
<i>Atriplex confertifolia</i>									
97	0	0	0	0	-	0	0	0	-/-
01	20	0	0	100	-	0	0	0	13/31
05	60	0	100	0	-	0	0	0	21/39
10	80	0	100	0	-	0	0	0	16/41
<i>Ceratoides lanata</i>									
97	20	0	100	-	-	100	0	0	7/7
01	40	100	0	-	-	0	0	0	14/10
05	0	0	0	-	-	0	0	0	23/26
10	0	0	0	-	-	0	0	0	15/19
<i>Chrysothamnus nauseosus consimilis</i>									
97	0	0	0	0	-	0	0	0	-/-
01	40	0	50	50	-	0	0	50	11/10
05	0	0	0	0	-	0	0	0	-/-
10	0	0	0	0	-	0	0	0	11/11
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
97	560	39	61	0	-	11	0	4	15/24
01	400	15	75	10	-	0	0	40	11/20
05	100	0	100	0	-	0	0	0	15/21
10	40	50	50	0	-	0	0	0	11/16

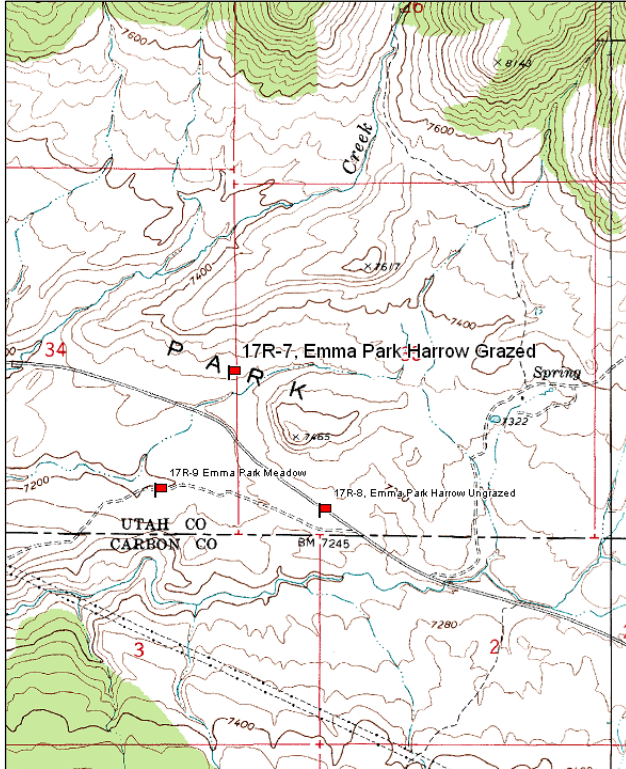
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Eriogonum microthecum</i>									
97	0	0	0	-	-	0	0	0	-/-
01	40	0	100	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
97	980	12	88	0	80	0	0	0	7/8
01	1280	0	94	6	-	0	0	6	6/8
05	1660	0	100	0	-	0	0	0	9/11
10	740	11	86	3	-	0	0	3	6/10
<i>Juniperus osteosperma</i>									
97	20	100	0	-	-	0	0	0	-/-
01	20	0	100	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	40	100	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
97	560	11	86	4	-	0	0	4	5/12
01	620	13	81	6	40	0	0	0	3/12
05	620	6	87	6	-	0	0	0	6/19
10	860	16	84	0	120	5	0	0	5/19
<i>Sclerocactus sp.</i>									
97	20	0	100	-	-	0	0	0	-/-
01	40	50	50	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	5/4
10	0	0	0	-	-	0	0	0	-/-

EMMA PARK HARROW GRAZED - TREND STUDY NO. 17R-7-10

Vegetation Type: Harrowed, Seeded Mountain Big Sagebrush
Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer
NRCS Ecological Site Description: Not Available
Land Ownership: BLM
Elevation: 7270 ft. (2216 m)
Aspect: Southwest
Slope: 5%
Transect bearing: 246° magnetic
Belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).

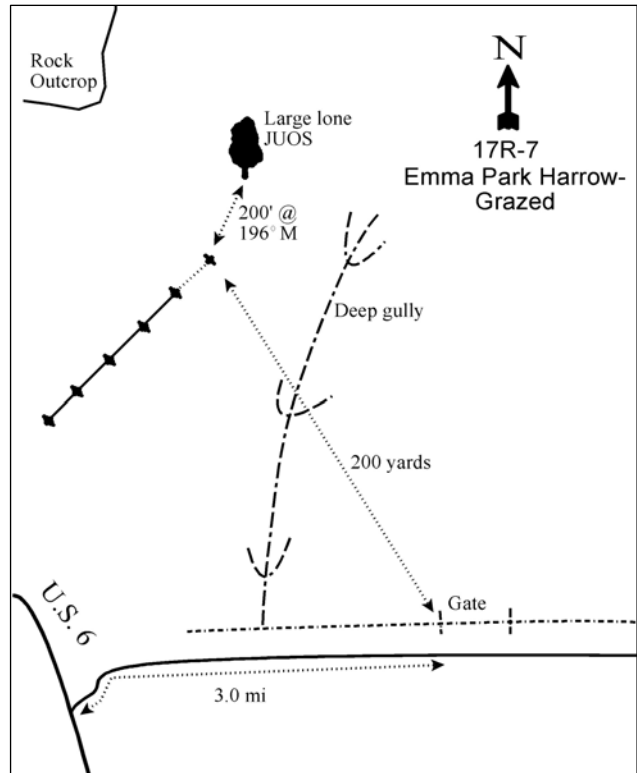
Directions:
From the Kyune turnoff on U.S. 6 travel 3.0 miles to a gate on the north side of the road. From the gate walk approximately 200 yards towards a lone, large juniper tree on the other side of the deep gully. The 0-foot post is about 200 feet south of the juniper and is marked by browse tag #422.

Map Name: Kyune



Township: 11S Range: 9E Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 508917 E 4407739 N

EMMA PARK HARROW GRAZED - TREND STUDY NO. 17R-7

Site Information

Site Description: The study is located about three miles east of the junction of Highway 6 and Kyune in Spanish Fork Canyon. The area had been pipe harrowed one-way and seeded prior to placement of the transect. This study was paired with study 17R-8 to monitor site differences with and without livestock grazing following a pipe harrow treatment. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Kyune I allotment. Cattle grazing will still occur on this site, but not on study 17R-8. Pellet group transect data has indicated light use by deer and elk since 2001. Estimated use by cattle was light in 2005, but was moderate in 2010 (Table - Pellet Group Data).

Browse: The dominant browse species on the site is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), which provides nearly all of the browse cover on the site. The cover (Table - Browse Trends) and density of sagebrush have increased since the outset of the study in 2001. In 2001, the sagebrush population was mostly mature with a high amount of decadence and poor vigor. In 2010, the population was a mixture of young and mature sagebrush plants with low decadence and good vigor. It appears the sagebrush population has rebounded quickly from the treatment. Utilization of sagebrush has been mostly light over the course of the study. The only other common browse species sampled was stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) (Table - Browse Characteristics). A small number of snowberry (*Symphoricarpos oreophilus*) and Utah serviceberry (*Amelanchier utahensis*) occur on and around the site, and it was noted that they all exhibited moderate to heavy use in 2010.

Herbaceous Understory: Grasses on the site are fairly diverse, but are not overly abundant. The grasses are comprised of a mixture of native and seeded species. The most common species include western wheatgrass (*Agropyron smithii*) and Salina wildrye (*Elymus salina*). Grasses were difficult to identify in 2001 due to the lack of seedheads on many individuals, and in 2010 due to grazing. Western wheatgrass and Salina wildrye were particularly hard to distinguish from each other. Forbs are diverse and fairly abundant, though most of the forb cover is provided by desert phlox (*Phlox austromontana*) which provides little forage value. Several seeded species were sampled in 2001 including Lewis flax (*Linum lewisii*), alfalfa (*Medicago sativa*) and small burnet (*Sanguisorba minor*), but only Lewis flax was sampled in 2010 (Table - Herbaceous Trends).

Soil: The soils are clay loam in texture with a soil reaction that is slightly alkaline (pH 7.5). Phosphorus may have limited availability for plant growth and development at 2.8 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderately high with all of the protective ground cover coming from vegetation and litter cover (Table - Basic Cover). The soil erosion condition was classified as slight in 2001, 2005 and 2010 because of pedestals around vegetation and flow patterns. Several active gullies also traverse the study.

Trend Assessments

Browse:

- **2001 to 2005 - slightly up (+1):** There was a 20% increase in the density of mountain big sagebrush from 3,980 plants/acre to 4,780 plants/acre, and cover increased from 11% to 14%. Decadence of sagebrush decreased from 39% to 8% and poor vigor decreased from 57% to 4%.
- **2005 to 2010 - up (+2):** The density of sagebrush increased three-fold to 15,400 plants/acre due to a large increase in the recruitment of young plants. Cover of sagebrush also increased slightly to 15%.

Grass:

- **2001 to 2005 - up (+2):** There was a 26% increase in the sum of nested frequency of perennial grasses, but cover increased only slightly from 12% to 13%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses changed little, but cover decreased to 9%.

Forb:

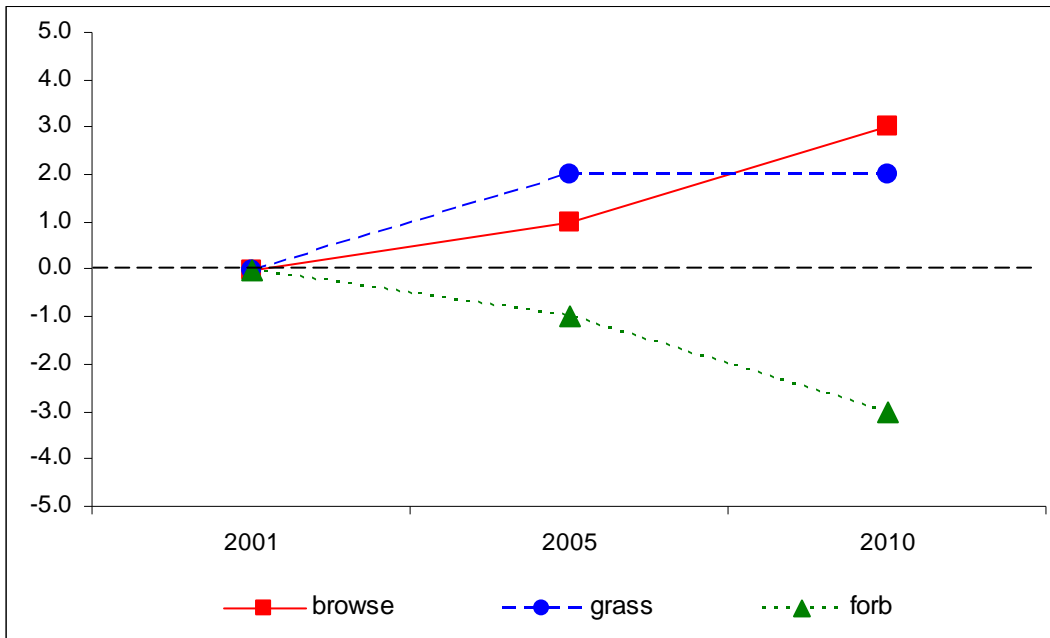
- **2001 to 2005 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 18% and cover decreased from 5% to 4%. There was a significant decrease in the nested frequency of yellow Indian paintbrush (*Castilleja flava*).
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 23%, though cover remained similar.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 17R, study no: 7

