

UTAH BIG GAME RANGE TREND STUDIES 2000 Volume 1



Photo courtesy of Greg Wilson

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REPORT FOR FEDERAL AID PROJECT W-135-R-21

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES

**UTAH BIG GAME
RANGE TREND STUDIES
2000 Volume 1**

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PROGRAM NARRATIVE

State: UTAH

Project Number: W-135-R

Project Title: Statewide Big Game Range Trend Studies

Problem and Need: The ability to monitor vegetation composition changes (range trend) on key big game areas is an important part of a big game management program. The health and vigor of big game populations are closely associated with the quality and quantity of forage in key areas. Key areas are defined as those areas "where deer or other big game have demonstrated a definite pattern of use during normal climatic conditions over a long period." This project will emphasize deer and elk habitat although monitoring efforts may include other big game species as needed. Winter ranges for both deer and elk will comprise the bulk of the trend studies, although there are certain herd units where summer range is the portion of the unit that limits carrying capacity. Most of the key areas are located on public lands (BLM, USFS or State Lands) that are impacted by livestock grazing programs. Most of these programs are summarized in allotment management plans (USFS) or resource management plans (BLM) which are used to direct the management of a variety of resources on public lands (rangelands, watersheds, energy and minerals, recreational opportunities, etc.). This project was initiated to direct the attention of local interagency committees on the proper management of key big game areas throughout the state. The Division adopted monitoring guidelines established by the Utah State Interagency Committee (staff level biologists from BLM, USFS and DWR) which assures that data collected by DWR is compatible with that collected by both federal agencies. This limits the amount of duplication involved in monitoring certain key areas where either BLM, USFS or DWR may have overlapping responsibilities or concerns about range trend.

Objective: To monitor, evaluate, and report range trend at designated key areas throughout the state during grant period. This includes monitoring wildlife habitat improvement projects and promoting cooperative efforts among Interagency personnel with respect to trend study site selection, sharing trend data, development of trend monitoring procedures and data analysis, and identification of management objectives for study areas.

Expected Results and Benefits:

Every five years the trend studies in each of the five regions will be reread and the status of the vegetation in key areas of each herd unit will be evaluated. The local interagency committee will be able to use the information to determine if key areas are declining in habitat value and if so, to recommend adjustments in management programs that would help restore big game habitat.

REMARKS

The work completed during the 2000 field season and reported in this publication involves the reading of interagency range trend studies in the DWR Southeastern and Northeastern Regions. Trend studies surveyed in these management units were established in 1982, 1986, 1988, 1994, 1995, 1997, 1998, and 1999, with rereads in 1988, 1994, 1995, 1997, and 2000. Some new sites were established in 2000 as well.

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

Bureau of Land Management

Moab District Office

Price River Resource Area

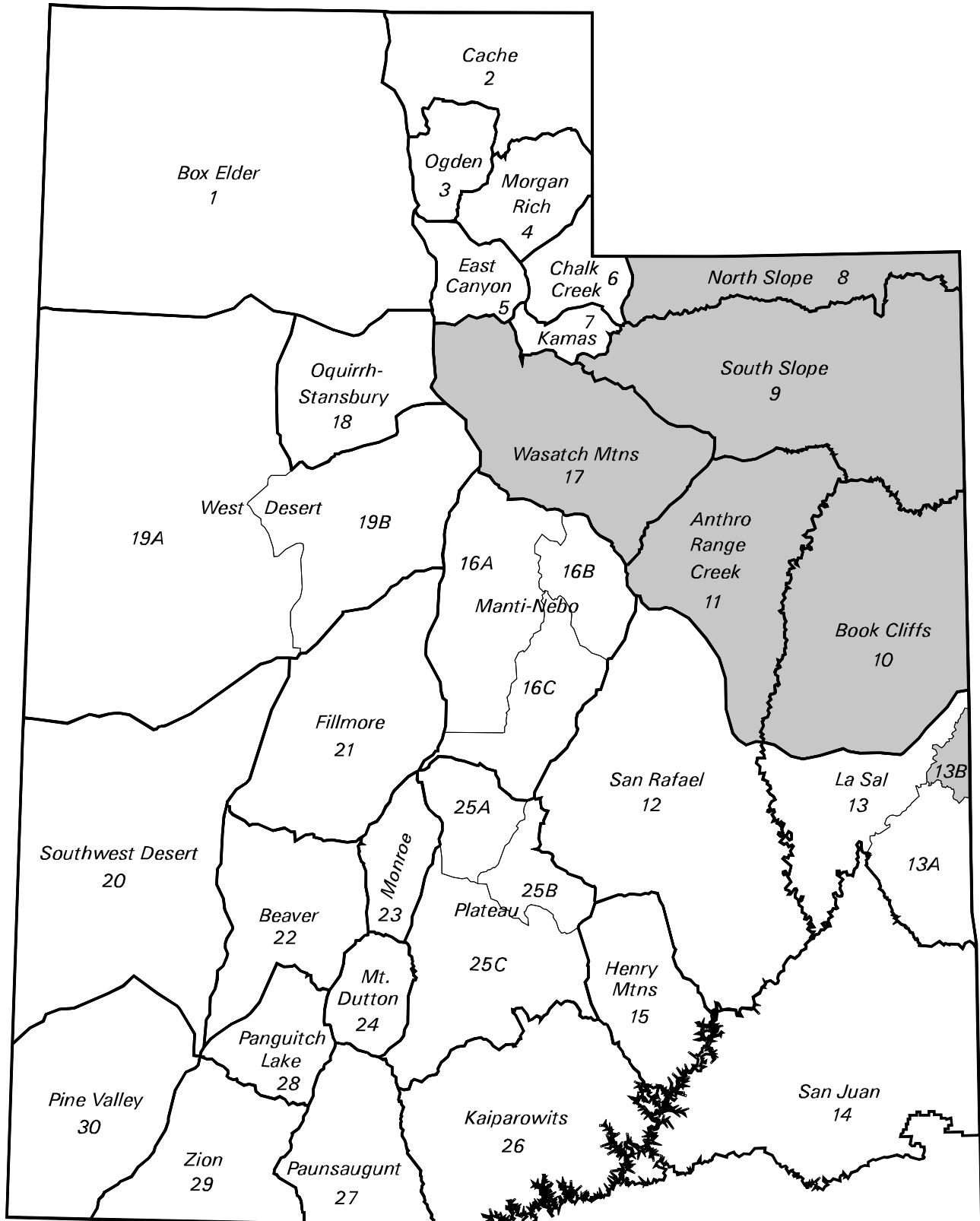
Grand Resource Area

Vernal District Office

Book Cliffs Resource Area

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

Utah Management Units Surveyed in 2000



RANGE TREND STUDY METHODS

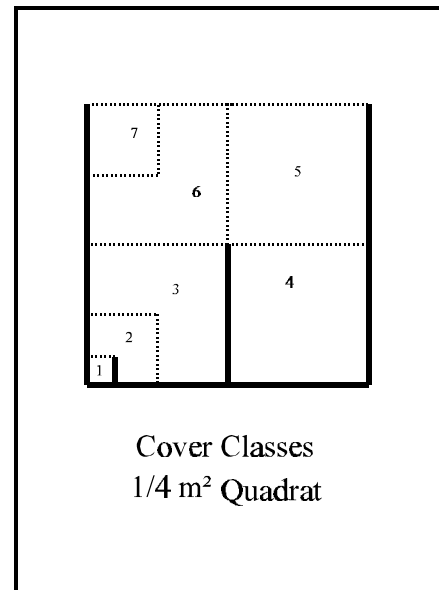
Studies monitoring range trend depend greatly on site selection, especially when dealing with large geographic areas such as wildlife management units. Since it is impossible to intensively monitor all vegetative or habitat types within a unit, it is necessary to concentrate on specific sites and/or “key” areas within distinct plant communities on big game ranges. These “key” areas should be where big game have 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 critical 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 beginning baseline stake, is marked with a metal tag for proper identification of the transect. The beginning of each belt is marked by rebar to ensure a more precise alignment of the originally sampled belt.

Vegetative composition

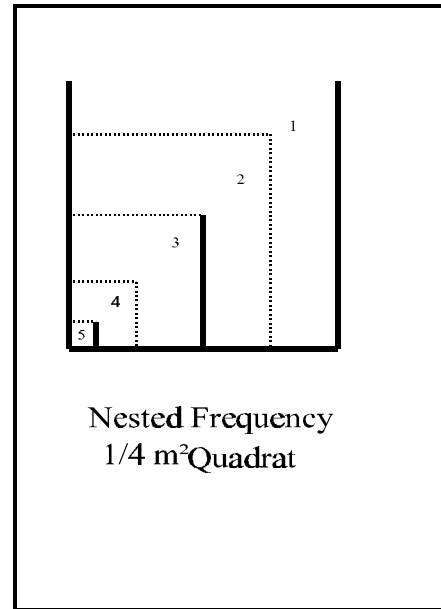
Determining vegetational characteristics for each “key” area is determined by setting up 5 consecutive 100 ft baseline transects in the area of interest. This 500 ft line is the baseline and one, 100 ft belt is placed perpendicular to each 100 ft section of the baseline at random foot marks and centered on the 50 ft mark. A 1/4 m² quadrat is centered every 5 feet along the same side of the belt. 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 species occurring within a quadrat, including annual species.