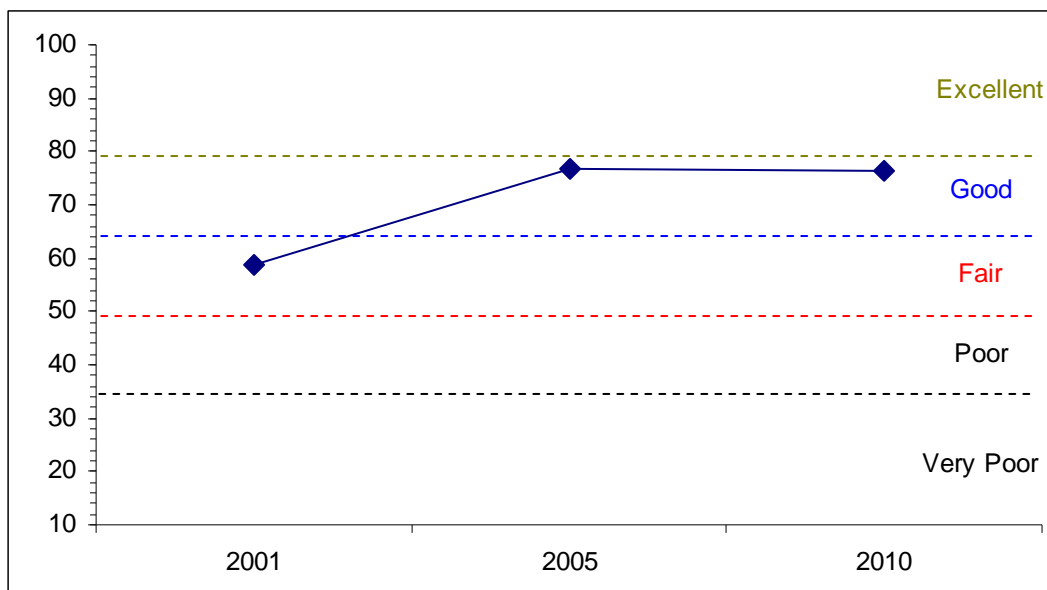
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
01	14.0	3.3	8.5	23.0	0.0	10.0	0.0	58.7	Fair
05	17.2	12.6	12.5	25.7	0.0	8.7	0.0	76.7	Good
10	19.3	14.4	15.0	18.7	0.0	8.9	0.0	76.3	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17R, Study no: 7



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 17R, Study no: 7



HERBACEOUS TRENDS--
 Management unit 17R, Study no: 7

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
G	Agropyron dasystachyum	a-	a4	b21	-	.16	.16
G	Agropyron intermedium	9	10	10	.07	.16	.02
G	Agropyron smithii	b208	a137	b197	7.38	2.05	3.59
G	Agropyron spicatum	18	17	26	.27	.31	.66
G	Bromus inermis	-	1	1	-	.00	.03
G	Carex sp.	-	7	5	.03	.04	.03
G	Elymus cinereus	2	-	-	.03	-	-
G	Elymus junceus	-	-	-	-	.03	-
G	Elymus salina	a87	b164	b175	2.52	6.44	3.86
G	Oryzopsis hymenoides	4	2	-	.06	.00	-
G	Poa fendleriana	a4	b92	a31	.01	2.46	.49
G	Poa pratensis	b17	a4	a8	.43	.06	.18
G	Poa secunda	20	36	23	.54	.81	.25
G	Stipa lettermani	b17	b11	a3	.14	.27	.03
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		386	485	500	11.49	12.83	9.34
Total for Grasses		386	485	500	11.49	12.83	9.34
F	Achillea millefolium	-	-	2	-	-	.00
F	Androsace septentrionalis (a)	-	2	-	-	.03	-
F	Antennaria rosea	4	4	9	.03	.00	.21
F	Arabis sp.	a2	b27	a-	.00	.10	-
F	Aster chilensis	-	10	6	-	.19	.04
F	Astragalus cicer	b13	a-	a4	.41	-	.03
F	Astragalus convallarius	b18	ab12	a5	.21	.04	.03

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
F	Astragalus tenellus	1	3	1	.03	.00	.03
F	Castilleja flava	_b 66	_a 6	_a 25	1.18	.04	.38
F	Chaenactis douglasii	_{ab} 24	_b 26	_a 6	.14	.35	.04
F	Chenopodium album (a)	-	8	3	-	.02	.00
F	Chenopodium leptophyllum(a)	_b 15	_{ab} 11	_a 5	.04	.02	.01
F	Cirsium sp.	-	3	4	-	.03	.15
F	Cleome serrulata (a)	-	-	-	.00	-	-
F	Descurainia pinnata (a)	2	-	-	.00	-	-
F	Erigeron sp.	-	2	-	-	.00	-
F	Gilia sp. (a)	4	-	-	.01	-	-
F	Hedysarum boreale	_a 11	_b 29	_{ab} 25	.06	.96	.67
F	Ipomopsis aggregata	_a -	_b 19	_a -	-	.06	-
F	Lactuca serriola	-	2	-	-	.00	-
F	Linum lewisii	7	6	1	.04	.05	.00
F	Lomatium sp.	-	-	-	-	.00	-
F	Lotus utahensis	2	-	-	.00	-	-
F	Machaeranthera canescens	_b 36	_b 45	_a 5	.43	.76	.01
F	Medicago sativa	4	-	-	.03	.00	-
F	Penstemon caespitosus	_b 71	_a 20	_a 14	.65	.15	.11
F	Penstemon palmeri	15	7	13	.40	.04	.05
F	Penstemon watsonii	-	1	-	-	.00	-
F	Petradoria pumila	-	5	-	-	.00	-
F	Phlox austromontana	64	72	86	1.06	1.16	2.30
F	Phlox longifolia	-	5	4	-	.03	.04
F	Polygonum douglasii (a)	2	2	-	.00	.00	-
F	Potentilla gracilis	7	-	6	.04	-	.06
F	Sanguisorba minor	_b 13	_a 2	_a -	.18	.00	-
F	Schoenocrambe linifolia	-	3	-	-	.01	-
F	Senecio multilobatus	3	1	-	.01	.01	.00
F	Sphaeralcea coccinea	39	24	37	.25	.29	.21
F	Taraxacum officinale	2	-	-	.03	-	-
F	Tragopogon dubius	4	-	-	.00	-	-
F	Trifolium sp.	2	-	3	.01	-	.04
Total for Annual Forbs		23	23	8	0.07	0.08	0.01
Total for Perennial Forbs		408	334	256	5.26	4.34	4.46
Total for Forbs		431	357	264	5.33	4.42	4.48

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

BROWSE TRENDS--

Management unit 17R, Study no: 7

Type	Species	Strip Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
B	Artemisia tridentata vaseyana	82	82	98	11.17	13.79	15.25
B	Atriplex canescens	-	-	-	-	-	.18
B	Chrysothamnus depressus	-	-	-	-	-	.03
B	Chrysothamnus nauseosus	9	12	16	.21	1.58	.40
B	Chrysothamnus viscidiflorus viscidiflorus	48	45	54	2.52	2.35	2.44
B	Gutierrezia sarothrae	0	11	1	-	1.21	.03
B	Symphoricarpos oreophilus	5	10	7	.00	.01	.07
B	Tetradymia canescens	4	8	7	-	.15	.18
Total for Browse		148	168	183	13.92	19.10	18.58

CANOPY COVER, LINE INTERCEPT--

Management unit 17R, Study no: 7

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	17.63	20.41
Chrysothamnus nauseosus	1.60	.73
Chrysothamnus viscidiflorus viscidiflorus	4.13	3.08
Gutierrezia sarothrae	.15	-
Symphoricarpos oreophilus	.48	.33
Tetradymia canescens	.21	.03

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17R, Study no: 7

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	-	1.5
Artemisia tridentata vaseyana	2.2	1.2
Cowania mexicana stansburiana	-	2.3

BASIC COVER--

Management unit 17R, Study no: 7

Cover Type	Average Cover %		
	'01	'05	'10
Vegetation	32.43	33.45	31.03
Rock	.14	.01	0
Pavement	.38	.40	.19
Litter	46.17	38.37	47.15
Cryptogams	.31	.06	.00
Bare Ground	35.73	38.75	32.29

SOIL ANALYSIS DATA --

Management unit 17R, Study no: 7, Study Name: Emma Park Harrow-Grazed

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.8	7.5	38.9	31.4	29.7	1.8	2.8	332.8	0.7

PELLET GROUP DATA--

Management unit 17R, Study no: 7

Type	Quadrat Frequency			Days use per acre (ha)		
	'01	'05	'10	'01	'05	'10
Rabbit	5	14	1	-	-	-
Elk	-	4	2	1 (2)	5 (13)	-
Deer	8	-	5	9 (22)	5 (12)	5 (13)
Cattle	-	3	8	-	15 (36)	44 (107)

BROWSE CHARACTERISTICS--

Management unit 17R, 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)
Amelanchier utahensis									
01	0	0	0	-	-	0	0	0	13/21
05	0	0	0	-	-	0	0	0	11/15
10	0	0	0	-	-	0	0	0	9/11
Artemisia tridentata vaseyana									
01	3980	17	45	39	260	0	0	57	17/24
05	4780	25	67	8	23380	2	0	4	20/27
10	15400	67	32	2	7140	13	2	3	20/29
Chrysothamnus nauseosus									
01	180	22	22	56	-	0	0	22	19/21
05	260	8	92	0	40	0	0	0	22/25
10	400	20	80	0	20	0	0	0	21/22
Chrysothamnus viscidiflorus viscidiflorus									
01	3820	3	93	4	-	0	0	1	5/9
05	3440	1	97	2	20	0	0	.58	8/14
10	4420	21	79	0	180	1	5	0	6/11
Eriogonum corymbosum									
01	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	11/17
10	0	0	0	-	-	0	0	0	-/-
Gutierrezia sarothrae									
01	0	0	0	-	-	0	0	0	-/-
05	340	0	100	-	-	0	0	0	8/13
10	20	0	100	-	-	0	0	0	6/12