Cover is determined using a slightly modified Daubenmire (1959) cover class method (Bailey and Poulton, 1968). The seven cover class are: 1) .01-1%, 2) 1.1-5%, 3) 5.1-25%, 4) 25.1-50%, 5) 50.1-75%, 6) 75.1-95%, 7) 95.1-100%. For example, to estimate vegetative 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.

Canopy cover of shrubs or trees above eye level is estimated using the line intercept method. 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.



Nested frequency values for the quadrat range from 1-5 according to which area or which sub-quadrat the plant species 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.



Higher nested frequency scores represent a higher abundance for that plant species. 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 by themselves and do not necessarily indicate changes in composition and/or distribution of key plant species. Quadrat frequency is used as another quantitative, but less sensitive measure to help corroborate the trends being illustrated by the sum of nested frequency values.

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

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 placed in the following five classes. (U.S. Department of Interior Bureau of Land Management 1996).

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 1/5-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 the amount of use by placing shrubs in form classes 1 through 9.

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.

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

Shrubs are also rated on their health by vigor classes 1-4.

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 possible sample of 50 plants per species depending on their respective densities. Tree density is determined by the point-center quarter method centered on two-hundred foot intervals, where 300 feet are 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, used to estimate shrub density, can in most cases effectively inventory seedling and young tree densities.

A more accurate method of determining shrub frequency is being used in this and all subsequent reports. It was found that nested and quadrat frequency of shrubs in previous reports did not usually reflect accurate trends in shrub populations which had particularly low or high densities. Therefore, each 1/100 acre shrub strip is divided into 20, five foot segments. Presence or absence is now determined in these strip segments to give a more accurate measure of shrub frequency. This larger sample will better reflect changing trends in the shrub populations. This data along with shrub cover is recorded in the browse trends table. For example, if a species was rooted in 25 of the shrub 100 strips, strip frequency for this species would be 25%.

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, height, crown diameter, form class, and age class are utilized to characterize shrub populations. Particular attention is paid to woody plants and their important role as trend indicators on critical winter ranges. A variety of parameters are used to help determine trend on key browse species through time. These include:

- 1) changes in density or number of plants/acre
- 2) proportion of decadent plants and percentage of decadent plants that are classified as dying
- 3) biotic potential or proportion of seedlings to the population
- 4) proportion of young plants in population
- 5) proportion of individuals moderately or heavily browsed
- 6) proportion of plants in poor vigor
- 7) changes in height and crown diameter measurements for mature age class
- 8) changes in browse species composition
- 9) strip frequency values
- 10) proportion of cover contributed by key species

Trends in herbaceous plants as a group or as a single "key" species can be determined by comparing the sum of nested and quadrat frequency values between readings. Attention is also given to changes in species composition of grasses and forbs through time. A non-parametric statistical test (Friedman test which is analogous to analysis of variance) (Conover 1980) is conducted on nested frequencies of each species to determine significant changes at $\alpha = .10$. Ground cover parameters are analyzed and compared in the discussions of the reread studies. Trends for soil are determined by comparing basic ground cover measurements and cover composition (herbs vs shrubs) between years as well as comparing photos and observer observations between readings. The ratio of bare soil nested frequency values to protective cover nested frequency values can also be used to help determine changes in soil trend. On newly established studies, a more subjective or apparent assessment is made from qualitative comparisons.

The following tables and partial tables are taken from study number 23-1 to help illustrate some basic comparisons that can be made with the data. The "herbaceous trends" table summarizes average cover, quadrat frequency, and nested frequency data for individual grass and forb species. The table contains all the grass and forb species found on site 23-1. Readings prior to mid-1992 include only nested and quadrat 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, grasses have a combined total cover of 11.39%. In 1985, *Agropyron spicatum* had a sum of nested frequency value of 227. In 1991, the sum of nested frequency value slightly decreased to 220. By 1998, sum of nested frequency declined to 183. The subscript letters indicate that the sum of nested frequency value between 1985 and 1991 were not statistically different. However, the 1998 sum of nested frequency for *A. spicatum* shows a significant decrease compared to 1985 and 1991. Quadrat frequency showed a slight increase from 1985 to 1991 and then a marked decrease in 1998. Cover was estimated at 7.78% for *A. spicatum* in 1998. Trend for this grass is down due to a significant decline in sum of nested frequency.

HERBACEOUS TRENDS --

Herd unit 23 , Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '98
		'85	'91	'98	'85	'91	'98	
G	<i>Agropyron spicatum</i>	_b 227	_b 220	_a 183	79	84	68	7.78
G	<i>Bromus tectorum</i> (a)	-	-	42	-	-	14	.43
G	<i>Oryzopsis hymenoides</i>	4	12	12	2	4	4	.17
G	<i>Poa fendleriana</i>	_a 6	_b 36	_b 49	3	16	21	.98
G	<i>Poa secunda</i>	_a 3	_b 18	_c 94	1	10	40	2.00
G	<i>Sitanion hystrix</i>	_b 25	_{ab} 20	_a 6	13	9	3	.01
Total Annual Grasses		0	0	42	0	0	14	.43
Total Perennial Grasses		265	313	344	98	123	136	10.96
Total for Grasses		265	313	386	98	123	150	11.39
F	<i>Agoseris glauca</i>	-	10	1	-	5	1	.00
F	<i>Arabis</i> spp.	_a -	_b 18	_a 1	-	9	1	.00
F	<i>Astragalus convallarius</i>	_a 2	_a 4	_b 6	1	1	6	.15
F	<i>Calochortus nuttallii</i>	_{ab} 4	_b 8	_a -	2	4	-	-
F	<i>Collinsia parviflora</i> (a)	-	-	3	-	-	1	.00
F	<i>Crepis acuminata</i>	-	6	7	-	2	2	.06
F	<i>Eriogonum racemosum</i>	-	-	4	-	-	1	.03
F	<i>Eriogonum umbellatum</i>	-	1	9	-	1	5	.16
F	<i>Phlox austromontana</i>	-	6	4	-	3	2	.16
F	<i>Phlox longifolia</i>	_a 8	_b 27	_a 16	4	14	6	.20
Total Annual Forbs		0	0	3	0	0	1	.00
Total Perennial Forbs		14	80	48	0	0	24	.78
Total for Forbs		14	80	51	7	39	25	.78

Values with different subscript letters are significantly different at $\alpha = .10$ (annuals excluded)

In 1985, perennial grasses had a sum of nested frequency value of 265. This value has steadily increased to 313 in 1991 and 344 in 1998. The summed value of 344 for 1998 was derived by subtracting the annual grass value (*Bromus tectorum*) from the total value of 386. These changes would indicate a slightly upward overall trend

for perennial grasses on this site. The forb trend can be determined in a similar manner. The herbaceous understory trend is determined using both (combined value for nested frequency) the grass and forb nested frequency value. For example, total herbaceous cover is 12.23% (total grass cover + total forb cover) with grass providing the bulk of the cover. Therefore, when determining herbaceous trend, the grass proportion should be weighted more heavily than the forb proportion in this example.

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 23-1 are listed. For example, mountain big sagebrush had a strip frequency of 40 out of a possible 100. Cover is determined using the 1/4m² quadrat and estimating the percent of the quadrat covered below eye level (~4 feet). In this case, mountain big sagebrush cover is estimated to be 2.54%.

BROWSE TRENDS --

Herd unit 23 , Study no: 1

T y p e	Species	Strip Frequency Ø8	Average Cover % Ø8
B	Artemisia nova	35	2.24
B	Artemisia tridentata vaseyana	40	2.54
B	Chrysothamnus depressus	1	-
B	Chrysothamnus viscidiflorus viscidiflorus	1	.15
B	Gutierrezia sarothrae	2	-
B	Juniperus osteosperma	4	5.51
B	Opuntia spp.	1	.15
B	Pinus edulis	4	5.99
B	Purshia tridentata	18	3.20
Total for Browse		106	19.79

To more accurately estimate overhead canopy cover for trees and tall shrubs, the line intercept method is used along each 100 ft belt. This data is reported in the canopy cover table which follows. For example, *Juniperus osteosperma* has an estimated average cover of 7%.