		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>Symphoricarpos oreophilus</i>											
01	240	42	25	33	-	0	0	8	9/16		
05	280	50	50	0	-	0	7	0	11/20		
10	220	18	82	0	-	36	9	0	14/21		
<i>Tetradymia canescens</i>											
01	80	0	25	75	20	0	0	50	-/-		
05	220	36	64	0	20	0	0	0	9/12		
10	160	38	63	0	-	0	0	13	10/12		

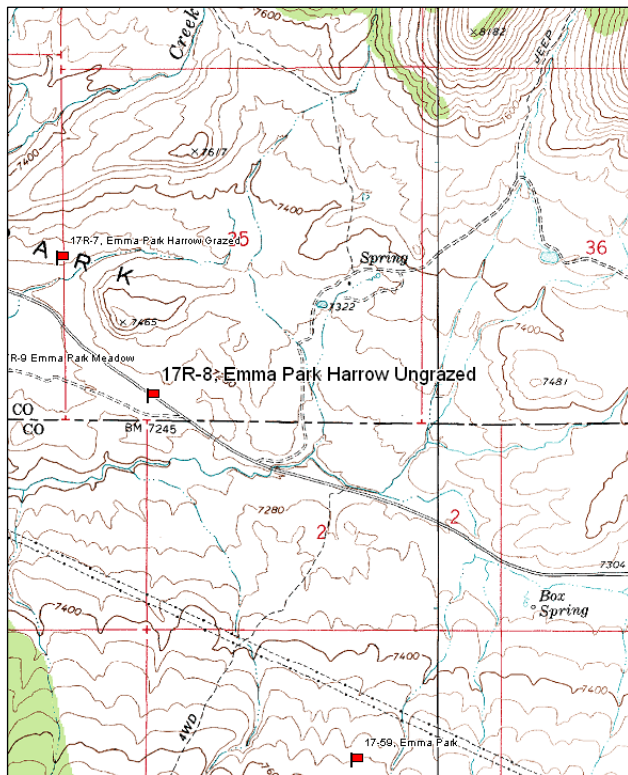
EMMA PARK HARROW UNGRAZED - TREND STUDY NO. 17R-8-10

Vegetation Type: Harrowed, Seeded Mountain Big Sagebrush
Range Type: Crucial Deer Summer, Crucial Elk Summer (Calving habitat)
NRCS Ecological Site Description: Not Available
Land Ownership: BLM
Elevation: 7245 ft. (2209 m)
Aspect: South-Southwest
Slope: 5%
Transect bearing: 298° magnetic
Belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).

Directions:

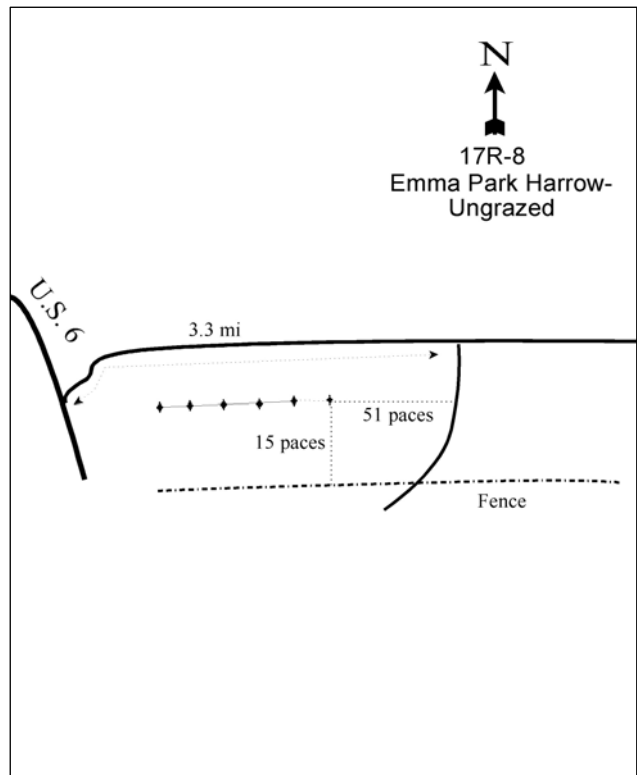
From the Kyune turnoff on U.S. 6 travel 3.3 miles to a turnoff on the south side of the road. The study site is located between the road and the fence. From the gate, go northwest along the fence to the 27th post. The 0-foot stake is 15 paces north of the fence post and is marked by browse tag #425.

Map Name: Kyune



Township: 11S Range: 9E Section: 35

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 509329 E 4407117 N

EMMA PARK HARROW UNGRAZED - TREND STUDY NO. 17R-8

Site Information

Site Description: The study is located about three and a half miles east of the junction of Highway 6 and Kyune in Spanish Fork Canyon, just off of the Emma Park Highway. The area had been pipe harrowed one-way and seeded prior to site placement. This study was paired with study 17R-7 to monitor site differences with and without livestock grazing following a pipe harrow treatment. Cattle grazing is not supposed to occur on this location, but will occur on study 17R-7. Pellet group transect data has estimated very light use by deer, elk and cattle since 2001. Grouse pellets were sampled in 2005 (Table - Pellet Group Data).

Browse: The dominant browse species is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). The sagebrush population is comprised of mostly mature plants with light use and good recruitment of young plants. Decadence and poor vigor were high in the sagebrush population at the outset of the study in 2001, but have been good since 2005. Other common browse species include stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and rubber rabbitbrush (*C. nauseosus*). Other less abundant browse species include snowberry (*Symphoricarpos oreophilus*) and gray horsebrush (*Tetradymia canescens*). All of these browse species displayed light use (Table - Browse Characteristics).

Herbaceous Understory: Grasses are fairly diverse and abundant, consisting of a mixture of native and seeded perennial species. The most abundant species include western wheatgrass (*Agropyron smithii*), bluebunch wheatgrass (*A. spicatum*) and Salina wildrye (*Elymus salina*). It appears that Salina wildrye was identified as western wheatgrass in 2001. In 2005, western wheatgrass was differentiated from Salina wildrye, so 2005 data showed decreases in western wheatgrass cover. Forbs are diverse and fairly abundant. Sweetvetch (*Hedysarum boreale*), desert phlox (*Phlox austromontana*) and chickpea milkvetch (*Astragalus cicer*) are the most abundant forbs (Table - Herbaceous Trends).

Soil: The soils are clay loam in texture with a soil reaction that is slightly alkaline (pH 7.6). Phosphorus may have limited availability for plant growth and development at 2.9 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover has been moderate to low with most of the protective ground cover being provided by vegetation and litter (Table - Basic Cover). The soil erosion condition was classified as stable in 2001 and 2010, but slight in 2005 because of pedestals around vegetation and a few small gullies and rills.

Trend Assessments

Browse:

- **2001 to 2005 - stable (0):** The density of mountain big sagebrush decreased by 17% from 4540 plants/acre to 3,760 plants/acre and cover decreased from 13% to 11%. However, decadence of sagebrush decreased from 42% to 14% and poor vigor decreased from 72% to 7%. Recruitment of young sagebrush plants decreased from 12% to 8% of the population.
- **2005 to 2010 - up (+2):** Mountain big sagebrush density increased by 29% to 4,840 plants/acre and cover increased to 14%. Decadence and poor vigor remained low, and recruitment of young sagebrush plants increased to 22%.

Grass:

- **2001 to 2005 - up (+2):** The sum of nested frequency of perennial grasses increased by 28% and cover increased from 14% to 20%.
- **2005 to 2010 - slightly up (+1):** The perennial grass sum of nested frequency increased 14% and cover remained similar at 18%.

Forb:

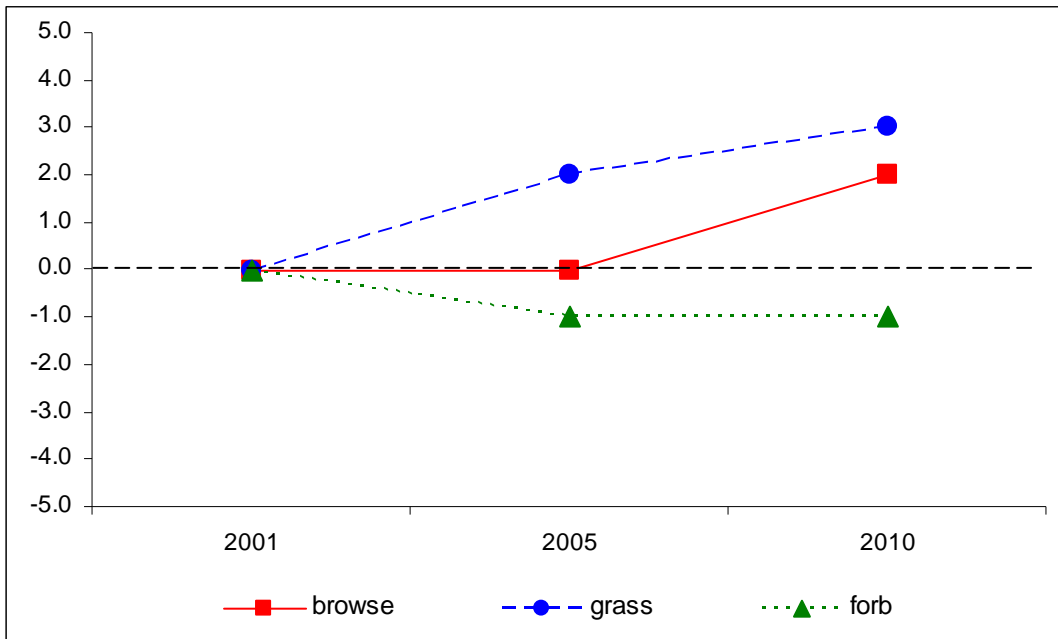
- **2001 to 2005 - slightly down (-1):** There was a 14% decrease in the sum of nested frequency of perennial forbs, but cover increased from 2% to 4%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial forbs remained similar, though cover decreased to 3%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 17R, study no: 8