CANOPY COVER --

Herd unit 23 , Study no: 1

Species	Percent Cover Ø8
Juniperus osteosperma	7
Pinus edulis	3

The basic cover table summarizes nested frequency and 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 vegetative cover (2.0 and 5.75), while the new method estimates projected vegetational cover (30.04). Therefore, comparisons can be made for all cover measurements except for general vegetation cover which now examines projected foliar cover rather than just basal cover.

BASIC COVER --
Herd unit 23 , Study no: 1

Cover Type	Nested Frequency '08	Average Cover %		
		'85	'91	'98
Vegetation	274	2.00	5.75	30.04
Rock	216	6.00	5.25	11.18
Pavement	279	30.50	24.25	26.32
Litter	381	46.50	46.50	42.49
Cryptogams	46	5.00	3.00	.93
Bare Ground	254	10.00	15.25	21.42

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. Average soil temperature is taken from the deepest probe, one at each of the 5 baseline starting stakes. The temperature is listed in the table as the top measurement (e.g., 64.4°F), with the average depth (in inches) as the lower measurement (12.7). Chemical and textural characteristics are also listed and were determined by laboratory analysis of a composite sample taken near each of the 5 baseline starting stakes.

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 01, Study Name: Bear Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	64.4 (12.7)	7.3	40.0	33.4	26.6	3.4	9.0	57.6	.5

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

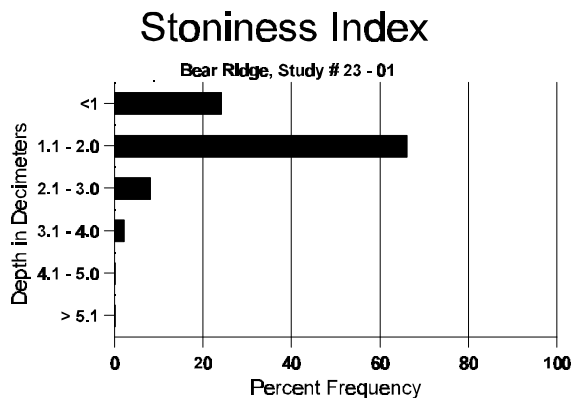
Ultra acid	<3.5
Extremely acid	3.5-4.4
Very strongly acid	4.5-5.0
Strongly acid	5.1-5.5
Moderately acid	5.6-6.0
Slightly acid	6.1-6.5
Neutral	6.6-7.3
Slightly alkaline	7.4-7.8
Moderately alkaline	7.9-8.4
Strongly alkaline	8.5-9.0
Very strongly alkaline	>9.1

Percent organic matter (% OM) refers to the amount of organic matter in the top 12 inches of soil. Parts per million of phosphorus and potassium are also included. Values for phosphorus and potassium less than 10 ppm and 70 ppm respectively have been shown to be limiting to plant growth and development.

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

To help become more aware of how rock is distributed throughout the upper soil profile, a stoniness index is determined for each of the sites. Depth to the nearest rock is estimated at the first 10 feet (at one-foot intervals) of each of the 5 baselines, which allows 50 measurements. These data are then analyzed for each of the 5 incremental decimeter measurements, making it possible to visually determine the proportion (relative percent of rock at each depth) of rock from <1 decimeter to >5 decimeters.



The pellet group frequency table summarizes the quadrat frequency of wildlife and livestock droppings found on the site. This data was not included in reports done prior to mid-1992. For example in 1998, rabbit pellet groups were found in 25% of the quadrats placed on study 23-1, indicating the relative amount of rabbit use. With future readings, this data can help characterize changes in wildlife use patterns on the site.

PELLET GROUP FREQUENCY --

Herd unit 23 , Study no: 1

Type	Quadrat Frequency		Pellet Transect	
	'93	'98	Pellet Groups per Acre	Days Use per Acre (ha)
			Ø8	Ø8
Rabbit	6	25	218	N/A
Elk	2	4	35	3 (5)
Deer	9	36	357	25 (62)

It was determined additional information on pellet groups was necessary. Therefore, a larger sample distributed over a larger area is now read in conjunction with the vegetative transects. The pellet group transect utilizes 50, 100ft² circular plots which are placed through the area. These are usually two parallel transects of 25 plots on each side of the vegetative transect which runs 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. If more precision is required, the transect is marked permanently (rebar) and the pellet groups within the circular plots are removed or marked.

On the following page is a section of a browse table which summarizes characteristics of shrubs on study 23-1. Total plants/acre for Mountain big sagebrush, excluding seedlings (S) and dead (X) was 1,400 in 1985, 1,065 in 1991, and 1,100 in 1998. Seedlings are excluded from the population estimate because with summer drought, they will most likely all die by late fall causing great fluctuations in population estimates between sampling dates. Since mid-1992, a larger shrub sample (more than three times larger) is used to better characterize the shrub populations. Therefore, changes in density (before and after 1992) may not necessarily indicate changes in trend, especially species 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 decadency, vigor, percent heavy hedging, biotic potential, etc. should be given more weight in determining shrub trend when comparing sampled years where sample sizes are different.

The following data on mountain big sagebrush shows the proportion of decadent shrubs (abbreviated as Dec: in the table) in the population has steadily increased from 57% in 1985, to 63% in 1991, and to 67% by 1998. More seedlings were encountered in 1985 and 1991, with slight fluctuations in the numbers of young plants. The percentage of plants displaying poor vigor has increased from 14% in 1985 to 38% in 1991, and is estimated at 40% in 1998. This percentage is determined by dividing the number of shrubs in vigor classes 3 and 4 by the total number of shrubs sampled (yearly totals for each grouping; Y, M, and D). The proportion of shrubs displaying heavy hedging declined from 24% in 1985, to 6% in 1991, and only 2% by 1998. This is determined by dividing the number of shrubs in form classes 3, 6 and 9 by the total number of shrubs sampled (total column). The proportion of shrubs displaying moderate use has fluctuated from 67% in 1985, down to 19% in 1991, and up to 56% in 1998. This is determined by dividing the number of shrubs in form classes 2 and 5 by the total number of shrubs sampled. The dead to live ratio is 2:1. This ratio is determined by dividing the number of dead plants by the number of live plants. The average height of sagebrush (mature plants) and

crown diameter has fluctuated from 13" x 15" to 12" x 13", and finally 15" x 23". Considering all these factors, trend for sagebrush in 1998 is slightly downward due to increased poor vigor and increased percent decadency. Also the number of dead plants encountered is more than double the number of live plants inventoried. An additional statistic to look at is the proportion of plants classified as dying in the decadent age class. For example, 60% of the decadent plants were reported as dying in 1991 and 41% of the decadent plants were reported as dying in 1998. This number is determined by dividing the number of plants in vigor class 4 by the total number of plants in the decadent age class. Both the dead to live ratio and the percentage of dying plants in the decadent age class indicate there has been a large shrub die-off in the past and this might continue into the future.

BROWSE CHARACTERISTICS --

Herd unit 23, Study no: 1

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata vaseyana																		
S	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	-	-	-	1	-	-	4	-	-	5	-	-	-	333		5	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	2	1	-	-	-	-	-	-	3	-	-	-	200		3	
	91	4	-	-	1	-	-	-	-	-	5	-	-	-	333		5	
	98	2	-	-	3	-	-	-	-	-	5	-	-	-	100		5	
M	85	1	4	1	-	-	-	-	-	-	4	-	2	-	400	13	15	6
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66	12	13	1
	98	2	9	1	1	-	-	-	-	-	12	-	1	-	260	15	23	13
D	85	1	8	3	-	-	-	-	-	-	11	-	1	-	800		12	
	91	5	3	-	2	-	-	-	-	-	4	-	-	6	666		10	
	98	14	22	-	1	-	-	-	-	-	16	-	6	15	740		37	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	2300		115	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'85		67%			24%			14%			-24%							
'91		19%			06%			38%			+ 3%							
'98		56%			02%			40%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	1400	Dec:	57%				
											'91	1065		63%				
											'98	1100		67%				

Management background information, photographs, and knowledgeable plant identification add to the data base for each site. Management and background information for each site is obtained from the administering agency. Permanently located photographs are taken; a general view down and back up the line, then a close-up of each half-high baseline post to further characterize individual sites. Correct plant identification is critical for a complete and accurate site analysis. Species identification mostly follows "A Utah Flora" (Welsh et al. 1987). In some cases, most notably *Agropyron* and *Purshia*, the species names used by the Range Trend Study Plant Species List (Giunta 1983) and the Intermountain Flora (Cronquist et al. 1977) are retained to maintain continuity and alleviate confusion with earlier published reports.