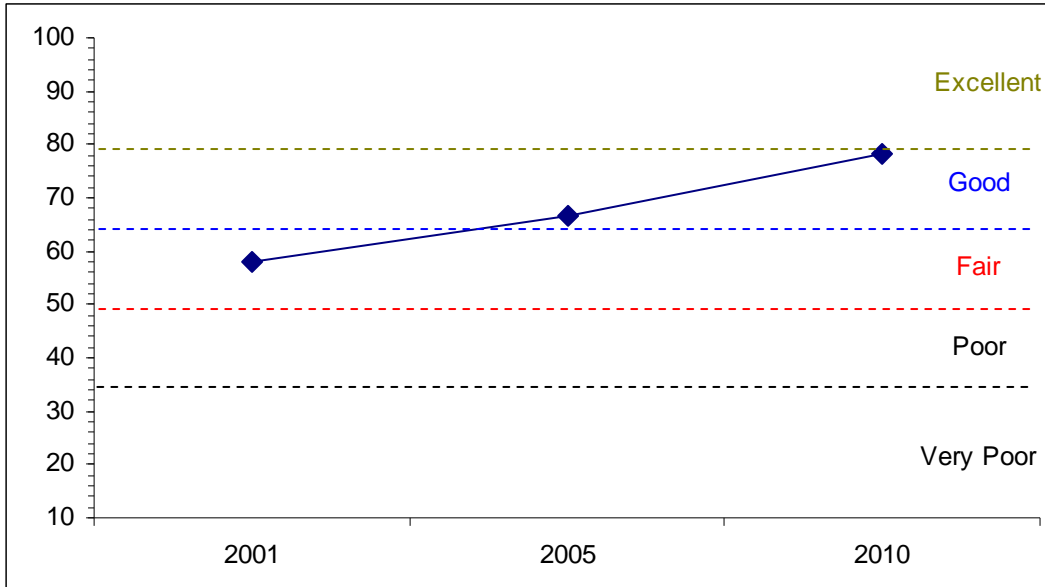
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
01	16.5	2.4	6.0	28.8	0.0	4.3	0.0	58.0	Fair
05	13.5	10.8	4.0	30.0	0.0	8.2	0.0	66.6	Fair-Good
10	17.8	12.9	11.0	30.0	0.0	6.5	0.0	78.2	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17R, Study no: 8



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 17R, Study no: 8



HERBACEOUS TRENDS--
 Management unit 17R, Study no: 8

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
G	Agropyron intermedium	3	3	8	.03	.15	.19
G	Agropyron smithii	c ₂₄₃	a ₆₈	b ₁₅₄	12.08	3.02	3.09
G	Agropyron spicatum	a ₅₃	b ₁₀₄	b ₁₀₉	2.00	7.48	5.69
G	Bromus inermis	1	4	7	.00	.06	.18
G	Carex sp.	2	-	-	.00	-	-
G	Elymus salina	a ⁻	b ₁₅₁	b ₁₆₅	-	8.07	8.73
G	Koeleria cristata	-	2	-	-	.06	-
G	Oryzopsis hymenoides	-	-	4	-	.00	.15
G	Poa fendleriana	a ⁻	ab ₁₂	b ₈	.00	.07	.19
G	Poa pratensis	1	4	-	.00	.03	-
G	Poa secunda	a ₁	b ₃₉	a ⁻	.00	1.06	-
G	Stipa lettermani	ab ₁₀	b ₁₄	a ⁻	.24	.36	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		314	401	455	14.40	20.40	18.23
Total for Grasses		314	401	455	14.40	20.40	18.23
F	Achillea millefolium	8	5	10	.09	.18	.21
F	Arabis sp.	-	3	-	-	.04	-
F	Aster sp.	-	10	10	-	.06	.19
F	Astragalus cicer	b ₂₅	a ₅	ab ₁₈	.66	.03	.85
F	Astragalus convallarius	a ⁻	b ₉	ab ₁	-	.03	.00
F	Astragalus tenellus	b ₁₃	a ⁻	a ₃	.21	-	.03
F	Calochortus nuttallii	-	-	1	-	-	.00
F	Chenopodium leptophyllum(a)	a ₅	b ₂₂	a ⁻	.00	.04	-
F	Cirsium sp.	3	2	1	.00	.03	.03

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
F	Descurainia pinnata (a)	-	3	-	-	.03	-
F	Erigeron sp.	4	-	9	.01	-	.01
F	Hedysarum boreale	_a 6	_b 35	_a 13	.21	2.18	.86
F	Lactuca serriola	2	1	-	.00	.00	-
F	Linum lewisii	9	3	-	.01	.03	-
F	Machaeranthera canescens	2	3	3	.01	.16	.04
F	Medicago sativa	3	-	-	.03	-	-
F	Penstemon caespitosus	_b 31	_a 8	_a 8	.19	.07	.01
F	Phlox austromontana	34	39	47	.60	1.13	.98
F	Potentilla gracilis	7	7	3	.03	.07	.01
F	Sanguisorba minor	6	2	-	.04	.03	-
F	Senecio multilobatus	-	2	-	-	.03	-
F	Taraxacum officinale	1	-	-	.00	-	-
F	Trifolium sp.	2	-	-	.00	-	-
Total for Annual Forbs		5	25	0	0	0.07	0
Total for Perennial Forbs		156	134	127	2.13	4.11	3.25
Total for Forbs		161	159	127	2.14	4.19	3.25

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

BROWSE TRENDS--

Management unit 17R, Study no: 8

Type	Species	Strip Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
B	Artemisia tridentata vaseyana	77	74	82	13.20	10.83	14.25
B	Chrysothamnus nauseosus	26	24	23	2.26	2.54	2.51
B	Chrysothamnus viscidiflorus viscidiflorus	57	62	65	3.26	7.40	6.00
B	Gutierrezia sarothrae	3	1	0	.41	-	-
B	Symphoricarpos oreophilus	1	1	1	-	.00	.03
B	Tetradymia canescens	1	1	1	.03	.03	-
Total for Browse		165	163	172	19.18	20.81	22.80

CANOPY COVER, LINE INTERCEPT--

Management unit 17R, Study no: 8

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	15.30	22.54
Chrysothamnus nauseosus	4.63	4.50
Chrysothamnus viscidiflorus viscidiflorus	8.21	7.23
Gutierrezia sarothrae	.15	-
Symphoricarpos oreophilus	.28	.51

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17R, Study no: 8

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	2.2	1.4

BASIC COVER--

Management unit 17R, Study no: 8

Cover Type	Average Cover %		
	'01	'05	'10
Vegetation	34.19	43.14	41.94
Rock	.02	.01	0
Pavement	.10	.43	.03
Litter	55.72	38.42	55.31
Cryptogams	.85	.37	.04
Bare Ground	28.29	32.29	15.34

SOIL ANALYSIS DATA --

Management unit 17R, Study no: 8, Study Name: Emma Park Harrow-Ungrazed

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
17.2	7.6	33.9	32.4	33.7	2.2	2.9	297.6	0.6

PELLET GROUP DATA--

Management unit 17R, Study no: 8

Type	Quadrat Frequency		
	'01	'05	'10
Rabbit	39	16	7
Grouse	-	2	-
Elk	-	5	1
Deer	5	2	5
Cattle	-	-	-

Days use per acre (ha)		
'01	'05	'10
-	-	-
-	12/acre	-
1 (2)	8 (20)	2 (5)
12 (30)	1 (3)	11 (28)
-	1 (2)	1 (2)

BROWSE CHARACTERISTICS--
 Management unit 17R, Study no: 8

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 vaseyana</i>									
01	4540	12	45	42	20	.44	0	72	20/24
05	3760	8	78	14	1100	0	.53	7	22/32
10	4840	22	71	7	260	18	0	7	22/32
<i>Chrysothamnus nauseosus</i>									
01	840	21	71	7	-	0	0	5	17/22
05	740	0	95	5	-	0	0	3	23/33
10	740	3	86	11	-	0	0	8	26/32
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
01	6440	3	90	7	-	0	0	14	6/9
05	7400	2	96	2	-	0	0	.54	8/15
10	6680	11	89	0	220	0	3	0	7/14
<i>Gutierrezia sarothrae</i>									
01	180	0	89	11	-	0	0	0	4/7
05	40	0	100	0	-	0	0	0	6/13
10	0	0	0	0	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
01	40	100	0	-	-	0	0	0	-/-
05	20	0	100	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	21/40
<i>Tetradymia canescens</i>									
01	60	0	0	100	-	0	0	0	-/-
05	40	0	100	0	-	100	0	0	10/12
10	20	0	100	0	-	0	0	0	13/11

ALLEN SMITH RESEEDING - TREND STUDY NO. 17R-22-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Private

Elevation: 6600 ft. (2012 m)

Aspect: Southeast

Slope: 2%

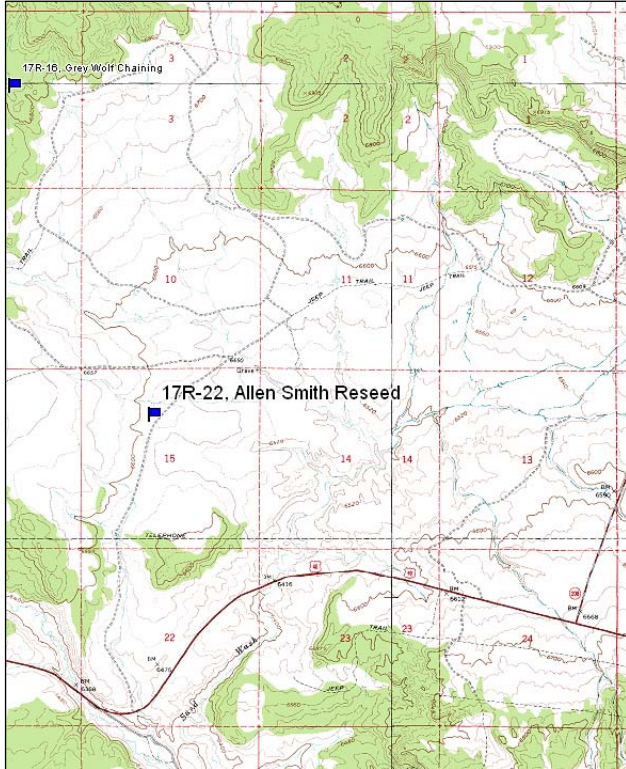
Transect bearing: 356° magnetic

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

Directions:

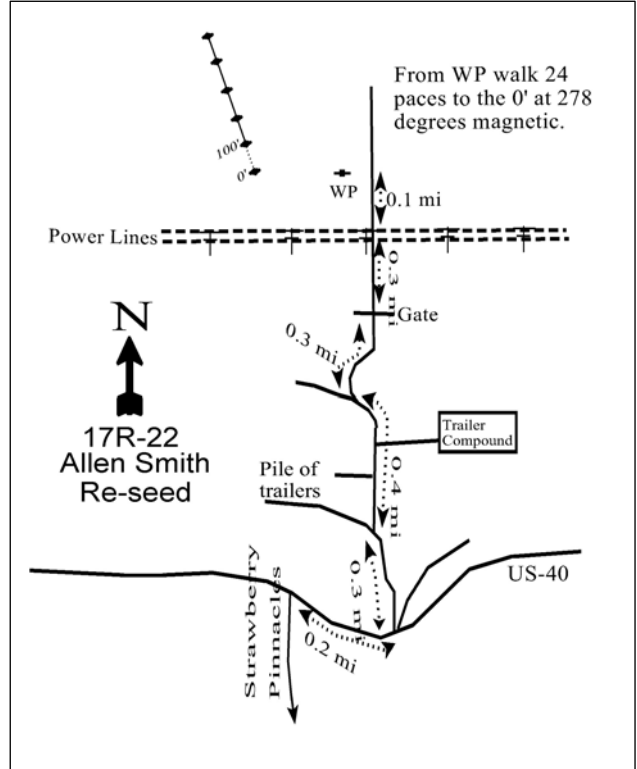
Driving east on US-40 drive to the farthest west turn off to the Strawberry Pinnacles. From there drive east 0.2 miles to a road on the left (north) side of the road. Turn here and drive north for 0.3 miles to a fork that leads to a pile of trailers. Stay to the right and drive 0.4 miles passing a trailer compound and coming to another fork. Stay to the right and drive 0.3 miles to a gate. Go through the gate and drive 0.5 miles to power lines crossing the road. From there drive 0.1 miles to a witness post on the left. From the witness post walk 24 paces at 278 degrees to the 0' stake marked with browse tag #147.