Sometimes information is requested for the production of shrubs and/or herbaceous species. These methods are described in a Interagency Technical Reference on Sampling Vegetation Attributes (²U.S. Department of Interior Bureau of Land Management 1996). The standard double weight sampling method is used for determining shrub production. This requires the establishment of a weight reference unit for each shrub species occurring in the area being sampled. Weights for 10 mature shrubs are determined for each species. Then this average weight is used with the population estimates to help estimate production by species on a per acre basis. When estimates for herbaceous species are needed, the same method is utilized except that three clipped quadrats are correlated to the herbaceous plant cover values.

REFERENCES

Bailey, A. W. & C. E. Poulton. 1968. Plant communities and environmental interrelationships in a portion of the Tillomook burn, Northwest Oregon. *Ecology*. Vol 49, No. 1. pp. 1-13.

Conover, W. J. 1980. *Practical Nonparametric Statistics* (second edition). John Wiley & Sons, New York. 493pp.

Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. Reveal and P. Holmgren. 1977. *Intermountain Flora* (volume six). Columbia University Press, New York. 584pp.

Daubenmire, R. 1959. A canopy coverage method of vegetational analysis. *Northwest Science* 33:43-66.

Giunta, B. C. 1983. Utah interagency big game range trend plant species list. Utah Dept. Of Natural Resources, Division of Wildlife Resources. Salt Lake City, Utah. 283 pp.

Mosley, J. C., S. C. Bunting, and M. Hironaka. 1986. Determining range condition from frequency data in mountain meadows of central Idaho. *J. Range Manage.* 39:561-565.

Smith, S. D., S. C. Bunting, and M. Hironaka. 1987. Evaluation of the improvement in sensitivity of nested frequency plots to vegetational change by summation. *Great Basin Naturalist*. 47(2): 299-307.

Smith, S. D., S. C. Bunting, and M. Hironaka. 1986. Sensitivity of frequency plots for detecting vegetation change. *Northwest Science*. 60:279-286.

¹U.S. Department of Interior Bureau of Land Management. 1996. *Utilization Studies and Residual Measurements*, Interagency Technical Reference, BLM/RS/ST-96/004+1730.

²U.S. Department of Interior Bureau of Land Management. 1996. *Sampling vegetation attributes*, Interagency Technical Reference, BLM/RS/ST-96/002+1730.

Welsh, S. L., N.D. Atwood, S. Goodrich and L. C. Higgins. 1987. *A Utah Flora*. Great Basin Naturalist Memoirs No. 9. Brigham Young University. 894 pp.

REPORT FORMAT

An introductory segment at the beginning of each herd 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 of the site and directions for locating the site are given on the location page. Due to many changes in management unit boundaries, trend studies have been renumbered. The previous trend study number is found in parenthesis following the trend study number currently being used. Also included on this page are the range type, 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 physical characteristics (elevation, slope, aspect), soil, ground cover, vegetative 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.

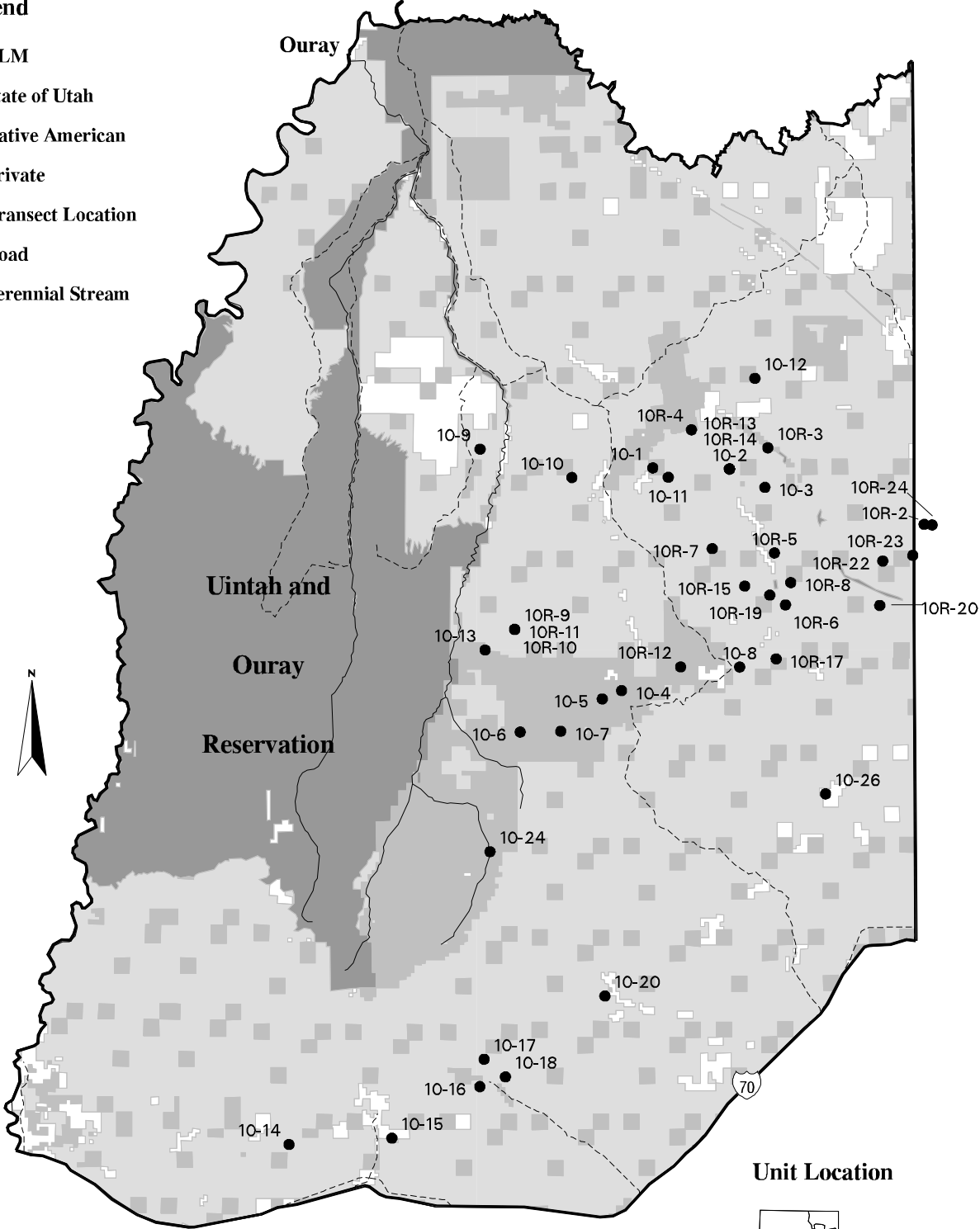
Tables with the compiled data follow the study discussions. A computer-generated data summary presents the pooled data for nested frequency, quadrat frequency, basic ground cover, soil characterization, shrub density, and shrub characterization. A nonparametric statistical analysis, Friedman test, is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

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 10

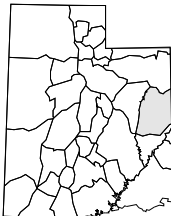
Legend

- BLM
- State of Utah
- Native American
- Private
- Transect Location
- Road
- Perennial Stream



Map Scale 1:655,990
(1 inch = 10.35 miles)

Unit Location



WILDLIFE MANAGEMENT UNIT 10 (16A & 16B) - BOOK CLIFFS

Boundary Description

Uintah and Grand Counties - Boundary begins at Interstate 70 and the Green River in Green River; northeast along the Green River to the White River; east along the White River to the Utah-Colorado state line; south along the Utah-Colorado state line to I-70; southwest along I-70 to the Green River and beginning point.

Management Unit Description

This management unit includes both the North Book Cliffs (old herd unit 16A), and the South Book Cliffs (old herd unit 16B). Of the entire land area of the Book Cliffs, about 2.1 million acres are classified as deer range. Of this 2.1 million acres, 66% is classified as deer winter range, 23% as deer summer range, and 11% as year-long range. Approximately 1.7 million acres in the Book Cliffs are classified as elk range with 50% of this being elk winter range, 27% elk summer range, and 23% year-long range. The Bureau of Land Management manages 58% of all the area classified as mule deer ranges, and 56% of all the area classified as elk ranges. State of Utah Trust Lands and Native American Trust Lands make up most of the remainder of deer and elk ranges on the Book Cliffs.

Key Areas

On the North Book Cliffs, areas such as Lower McCook Ridge, Big Park, the Crows Roost, Sunday School Canyon, Indian Ridge, and Atchee Ridge all support concentrations of wintering deer. Elk utilize many of the same areas, especially McCook Ridge. The winter range is composed of several main vegetative types including: pinyon-juniper, salt desert shrub, and Wyoming big sagebrush. The consensus is that the quantity and quality of the summer range are the most limiting factors on this unit. Vegetative composition on the summer range is principally sagebrush-grass and mountain brush with isolated patches of conifer and aspen. During the late 1990's, the BLM completed several thousand acres of prescribed burning in the mountain big sagebrush and mountain brush zones to improve herbaceous vegetation on summer ranges.

The South Book Cliffs is valuable mainly as deer winter range. With a maximum elevation of just over 9,000 feet, the unit contains only small amounts of fawning areas and summer range with few deer residing in the unit year-round. However, many deer that spend the summer on higher ranges in the northern portion of the unit, migrate annually to winter ranges in the southern portion of the unit. Terrain between the higher summer ranges and lower winter ranges in the south is steep and rugged and is used primarily as a travel corridor with limited migration occurring over a short period of time. The upper limits of the normal winter range are found normally between 8,000 and 8,500 feet, depending on the slope and exposure. During severe winters the upper limits are usually lowered to about the 7,000 feet. The lower limits of the winter range are bordered by the salt desert type at approximately 5,000 feet. There are concentrations of wintering deer at Horse Pasture, Nash Wash, Cottonwood Ranch, and the Pear Park area. Due to the steep, rough terrain at the upper elevations of the winter range, these lower critical areas have been historically over utilized by livestock and game for a long period of time.

Livestock Grazing

Pictographs and petroglyphs found in the unit indicate historically the presence of bighorn sheep, deer, buffalo, and elk in the area before settlement by Europeans. Although large herds of cattle and sheep were brought into the area around Moab in the mid-1870's and the 1890's respectively, livestock use on the South Book Cliffs was limited to the stock of local settlers. This changed in the 1920's when Colorado sheepmen began wintering large

herds on the South Book Cliffs. During this period, as many as 200,000 sheep were using the range each winter (Carter 1983). Hundreds of wild horses were also present during the early 1900's. However, none remained when the Wild Horse and Burro Act was passed in 1971. In cooperation with local ranchers, the BLM has been working on fences, water developments, and other improvements to encourage more uniform use of the range by livestock (Carter 1983).

The North Book Cliffs is broken up into several allotments including: Atchee Ridge, Sweetwater, Winter Ridge, Sunday School, and Book Cliffs Pasture. The Atchee Ridge and Sweetwater allotments are summer allotments with a deferred rest rotation grazing system for 1,500 to 1,800 cattle. The Winter Ridge and Book Cliffs Pasture allotments are summer allotments with a deferred grazing system. The Sunday School allotment is a winter allotment with a deferred rotation grazing system.

Trend studies on the South Book Cliffs occur in 3 allotments, the Cisco, Floy Creek and Cisco Mesa allotments. Most of the trend studies occur within the Cisco allotment. It is grazed by sheep from December 1st through May 10th. Cattle grazing occurs from November 1st through May 10th. The Cisco Mesa allotment is a sheep allotment which is used from November 15th through May 15th for 2,628 AUM's. The Floy Creek allotment was a sheep allotment which was converted to cattle about 5 years ago to avoid disease problems with bighorn sheep. It currently is used from November 15th through May 15th for 958 AUM's on a 4-pasture deferred rotation.

Big Game Management Objectives

Following the liberal hunting regulations of the late 1950's and 1960's, deer numbers were low and recovery has been slow. The buck only (1974-77) and 4-point-or-better (1978-84) restrictions have played a role in increases in deer numbers and hunter success. Between 1986 and 1993 however, the harvest of bucks slowly declined. The extended drought and the harsh winter of 1992-93 had detrimental effects upon the deer population in the Book Cliffs and throughout the state. Deer hunting was closed in the mid-1990's due to low population numbers, and re-opened again in 1999 as a limited entry hunting area. Currently, both deer and elk hunting are on a limited entry basis. Pronghorn are also hunted on the Book Cliffs unit.

The most current deer herd management objectives for the Book Cliffs call for a target population of 15,000 wintering deer distributed in the following way: 10,000 wintering deer on the North Book Cliffs, and 5,000 wintering deer on the South Book Cliffs. Management objectives also call for a post-season buck to doe ratio of 15:100 with 30% of the bucks being 3-point-or-better. The wintering population should result in an expected harvest of 1,000 bucks on the Bitter Creek and Little Creek portions of the unit (north), and 450 bucks on the southern portion of the unit.

Management objectives for elk herds call for 7,500 wintering animals with 6,500 of these being distributed in the north and 1,000 in the south. These are preliminary population objectives that will be re-evaluated after a two-year stabilization study is completed upon which actual population objectives will be determined. Objectives call for a bull to cow ratio of 8:100 with at least 50% of the bulls being 2 ½ years of age or older.

Management concerns on Unit 10 principally revolve around low fawn production, summer range condition and/or quality, especially fawn rearing habitat, and the increasing demands for oil and gas development. There is also the possibility at some later date that oil shale and tar sands would be developed.

Study Site Description

Permanent range trend studies were initially established in the North Book Cliffs (old unit 16A) in 1982, with five studies being established. Seven additional studies were established in 1988, and one more in 1995. At a

local interagency meeting in Moab in May 1986, interagency personnel selected nine range trend study sites for the South Book Cliffs (old unit 16B) initially. Three additional studies were established in the Book Cliffs roadless area in 1990. The transects on the North Book Cliffs were re-read during 1988, 1995, and 2000. Transects on the South Book Cliffs were re-read in 1995 and 2000. Most of these initial studies were placed on what was considered important winter ranges.

In addition to these regularly established trend studies, 31 additional range trend studies were established between 1997 and 1999 to address conflicts over elk and livestock use in the Book Cliffs. These sites were primarily placed on summer range areas to monitor use by both elk and livestock. Of the 56 total range trend studies in the Book Cliffs unit, 42 were re-read in 2000. Twenty-five of these occur on winter ranges, nine on transitional ranges, and eight on summer ranges. A site description, map, trend discussion, and data tables for each of the transects follows.

Trend Study 10-1-00

Study site name: Indian Ridge .

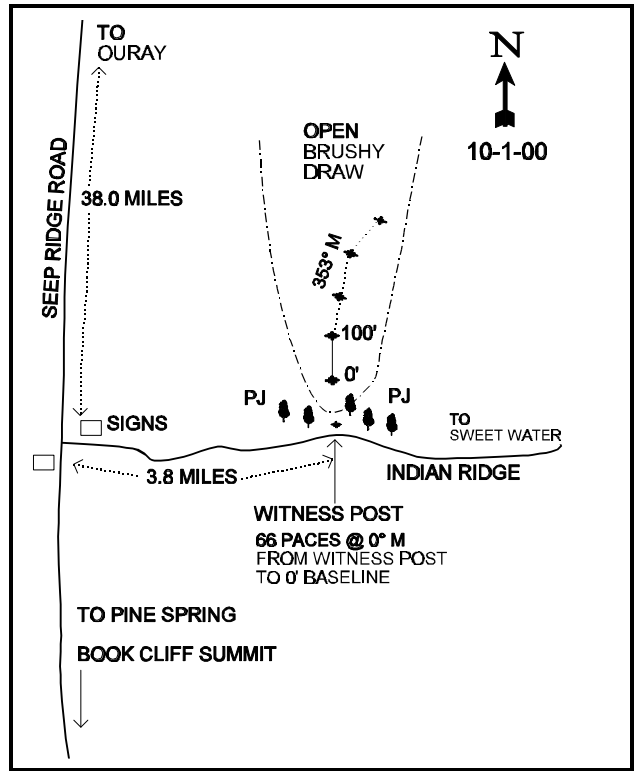
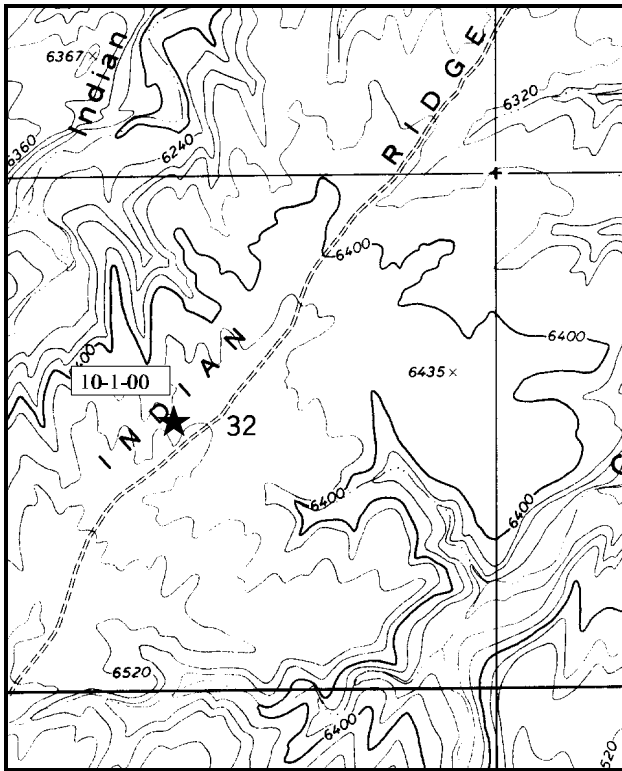
Range type: Desert Shrub .