Map Name: Fruitland



Township: 3S Range: 8W Section: 15

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 519024 E 4452480 N

Site Description

Site Information: The study is located in the Sand Wash area three and a half miles east of Fruitland on private land. The study was established to monitor an aerial seeding to promote forb and browse production in a crested wheatgrass (*Agropyron cristatum*) and Russian wildrye (*Elymus junceus*) dominated flat as part of the Sink Draw Interseeding project ([WRI Project #417](#)). The Allen Smith property was disked and seeded in the early 1990's. The site was heavily seeded to crested wheatgrass and Russian wildrye. In the early 2000's, the sagebrush left on the site was treated with Spike (Tebuthiuron). Initially, the project planned to spray the area with Roundup (glyphosate) herbicide and use a rangeland drill to distribute the seed mix, but the project was later changed to an aerial seeding and was not sprayed with Roundup herbicide. The seeding occurred in November 2006 and shortly afterward, 300 head of Livestock were used to incorporate the seed mix into the soil for the span of two weeks. The objectives of the project were to incorporate forb and browse species and establish cover for sage-grouse on the site and enhance winter range for mule deer and elk. Pellet group data estimated light deer and cattle use and heavy elk use in each year (Table - Pellet Group Data).

Browse: The key browse species was Wyoming big sagebrush at one time, but nearly the whole population was dead in 2006. A few live sagebrush plants have established since treatment. It is likely that the high density of crested wheatgrass has prevented sagebrush seedling establishment prior to, and following, the treatment. Forage kochia (*Kochia prostrata*) has established a small population on the site, after being seeded as part of the treatment. Patches of black greasewood (*Sarcobatus vermiculatus*) occurred in nearby depressions, but were not sampled within the study. Other species sampled include broom snakeweed (*Gutierrezia sarothrae*), prickly pear (*Opuntia sp.*) and slenderbush eriogonum (*Eriogonum microthecum*) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant and fairly diverse. The grass component is dominated by the seeded species crested wheatgrass which accounts for the majority of the herbaceous understory cover. Seeded species sampled after the treatment include western wheatgrass (*Agropyron smithii*) and Sandberg bluegrass (*Poa secunda*), though Sandberg bluegrass was sampled prior to the treatment. Cheat grass (*Bromus tectorum*) has been sampled on the site, but is not common. Perennial forbs were rare in all sample years, but decreased substantially following treatment (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a slightly alkaline soil reaction (pH 7.5) (Table - Soil Analysis Data). Bare ground cover is moderate with high amount of litter and moderate amount of vegetation providing protective ground cover (Table - Basic Cover). Soil erosion condition was classified as stable in all sample years.

Trend Assessments

Browse:

- **2006 to 2010 - stable (0):** There were no live Wyoming big sagebrush plants sampled prior to the treatment in 2006, and dead plants were sampled at a density of 2,320 plants/acre. Following the treatment, Wyoming big sagebrush density was 40 plants/acre, all of which were mature. Forage kochia was also sampled at a density of 140 plants/acre.

Grass:

- **2006 to 2010 - stable (0):** The sum of nested frequency of perennial grasses remained similar and cover increased from 22% to 24%. Crested wheatgrass cover remained at 21% cover.

Forb:

- **2006 to 2010 - slightly down (-1):** Forbs are rare on the site. The nested frequency of perennial forbs decreased 42% and cover decreased from 2% to 1%. Alfalfa (*Medicago sativa*) was the most common forb.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17R, study no: 22

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
06	0.0	0.0	0.0	30.0	0.0	4.3	0.0	34.3	Fair
10	0.1	0.0	0.0	30.0	0.0	2.5	0.0	32.6	Fair

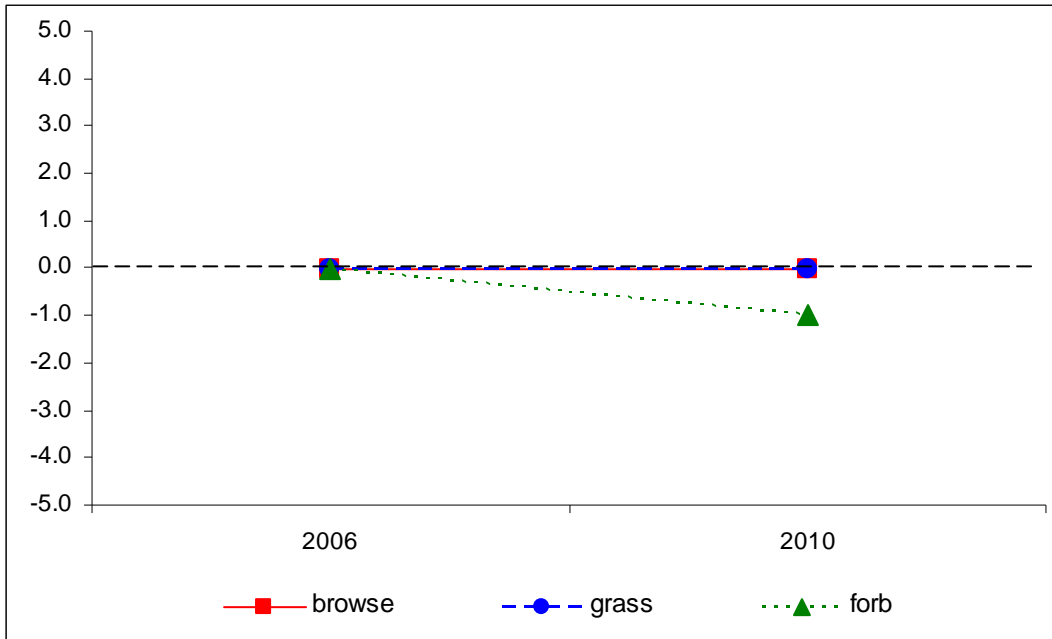
SEED MIX--

Management unit 17R, Study no: 22

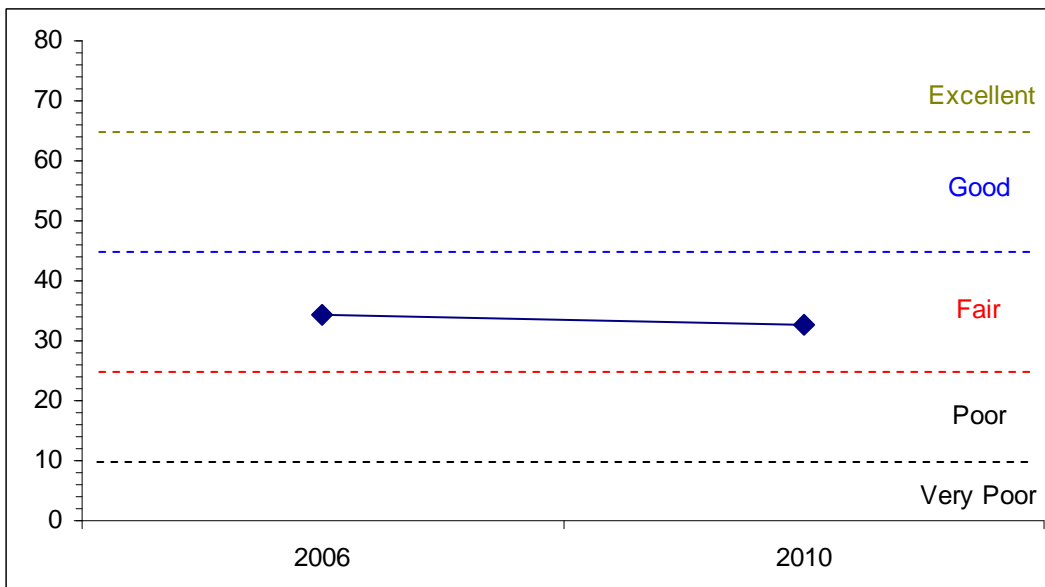
Project Name: Sink Draw Interseeding			
WRI Database #: 417			
Application: Aerial Seed		Acres: 600	
Seed type		lbs in mix	lbs/acre
G	Blue Grama	150	0.25
G	Orchardgrass 'Paiute'	60	0.10
G	Sandberg Bluegrass 'Toole MT'	150	0.25
G	Western Wheatgrass 'Arriba'	300	0.50
F	Alfalfa 'Ladak'	250	0.42
F	Alfalfa 'Ranger'	250	0.42
F	Alfalfa 'Spredor 4'	250	0.42
F	Blue Flax 'Appar	150	0.25
F	Cicer Milkvetch 'Lutana'	600	1.00
F	Sainfoin 'Eski'	1200	2.00
F	Small Burnet 'Delar'	1200	2.00
B	Forage Kochia	600	1.00
B	Fourwing Saltbush	300	0.50
B	Sagebrush, Wyoming	600	1.00
B	Winterfat	150	0.25
Total Pounds:		6210	10.35
PLS Pounds:			8.00

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17R, Study no: 22



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 17R, Study no: 22



HERBACEOUS TRENDS--

Management unit 17R, Study no: 22

Type	Species	Nested Frequency		Average Cover %	
		'06	'10	'06	'10
G	Agropyron cristatum	403	376	20.61	21.00
G	Agropyron intermedium	21	20	.13	.31
G	Agropyron smithii	a-	b13	-	.48
G	Agropyron spicatum	4	-	.03	-
G	Bromus tectorum (a)	3	-	.03	-
G	Carex sp.	14	27	.10	.53
G	Elymus junceus	b34	a19	1.31	1.06
G	Oryzopsis hymenoides	b37	a5	.21	.15
G	Poa secunda	1	9	.00	.33
G	Stipa comata	-	3	-	.03
Total for Annual Grasses		3	0	0.03	0
Total for Perennial Grasses		514	472	22.41	23.93
Total for Grasses		517	472	22.45	23.93
F	Arabis sp.	1	-	.00	-
F	Astragalus convallarius	-	4	-	.30
F	Chenopodium leptophyllum(a)	-	4	-	.00
F	Cryptantha sp.	2	-	.00	-
F	Descurainia pinnata (a)	b24	a-	.08	-
F	Draba sp. (a)	2	1	.00	.00
F	Eriogonum cernuum (a)	5	-	.01	-
F	Lappula occidentalis (a)	1	-	.00	-
F	Leucelene ericoides	3	3	.00	.03
F	Machaeranthera canescens	b35	a-	.37	-
F	Medicago sativa	b42	a26	1.39	.53
F	Melilotus officinalis	2	-	.00	-
F	Phlox austromontana	3	2	.03	.03
F	Salsola iberica (a)	b141	a-	.46	-
F	Schoenrambe linifolia	4	1	.01	.01
F	Senecio multilobatus	3	-	.00	-
F	Sphaeralcea coccinea	24	21	.30	.29
F	Trifolium sp.	6	15	.01	.08
Total for Annual Forbs		173	5	0.57	0.00
Total for Perennial Forbs		125	72	2.16	1.27
Total for Forbs		298	77	2.73	1.28