Compass bearing: frequency baseline 357 °M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on the Indian Ridge road towards Sweetwater Canyon and McCook Ridge for 3.8 miles. Stop by the head of a small sagebrush-saltbrush draw, marked by a 20 inch tall fencepost on the left. Walk down the draw 60 paces to the 0-foot baseline stake. The frequency baseline is marked by red steel fenceposts, 12 to 18 inches in height. The 0-foot baseline stake is marked by a red browse tag.



Map Name: Cooper Canyon .

Diagrammatic Sketch

Township 13S , Range 23E , Section 32

UTM. 4389176.354 N, 639914.273 E

DISCUSSION

Trend Study No. 10-1 (16A-1)

The Indian Ridge study is located in a shallow draw on the north side of Indian Ridge. The area is principally deer winter range. The site has an elevation of 6,450 feet, a northern aspect and a slope of 5-6%. The range type is salt desert shrub dominated by fourwing saltbush, winterfat, and black sagebrush. The large fourwing saltbush are scattered throughout the draw. Cheatgrass brome is the principal understory species with lesser amounts of sand dropseed, blue grama, and thickspike wheatgrass. The low ridges surrounding the study site are dominated by juniper and pinyon woodland. There is some cattle use between winter and spring on a rotational deferment grazing system. Pellet transect data from 2000 estimate 23 cow days use/acre (57 cdu/ha), 27 deer days use/acre (67 ddu/ha), and 28 elk days use/acre (69 edu/ha).

Soils are alluvially deposited from limestone parent material and are moderately deep with an estimated effective rooting depth of nearly 23 inches. Soil depth progressively becomes more shallow toward the ridgetops. Soils have a loam texture and a slightly alkaline soil reaction (7.8 pH). Average soil temperature is 58°F at just over 18 inches in depth. A profile stoniness index estimated from penetrometer readings shows rockiness in the profile to be quite uniform down to 20-25 inches below the surface. There are dense pockets of soil in the shrub interspaces. Erosion is generally outweighed by soil sedimentation coming from the surrounding woodland slopes. Protective ground cover is adequate to limit erosion due to the abundance of thickspike wheatgrass and cheatgrass. Phosphorus is low at 2.4 ppm where 10 ppm has been shown to be necessary for normal plant growth and development.

The key browse species at this site are fourwing saltbush, winterfat, and black sagebrush. Currently ('00), fourwing saltbush is moderately large with an average height of 33 and a crown diameter of 44 inches. This species provides the majority of the browse cover at this site, 53% in 1995 and 58% in 2000. Currently, two-thirds of the population consists of mature plants that show mostly light use and good vigor. Young age class recruitment was extremely high in 1995 at 57%, and is currently ('00) moderately high at 19%. Percent decadency increased from 3% in 1995 to 15% in 2000. The extended drought, especially the dry fall and spring of 1999-2000, is a primary factor in the increased decadency and decreased recruitment of fourwing saltbush.

Winterfat, though more numerous, is low growing and provides only 21% and 14% of the browse cover in 1995 and 2000 respectively. During severe winters, winterfat would be covered by snow and largely unavailable. Winterfat was fairly stable in density from 1982 (7,133 plants/acre) to 1995 (6,240 plants/acre), but decreased substantially in 2000 to an estimated 3,980 plants/acre. Mature individuals are small, currently ('00) averaging less than a foot in height. Use was mostly light in 1995, increasing to mostly moderate in 2000. Winterfat displayed excellent leader growth in 2000 with leaders averaging nearly 5 inches in length. Utilization is difficult to determine on these shrubs due to abundant annual leader growth. Currently, winterfat displays low decadency and good vigor, but has a low biotic potential (# of seedlings) and young recruitment.

Black sagebrush was not picked up in the sample used in 1982 and 1988, but with the larger sample size used after 1991, a population of 960 plants/acre was estimated in 1995, decreasing slightly to 820 plants/acre in 2000. Black sagebrush consists mostly of mature and decadent plants with low recruitment from young plants. Percent decadency increased from 19% to 34% between the 1995 and 2000 samples, with the percentage of plants displaying poor vigor increasing from 0% to 22% during this same period. Increased decadency and a higher proportion of plants displaying poor vigor can be attributed in part to the extended drought.

Fringed sagebrush, a "sub" shrub, was moderately abundant in 1995, estimated at 6,000 plants/acre. However, with the drought, this species nearly disappeared in 2000 with the current population estimate at only 420 plants/acre. This low-growing species does not appear to be utilized, yet it can provide good winter forage for

big game when snows are not too deep. Other browse species encountered on the site include basin big sagebrush and broom snakeweed.

Perennial grasses are not abundant and have shown decreases in nested and quadrat frequencies since 1988. Composition is limited to seven species with sand dropseed, western wheatgrass and blue grama being the most numerous. Sand dropseed significantly decreased in nested frequency in 2000, while western wheatgrass significantly increased. The most abundant grass by far is the annual cheatgrass brome. Photos from 1982, 1988, and 1995 indicated that cheatgrass had steadily increased in abundance and stature. Due to the unusually wet spring in 1995, cheatgrass was knee high and very vigorous. However, due to drought in 2000, cheatgrass decreased in nested and quadrat frequencies as well as height in 2000. During the 1995 reading, cheatgrass had an average cover value of 52%, which accounted for 91% of all herbaceous cover and 73% of the total vegetative cover. In 2000, average cover of cheatgrass declined to 22% which accounted for 73% of the total herbaceous cover and 51% of the total vegetative cover. Even with a decrease in frequency and average cover, cheatgrass still presents a serious fire hazard at this site.

Forb composition is depleted. Perennial species are few with no more than four species being sampled in any year. Scarlet globemallow is the most commonly occurring perennial, but decreased in 2000 due to drought.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable but is influenced strongly by the surrounding pinyon- juniper type. Concurrent sedimentation and erosion result in a nearly continuous turnover or soil disturbance, which allows an abundant growth of annuals and inhibits, to a degree, perennial establishment. Vegetative trend may be slightly improving. The shrub stand, especially fringed sagebrush and winterfat, appear to be thickening. Management should strive towards encouraging the expansion of fourwing saltbush and other shrubs that can provide needed forage diversity.

1988 TREND ASSESSMENT

The reread of this 1982 range trend study demonstrated that very little change has occurred in this desert shrub type. The density and age structure of the key browse species, winterfat and fourwing saltbush, are basically unchanged. These browse species are very vigorous, with abundant seed heads and new growth. In 1988, 28% of the mature winterfat had a moderate to heavily hedged growth form, but the majority are still lightly used. There was a significant decrease in the number of fringed sagebrush encountered. Trend for the herbaceous understory is up but still in poor condition. Quadrat frequency for western wheatgrass and sand dropseed increased although perennial grasses are lacking on the site. Forb frequency is very low and slightly down since 1982. The soil trend is improved due to a decline in bare ground combined with an increase in litter and basal vegetative cover.

TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - improved but in poor condition (4)

1995 TREND ASSESSMENT

The soil trend appears stable. Erosion is minimal, mainly due to the dense cover of cheatgrass. Trend for browse has improved since the last reading. Fourwing saltbush densities have increased, while winterfat has slightly decreased due to a decline in number of young plants (3,266 to 500 plants/acre). The majority of the fourwing are young plants which make up 57% of the total population. Due to the large amounts of current

annual growth on winterfat and fourwing, percent utilization was difficult to determine this season. Use appears light for fourwing and winterfat. The dominant vegetation on the site is cheatgrass which is very vigorous this year due to the unusually wet spring. Cheatgrass has a sum of nested frequency of 373 out of a possible 400 and a quadrat frequency of 97%. The plants are 20 to 30 inches height and cover 52% of the ground surface. Perennial grasses consisting of sand dropseed, mutton bluegrass, and blue grama are present under the cheatgrass canopy while western wheatgrass occurs in small scattered patches. Sum of nested frequency for perennial grasses has declined since 1988 indicating a downward trend. Forbs are uncommon on the site and consist of mostly annuals. Scarlet globemallow is the only common perennial forb.

TREND ASSESSMENT

soil - stable (3)

browse - up, especially for fourwing saltbush (5)

herbaceous understory - down and in poor condition due to the over abundance of cheatgrass and lack of perennial grasses (1)

2000 TREND ASSESSMENT

Trend for soil appears stable. There is adequate ground cover from grasses and litter to minimize erosion. The ratio of bare soil to protective ground cover (vegetation, litter, and cryptogams) is almost unchanged since the last reading. Trend for browse is slightly down. The key species, fourwing saltbush, winterfat, and black sagebrush show declines in density and increases in decadency. Also, the proportion of decadent plants classified as dying is high for all of the key species. Biotic potential (proportion of seedlings to the population) is low for all the key species, with recruitment (proportion of young plants in the population) being low for black sagebrush and winterfat, and moderate for fourwing saltbush. The proportion of plants displaying poor vigor increased for fourwing saltbush and black sagebrush. Increased poor vigor, decreases in density and increases in decadency for browse can be attributed in many ways to drought. Also, dry conditions make it difficult for seedling and young plants to become established and persist. Trend for the herbaceous understory is down with sum of nested frequency for perennial grasses and forbs decreasing by nearly 25% in 2000. This decrease is mostly due to drought, and the downward trend could improve with a return to normal precipitation.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - down due to drought (1)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	_b 75	_a 38	_b 77	4	25	14	21	1.29	6.28
G	Bouteloua gracilis	_a 8	_b 26	_{ab} 25	-	4	11	11	1.01	.76
G	Bromus tectorum (a)	-	_b 379	_a 302	-	-	97	84	51.80	22.05
G	Oryzopsis hymenoides	_a -	_b 10	_b 4	-	-	4	3	.09	.04
G	Poa fendleriana	9	16	14	-	3	8	8	.21	.07
G	Sitanion hystrix	_a -	_b 10	_b 7	-	-	5	4	.10	.19
G	Sporobolus cryptandrus	_c 161	_b 94	_a 37	48	61	37	17	1.04	.66
G	Stipa comata	-	1	-	-	-	1	-	.00	-
Total for Annual Grasses		0	379	302	0	0	97	84	51.80	22.05
Total for Perennial Grasses		253	195	164	52	93	80	64	3.76	8.03
Total for Grasses		253	574	466	52	93	177	148	55.57	30.08
F	Astragalus spp.	-	1	-	-	-	1	-	.00	-
F	Astragalus convallarius	-	-	-	2	-	-	-	-	-
F	Descurainia pinnata (a)	-	4	-	13	-	2	-	.01	-
F	Draba spp. (a)	-	3	-	-	-	1	-	.00	-
F	Lappula occidentalis (a)	-	_b 57	_a 5	-	-	23	3	.48	.07
F	Schoenrambe linifolia	-	6	1	-	-	3	1	.04	.00
F	Sphaeralcea coccinea	_a 20	_b 48	_a 19	4	9	19	8	.58	.23
F	Tragopogon dubius	5	-	5	-	2	-	4	-	.07
F	Trifolium dubium	6	-	-	-	5	-	-	-	-
F	Unknown forb-perennial	1	-	-	-	1	-	-	-	-
Total for Annual Forbs		0	64	5	13	0	26	3	0.50	0.07
Total for Perennial Forbs		32	55	25	6	17	23	13	0.62	0.31
Total for Forbs		32	119	30	19	17	49	16	1.12	0.37

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 1

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia frigida	75	9	1.36	.09
B	Artemisia nova	11	9	2.27	2.53
B	Artemisia tridentata tridentata	1	1	.01	-
B	Atriplex canescens	56	51	7.87	7.57
B	Ceratoides lanata	86	73	3.09	1.86
B	Gutierrezia sarothrae	10	15	.12	1.01
B	Pinus edulis	0	1	-	.00
Total for Browse		239	159	14.73	13.08

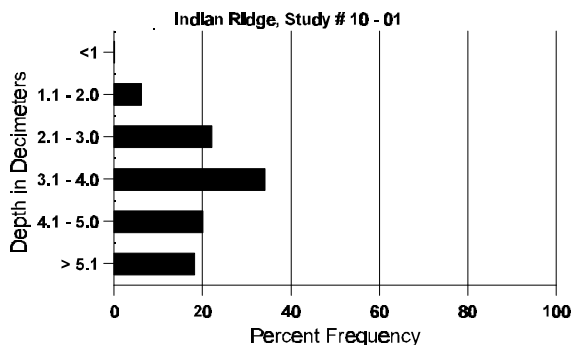
BASIC COVER --
Herd unit 10 , Study no: 1

Cover Type	Nested Frequency		Average Cover %			
	'95	'00	'82	'88	'95	'00
Vegetation	389	365	2.30	8.75	65.86	46.86
Rock	132	34	1.30	.50	1.08	.32
Pavement	196	115	13.50	4.75	3.41	3.65
Litter	397	380	73.00	79.50	62.46	60.58
Cryptogams	9	31	0	0	.39	1.19
Bare Ground	226	220	10.00	6.50	8.80	12.56

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 1, Study Name: Indian Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
22.80	58.4 (18.11)	7.8	36.0	38.0	26.0	1.7	2.4	275.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 1

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'95	'00	00	00
Horse	0	0	9	N/A
Rabbit	6	21	827	N/A
Elk	2	11	365	28 (70)
Deer	9	6	357	27 (68)
Cattle	6	3	270	23 (56)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 1

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Artemisia frigida																		
S	82	11	-	-	-	-	-	-	-	-	11	-	-	-	733			11
	88	3	-	-	-	-	-	1	-	-	4	-	-	-	266			4
	95	26	-	-	-	-	-	-	-	-	26	-	-	-	520			26
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
Y	82	19	-	-	-	-	-	-	-	19	-	-	-	1266			19	
	88	1	-	-	-	-	-	1	-	2	-	-	-	133			2	
	95	47	-	-	-	-	-	-	-	47	-	-	-	940			47	
	00	1	2	-	-	-	-	1	-	4	-	-	-	80			4	
M	82	38	-	-	-	-	-	-	-	38	-	-	-	2533	9	9	38	
	88	1	-	-	1	-	-	-	-	2	-	-	-	133	13	5	2	
	95	253	-	-	-	-	-	-	-	253	-	-	-	5060	14	7	253	
	00	10	5	1	-	-	-	1	-	17	-	-	-	340	4	5	17	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%			-93%							
'88		00%			00%			00%			+96%							
'95		00%			00%			00%			-93%							
'00		33%			05%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	3799	Dec:	-			
												'88	266		-			
												'95	6000		-			
												'00	420		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia nova																	
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	95	2	13	18	-	-	-	-	-	-	33	-	-	-	660	9	17
	00	19	6	-	-	-	-	-	-	-	25	-	-	-	500	10	23
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	2	7	-	-	-	-	-	-	9	-	-	-	180		9
	00	7	-	-	-	-	-	7	-	-	5	-	-	9	280		14
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'82		00%			00%			00%									
'88		00%			00%			00%									
'95		31%			52%			00%			-15%						
'00		15%			00%			22%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	0%			
											'88	0		0%			
											'95	960		19%			
											'00	820		34%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia tridentata tridentata																	
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	41	69
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	15	16
% Plants Showing		<u>Moderate Use</u>					<u>Heavy Use</u>				<u>Poor Vigor</u>			<u>%Change</u>			
'82		00%					00%				00%						
'88		00%					00%				00%						
'95		00%					00%				00%			-50%			
'00		00%					100%				00%						
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-		
												'88	0		-		
												'95	40		-		
												'00	20		-		