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

BROWSE TRENDS--

Management unit 17R, Study no: 22

Type	Species	Strip Frequency		Average Cover %	
		'06	'10	'06	'10
B	Artemisia tridentata wyomingensis	0	2	-	.03
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	-	-
B	Gutierrezia sarothrae	5	10	.03	.21
B	Kochia prostrata	0	4	-	.01
B	Opuntia sp.	9	5	.15	.03
Total for Browse		14	22	0.18	0.28

CANOPY COVER, LINE INTERCEPT--

Management unit 17R, Study no: 22

Species	Percent Cover	
	'06	'10
Gutierrezia sarothrae	-	.50
Kochia prostrata	-	.11
Opuntia sp.	.10	.15

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17R, Study no: 22

Species	Average leader growth (in) '10
Artemisia tridentata wyomingensis	1.5

BASIC COVER--

Management unit 17R, Study no: 22

Cover Type	Average Cover %	
	'06	'10
Vegetation	25.70	25.87
Rock	.77	.31
Pavement	1.70	1.67
Litter	52.02	49.02
Cryptogams	.13	.15
Bare Ground	39.75	32.19

SOIL ANALYSIS DATA --

Management unit 17R, Study no: 22, Study Name: Allen Smith Reseed

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.1	7.5	49.6	27.1	23.3	1.9	12.1	160.0	0.7

PELLET GROUP DATA--

Management unit 17R, Study no: 22

Type	Quadrat Frequency		Days use per acre (ha)	
	'06	'10	'06	'10
Rabbit	25	1	-	-
Grouse	1	-	-	-
Elk	42	33	62 (152)	50 (122)
Deer	13	15	7 (17)	3 (7)
Cattle	9	14	21 (52)	10 (25)

BROWSE CHARACTERISTICS--

Management unit 17R, Study no: 22

		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>Artemisia tridentata wyomingensis</i>										
06	0	0	0	-	-	0	0	0	7/8	
10	40	0	100	-	-	0	0	0	12/13	
<i>Ceratoides lanata</i>										
06	0	0	0	-	-	0	0	0	14/23	
10	0	0	0	-	-	0	0	0	11/14	
<i>Chrysothamnus nauseosus</i>										
06	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	16/23	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
06	0	0	0	-	-	0	0	0	-/-	
10	20	0	100	-	-	0	0	0	-/-	
<i>Eriogonum corymbosum</i>										
06	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	11/15	
<i>Eriogonum microthecum</i>										
06	0	0	0	-	-	0	0	0	11/15	
10	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
06	140	0	100	-	-	0	0	0	5/11	
10	400	0	100	-	-	0	0	0	7/12	
<i>Kochia prostrata</i>										
06	0	0	0	-	-	0	0	0	-/-	
10	140	14	86	-	-	14	0	0	6/9	
<i>Opuntia sp.</i>										
06	180	11	56	33	-	0	0	22	4/16	
10	100	0	100	0	-	0	0	0	4/17	

SUMMARY
WILDLIFE MANAGEMENT UNIT 17 - WASATCH MOUNTAINS

Community Types

Deer winter range within a unit is summarized into three categories based on ecological potentials which include low potential, mid-level potential and high potential. Low potential sites include desert shrub, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and cliffrose (*Cowania mexicana* ssp. *stansburiana*) communities. Mid-level potential sites include mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) communities. High potential sites include mountain brush communities. Black sagebrush (*A. nova*) and basin big sagebrush (*A. tridentata* ssp. *tridentata*) communities are placed within the low potential or mid-level potential scales based on precipitation and elevation. Deer summer range is summarized separately from winter range as a fourth category and typically includes aspen (*Populus tremuloides*) and high elevation mountain brush or meadow communities. Sixteen interagency range trend studies were sampled in Unit 17 during the summer of 2010. Seven of the studies [Cutoff (17-52), Lower Horse Ridge (17-55), Buck Knoll (17-58), Emma Park (17-59), Little Horse Ridge (17-65), Emma Park Harrow Grazed (17R-7) and Emma Park Harrow Ungrazed (17R-8)] are categorized as mid-level potential sites for deer winter range and sample communities with a mixture of mountain big sagebrush and other mixed mountain brush. Though categorized as winter range in this summary, the three studies in the Emma Park area and the Little Horse Ridge studies are also considered to be deer summer range and fawning habitat. The three Emma Park studies are also considered to be elk summer range and calving habitat and the two studies on Horse Ridge are considered to

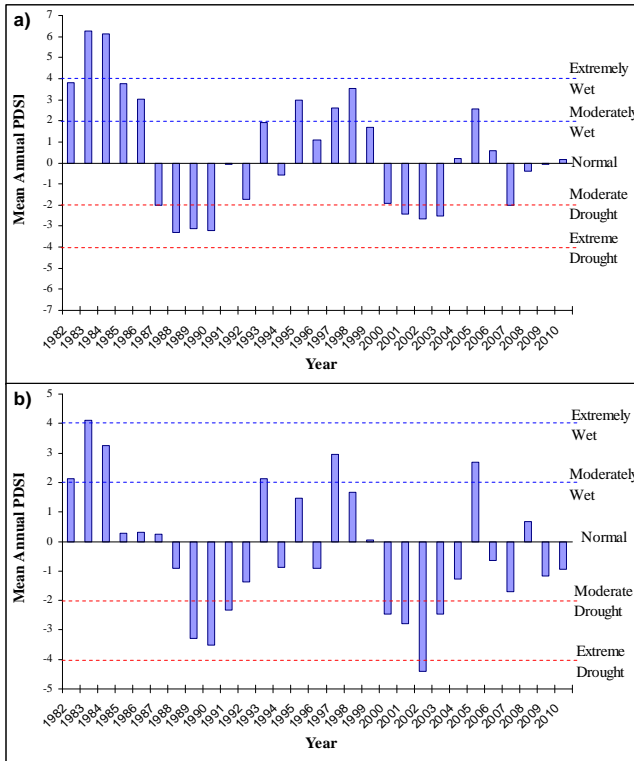


Figure 1. a) The 29 year mean annual Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). **b)** The 29 year mean annual PDSI for the Uinta Basin (Division 6). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

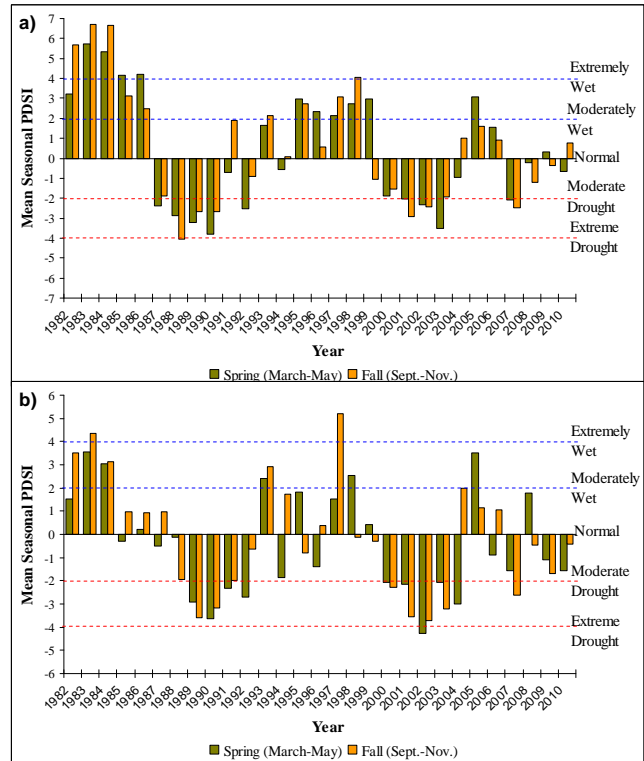


Figure 2. a) The 29 year mean spring (March-May) and fall (Sept.-Nov.) Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). **b)** The 29 year mean spring (March-May) and fall (Sept.-Nov.) PDSI for the Uinta Basin (Division 6). The PDSI is based on climate data gathered from 1895 to 2010. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2011).

be elk year long range. The remaining two studies are also considered elk winter range. The three studies at Emma Park are managed as part of the Southeastern Region, while the other four studies are managed as part of the Northeastern Region. Eight of the studies [Grey Wolf Mountain (17-49), Lower Santaquin Draw (17-50), Santaquins Cabin (17-51), Two Bar Ranch (17-53), Skitzzy Canyon (17-57), Sand Wash (17-66), Rabbit Gulch (17-67) and Allen Smith Reseed (17R-22)] are classified as low potential deer winter range sites and sample primarily Wyoming big sagebrush communities. All of these studies are also considered to be elk winter range. Only one of the range trend studies in the unit [Sam's Canyon (17-56)] was categorized as a high potential site for deer winter range. Because this category has only one study, it is not included in this summary. For further information on this study, refer to the discussion section. There were no studies in this unit that were categorized exclusively as summer range.

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Precipitation and Palmer Drought Severity Index (PDSI) data for the unit were compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the Northern Mountains (Division 5) and Uintah Basin (Division 6) Divisions. The Grey Wolf Mountain, Lower Santaquin Draw, Santaquins Cabin, Cutoff, Lower Horse Ridge, Sam's Canyon, Emma Park, Little Horse Ridge, Emma Park Harrow Grazed, Emma Park Harrow Ungrazed and Allen Smith Reseed studies fall within the Northern Mountains Division, while the Two Bar Ranch, Skitzzy Canyon, Sand Wash, Rabbit Gulch and Buck Knoll studies are within the Uintah Basin Division. The Northern Mountains and the Uintah Basin had historic annual mean precipitation of 19.11 inches and 7.99 inches, respectively, from 1895 to 2010. Over the course of the study years in Unit 7, the mean annual PDSI of both of the Divisions display several periods of prolonged drought. Moderate to extreme wet years in the Northern Mountains included 1982-1986, 1993, 1995, 1997-1998 and 2005, and moderate to extreme drought years included 1987-1990, 2000-2003 and 2007 (Figure 1a and Figure 2a). Moderate to extreme wet years in the Uintah Basin included 1982-1984, 1993, 1997 and 2005, and moderate to extreme drought years included 1989-1991 and 2000-2003 (Figure 1b and Figure 2b) (Time Series Data 2011).

Mountain Big Sagebrush Communities (Mid-Level Potential Winter Range)

Browse: The mid-level potential cumulative median browse trend had a slight increase in 1986 and increased slightly again in 2010 (Figure 8a). The browse composition on the studies is primarily a mixture of mountain big sagebrush and a few other mountain brush species. The prevalent browse species on the two studies on Horse Ridge and the Buck Knoll study is true mountain mahogany (*Cercocarpus montanus*). The density of mountain big sagebrush is moderate on the studies and the mean density increased significantly in 2010 (Figure 4a). This increase in the sagebrush mean density was due to a substantial increase in the recruitment of young plants on the Emma Park Harrow Grazed study. Density of mountain big sagebrush only increased slightly on the other studies in 2010. The mean cover of mountain big sagebrush was significantly lower in 2005 (Figure 4b). The mean decadence of mountain big sagebrush was high throughout the early years of the studies, but decadence decreased significantly to more moderate levels in 2010 (Figure 4c). True mountain mahogany mean density increased significantly in 2005 due to the addition of the Little Horse Ridge study, which has the densest population of mahogany of all the studies (figure 4a). The mean cover of mahogany has steadily increased and decadence has been low over the course of the study years (Figure 4b and Figure 4c).

Herbaceous Understory: The mid-level potential median cumulative grass trend was down in 2000/2001, but increased again in 2005 (Figure 8a). Grasses within most of these communities are diverse and abundant, and typically consist of a good mixture of native perennial species. The mean sum of nested frequency of perennial grasses decreased significantly in 2000/2001, but increased significantly again in 2005 (Figure 3a). Despite the decrease in nested frequency, the mean cover of perennial grasses increased significantly in 2000/2001, and remained higher throughout the remaining sample years (Figure 3b).

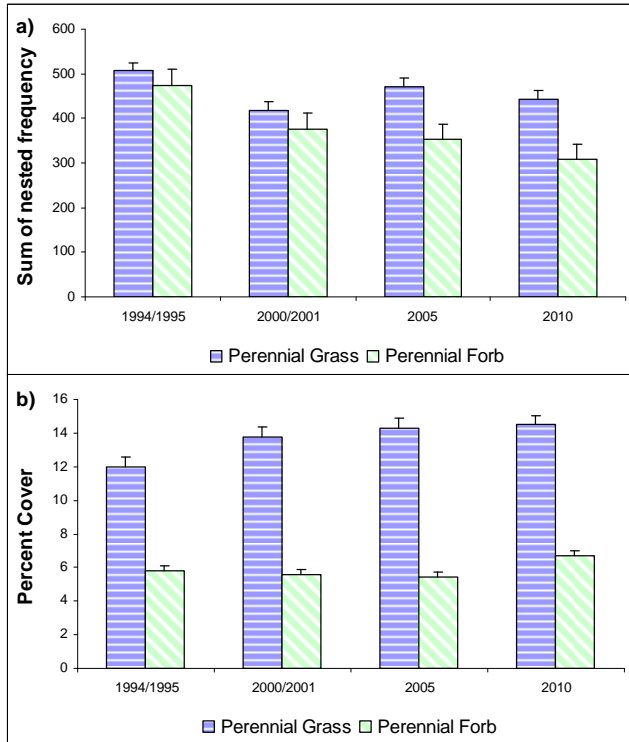


Figure 3. a) Mid-level potential sites mean perennial grass and perennial forb sum of nested frequency (n=7) by year for WMU 17, Wasatch Mountains. b) Mid-level potential sites mean perennial grass, perennial forb and cheatgrass cover (n=7) by year for WMU 17.

The mid-level potential median cumulative forb trend for the unit increased slightly in 1994/1995, but has steadily decreased throughout the subsequent sample years (Figure 8a). Perennial forbs are also diverse and fairly abundant within the sampled communities. The mean sum of nested frequency of perennial forbs was higher than perennial grasses in 1994/1995, but decreased significantly in 2000 and has continued to decrease throughout the remaining sample years (Figure 3a). Cover of perennial forbs was similar throughout the early years of the study, then increased slightly, but significantly, in 2010 (Figure 3b).

Utilization: Pellet group transect data indicates that deer predominantly use these areas, with the highest deer use sampled on the Cutoff study. The mean deer days use/acre on the unit has been mostly moderate with a slight decrease in 2010. The mean elk days use/acre has been mostly light, with the highest use in 2005. Cattle use appears to be light on these studies. Cattle use increased in 2010 due to a large increase in use on the Emma Park Harrow Grazed study (Figure 9a). Minor use by moose and horses has also been sampled on several studies.

Deer Desirable Components Index (DCI): The mid-level potential deer DCI has slightly in 2000/2001 and in 2010. Much of the increase is due to increases in cover of preferred browse and decreases in decadence (which increases the decadence score). The ranking of the DCI has been fair to good throughout the sample years (Table 1 and Figure 7).

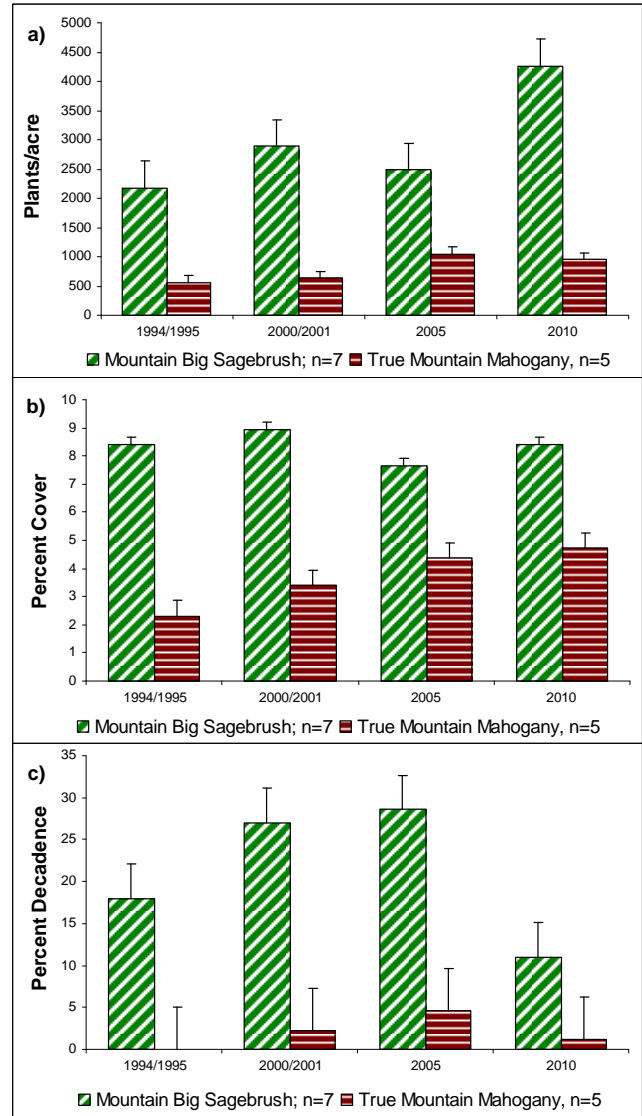


Figure 4. a) Mid-level potential sites mean density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and true mountain mahogany (*Cercocarpus montanus*) by year for WMU 17, Wasatch Mountains. b) Mid-level potential sites mean cover of mountain big sagebrush and true mountain mahogany by year for WMU 17. c) Mid-level potential sites mean population decadence of mountain big sagebrush and true mountain mahogany by year for WMU 17.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94/95	14.9	6.9	5.7	23.1	0.0	8.3	0.0	58.9	Fair
00/01	15.9	8.6	8.9	26.4	0.0	7.0	0.0	66.8	Fair-Good
05	15.2	9.3	6.5	24.6	0.0	8.1	0.0	63.8	Fair-Good
10	17.7	13.2	8.7	25.8	0.0	7.3	0.0	72.7	Good

Table 1. Mid-level potential scale mean deer DCI scores (n=7) by year for WMU 17, Wasatch Mountains. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

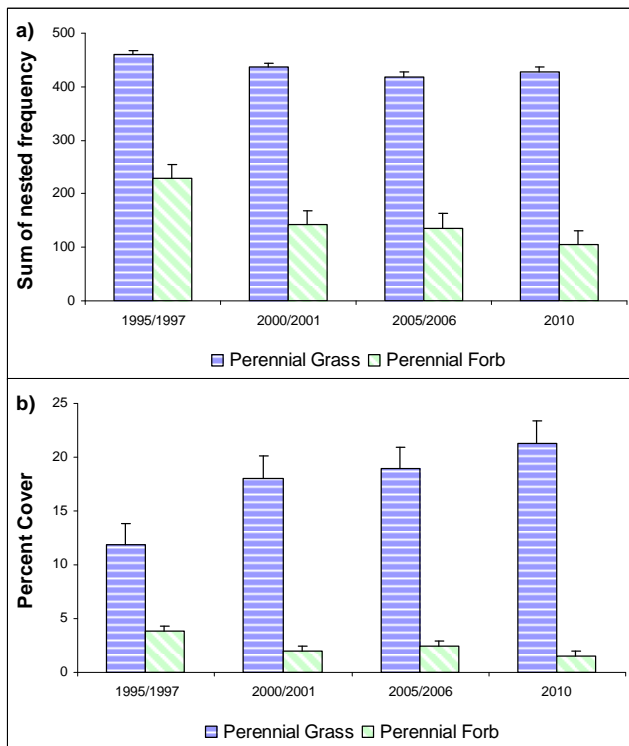


Figure 5. a) Low potential sites mean perennial grass and perennial forb sum of nested frequency (n=8) by year for WMU 17, Wasatch Mountains. b) Low potential sites mean perennial grass and perennial forb cover (n=7) by year for WMU 17.

Wyoming Big Sagebrush Communities (Low Potential Winter Range)

Browse: The low potential studies cumulative median browse trend increased slightly in 1986, remained stable through 2000/2001, then decreased in 2005/2006 (Figure 8b). Browse species are not common on the Skitzzy Canyon or Allen Smith Reseed studies. The most common browse species on the Skitzzy Canyon study is black sagebrush. Wyoming big sagebrush is the dominant browse species on all of the other low potential studies. Only Wyoming big sagebrush is summarized for this unit. The mean density of Wyoming big sagebrush was moderately high in the first two sample years, but decreased significantly in 2005 (Figure 6a). The mean cover followed a similar

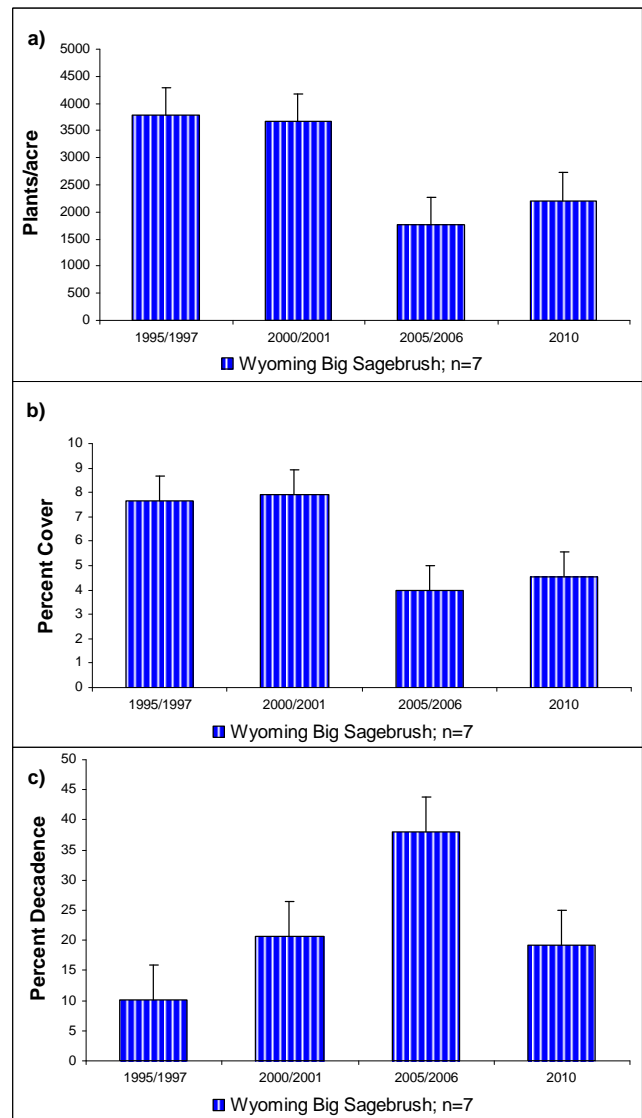


Figure 6. a) Low potential sites mean density of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) by year for WMU 17, Wasatch Mountains. b) Low potential sites mean cover of Wyoming big sagebrush by year for WMU 17. c) Low potential sites mean population decadence of Wyoming big sagebrush by year for WMU 17.

trend (Figure 6c). Mean decadence of Wyoming big sagebrush has been moderately high for the unit, but was significantly higher in 2005 than the other sample years (Figure 6c).

Herbaceous Understory: The low potential median cumulative grass trend increased slightly in 1995/1997 and remained relatively stable throughout the subsequent sample years (Figure 8b). Grasses within these communities are fairly diverse, but are typically dominated by one of two species, crested wheatgrass (*Agropyron cristatum*) or needle-and-thread (*Stipa comata*). The mean sum of nested frequency of perennial grasses has remained similar over the course of the study years (Figure 5a), but mean cover has steadily increased in each sample year (Figure 5b).

The low potential median cumulative forb trend increased slightly in 1995/1997, but decreased in 2000/2001 and 2010 (Figure 8b). Perennial forbs are diverse and moderately abundant within most of the sampled communities. The mean sum of nested frequency of perennial forbs decreased significantly in 1995/1997 and remained lower over the remaining sample years (Figure 5a). The mean perennial forb cover followed a similar trend (Figure 5b).

Utilization: Pellet group transect data indicates that deer and elk both predominantly use these study areas. Use by both species has been moderately heavy to heavy over the sample years. The mean deer days use/acre was very heavy in 1995/1997, but has steadily decreased in each sample year. The mean elk days use/acre increased markedly in 2005/2006, but decreased again in 2010. Cattle use appears to be light on the studies (Figure 9b).

Deer Desirable Components Index (DCI): The low potential deer DCI remained fairly stable over the sample years with a ranking of fair-good to good throughout the sample years. Generally, preferred browse cover has decreased on the unit, while perennial grass cover has increased (Table 2 and Figure 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
95/97	8.7	6.2	4.8	22.9	-0.1	6.4	0.0	48.8	Good
00/01	9.7	4.7	3.6	28.3	0.0	3.9	0.0	50.3	Good
05/06	5.8	2.5	3.6	29.3	-0.2	4.9	0.0	45.8	Fair-Good
10	6.2	3.9	4.0	30.0	0.0	3.0	0.0	47.1	Good

Table 2. Low potential scale mean deer DCI scores (n=8) by year for WMU 17, Wasatch Mountains. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high.

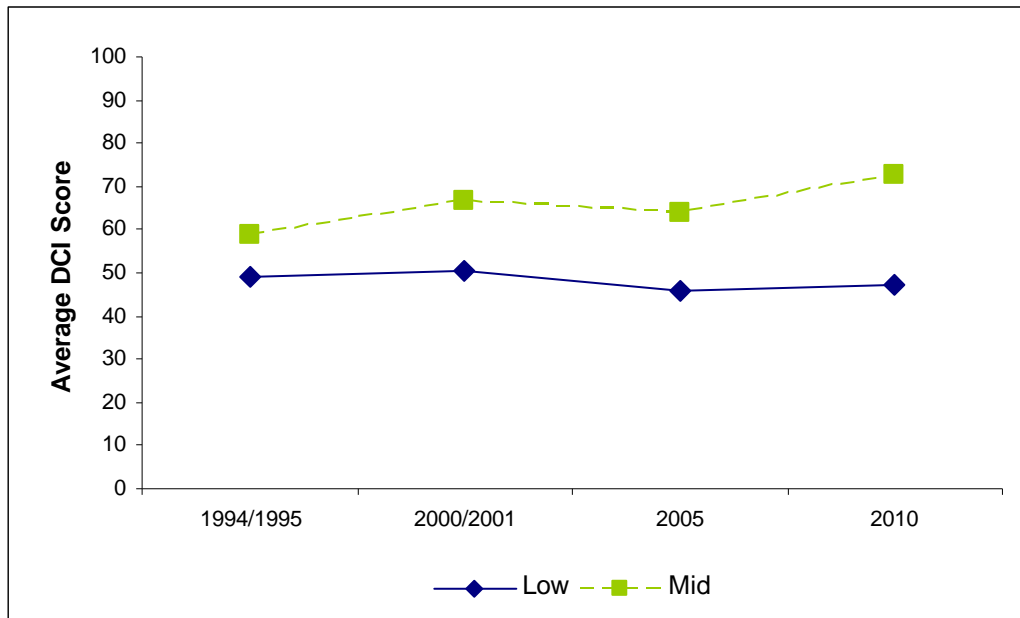


Figure 7. Mean low (n=8) and mid-level (n=7) potential scale deer DCI scores by year for WMU 17, Wasatch Mountains. The deer DCI scores are divided into three categories based on ecological potentials which include low, mid-level and high. For further information on the DCI for the only high potential study, refer to the Sam's Canyon (17-56) discussion section.

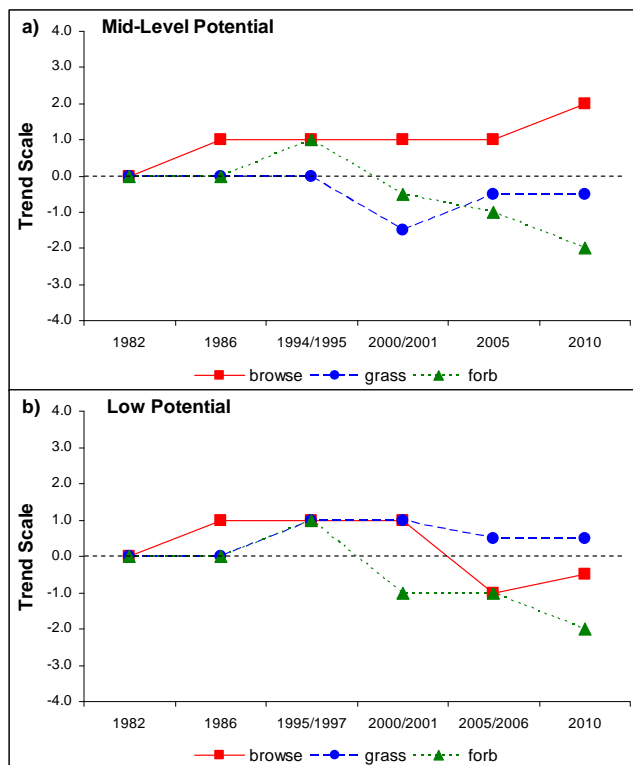


Figure 8. a) Mid-level potential sites (n=7) cumulative median browse, grass and forb trends by year for WMU 17, Wasatch Mountains. b) Low potential sites (n=8) cumulative median browse, grass and forb trends by year for WMU 17. For further information on trends for the only high potential study, refer to the Sam's Canyon (17-56) discussion section.

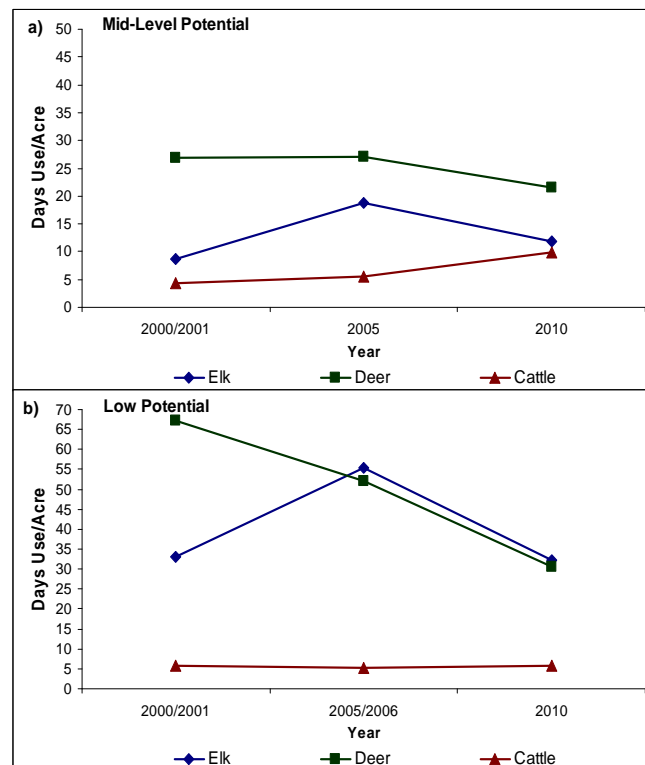


Figure 9. a) Mid-level potential sites (n=7) mean animals days use/acre by year for WMU 17, Wasatch Mountain. b) Low potential sites (n=8) mean animals days use/acre by year for WMU 17. For further information on animal use for the only high potential study, refer to the Sam's Canyon (17-56) discussion section.

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