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex canescens																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320		16	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	95	62	-	-	-	-	-	-	-	-	62	-	-	-	1240		62	
	00	11	6	-	-	-	-	-	-	-	17	-	-	-	340		17	
M	82	3	3	-	-	-	-	-	-	-	5	1	-	-	400	30 31	6	
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	49 70	8	
	95	44	-	-	-	-	-	-	-	-	44	-	-	-	880	38 46	44	
	00	48	4	-	7	-	-	-	-	-	59	-	-	-	1180	33 44	59	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	7	1	1	1	1	-	2	-	-	6	-	-	7	260		13	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		50%			00%			00%			+33%							
'88		00%			00%			00%			+73%							
'95		.91%			00%			00%			-18%							
'00		13%			01%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	0%			
												'88	599		0%			
												'95	2180		3%			
												'00	1780		15%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Ceratoides lanata																	
S	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
Y	82	18	-	-	-	-	-	-	-	-	28	-	-	-	1200		18
	88	27	12	4	2	-	-	4	-	-	49	-	-	-	3266		49
	95	25	-	-	-	-	-	-	-	-	25	-	-	-	500		25
	00	7	3	-	-	-	-	-	-	-	10	-	-	-	200		10
M	82	87	2	-	-	-	-	-	-	-	89	-	-	-	5933	12 9	89
	88	44	15	4	4	-	-	2	-	-	69	-	-	-	4600	15 10	69
	95	285	-	-	-	-	-	-	-	-	282	-	-	3	5700	13 9	285
	00	52	116	3	6	-	-	4	-	-	180	-	-	1	3620	10 11	181
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	95	1	1	-	-	-	-	-	-	-	1	-	-	1	40		2
	00	-	4	2	-	1	1	-	-	-	3	-	-	5	160		8
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'82		02%			00%			00%			+10%						
'88		24%			07%			00%			-21%						
'95		.32%			00%			01%			-36%						
'00		62%			03%			03%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	7133	Dec:	0%			
											'88	7932		1%			
											'95	6240		1%			
											'00	3980		4%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total							
		1	2	3	4										
<i>Gutierrezia sarothrae</i>															
S	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	1	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	3	-	-	-	-	-	-	3	-	-	-	60		3
	00	3	-	-	-	-	-	-	3	-	-	-	60		3
M	82	1	-	-	-	-	-	-	1	-	-	-	66	7 11	1
	88	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	95	16	-	-	-	-	-	-	16	-	-	-	320	10 6	16
	00	60	-	-	-	-	1	-	58	-	3	-	1220	6 8	61
D	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	4	-	-	3	-	-	1	-	-	2	6	160		8
X	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>							
'82		00%		00%		00%									
'88		00%		00%		00%									
'95		00%		00%		00%		+74%							
'00		00%		00%		15%									
Total Plants/Acre (excluding Dead & Seedlings)										'82	66	Dec:	0%		
										'88	0		0%		
										'95	380		0%		
										'00	1440		11%		
<i>Pinus edulis</i>															
S	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	2	-	-	-	-	-	-	2	-	-	-	40		2
Y	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>							
'82		00%		00%		00%									
'88		00%		00%		00%									
'95		00%		00%		00%									
'00		00%		00%		00%									
Total Plants/Acre (excluding Dead & Seedlings)										'82	0	Dec:	-		
										'88	0		-		
										'95	0		-		
										'00	20		-		

Trend Study 10-2-00

Study site name: Lower McCook Ridge Exclosure .

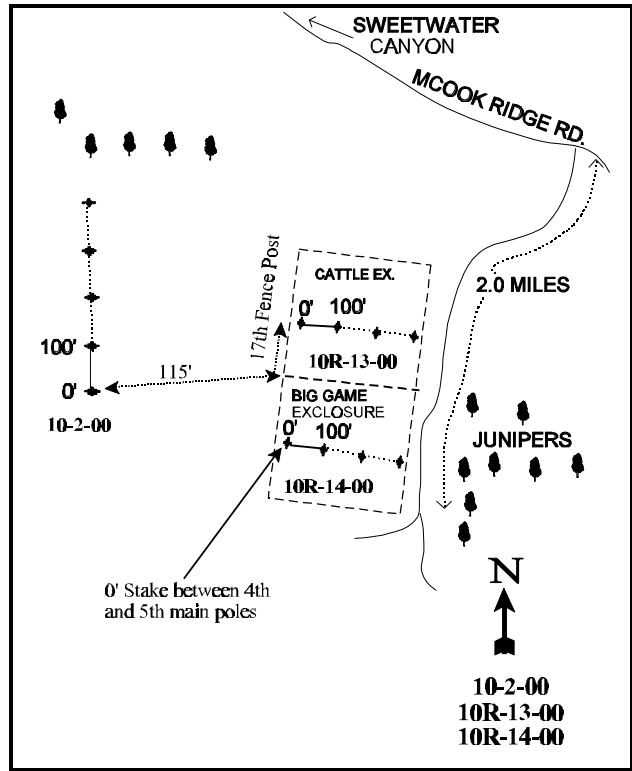
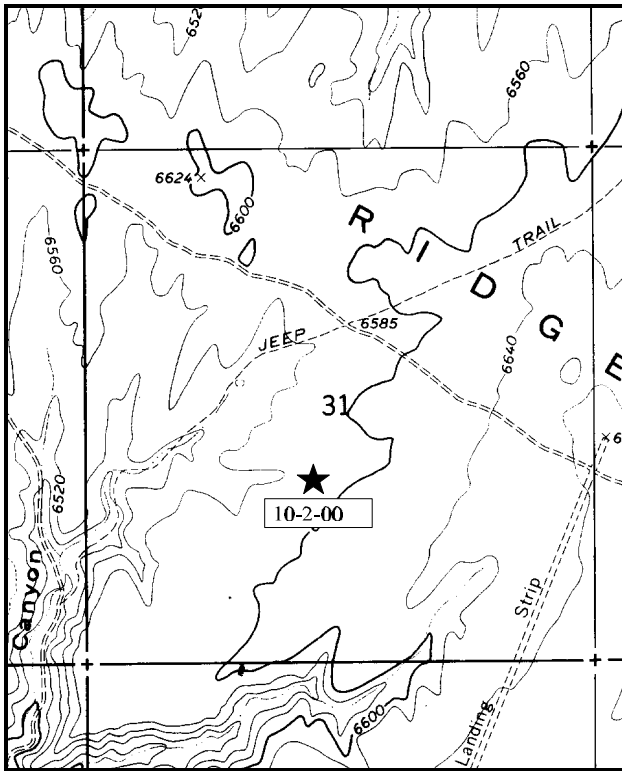
Range type: Desert Shrub .

Compass bearing: frequency baseline 345°M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles. A large exclosure can be seen off the south side of the road. From the northwest side of the deer fence on the lower McCook Ridge Exclosure, the 0-foot baseline stake is approximately 40 paces away bearing 263°M. The frequency baseline is marked by green fenceposts, 12-18 inches tall.



Map Name: Cooper Canyon .

Diagrammatic Sketch

Township 13S , Range 24E , Section 31

UTM. 4389198 N , 647916 E

DISCUSSION

Trend Study No. 10-2 (16A-2)

The Lower McCook Ridge Exclosure study is found outside of the exclosure complex on Lower McCook Ridge. The exclosure was constructed in 1964. In addition to the regular rotation, this site was re-read in 1997 as a special studies site to monitor perceived conflicts over elk and livestock use in the North Book Cliffs. The site is on a broad swale that slopes gently to the southwest at an elevation of 6,600 feet. Vegetative composition is dominated by a mixed stand of basin big sagebrush, fourwing saltbush, winterfat, and fringed sagebrush. This is thought to be an important wintering area for elk and mule deer. Pellet group data from 2000 indicate light use by wildlife with an estimated 27 deer days use/acre (67 ddu/ha) and 27 elk days use/acre (67 edu/ha). In 2000, no cattle pats from the current year were sampled. Cattle use (800 AUM'S) in this area is on a rotational deferred system between fall and spring, allowing some periods of rest. Early spring use is utilized to help control cheatgrass.

The soil is light brown in color, alluvially deposited, and has a loam texture. Soils are slightly alkaline (pH of 7.6) and have an average temperature of 61°F at over 17 inches in depth. Phosphorus is low (5.5 ppm) where 10 ppm is thought necessary for normal plant development and growth. The effective rooting depth averages 18 inches overall, but varies over the length of the transect. Effective rooting depth is 26 inches at the beginning of the transect decreasing to 12 inches at the end of the transect. Contradictory to conventional thought, a higher density of basin big sagebrush exists where the soils are more shallow, and more cheatgrass where the soils are deeper. There is a small wash that runs through the end of the baseline and plant pedestaling is associated with the area. Originally in 1982, there were extensive areas of exposed bare ground (49%), some ephemeral litter (i.e., mostly dead cheatgrass), and minimal basal vegetative cover. Vegetation and litter cover decreased between 1995 and 1997, but increased between 1997 and 2000. Bare ground has slightly increased in relative percent cover over the last 3 readings.

Several key browse species exist on the site including: basin big sagebrush, winterfat, fringed sagebrush, and fourwing saltbush. Currently, basin big sagebrush accounts for half of the browse cover with a density of 3,980 plants/acre. This is likely a hybrid between basin big sagebrush (*Artemisia tridentata tridentata*) and Wyoming big sagebrush (*A. tridentata wyomingensis*), but they were all classified as basin big sagebrush. Population density has increased since 1997 due to recruitment of young plants. The young age class made up 14% (420 plants/acre) of the population in 1997, increasing to 32% (1,260 plants/acre) in 2000. Percent decadency has increased over the last 3 sampling periods. In 1995, 11% of the population was classified as decadent, increasing to 20% in 1997 and 26% in 2000. Vigor has generally been good, with 9% of the population displaying poor vigor in 2000. Use on basin big sagebrush has generally been moderate to heavy on over half of the population from 1988 to 1997. However, moderate and heavy use decreased to 39% in 2000. Biotic potential (# of seedlings) has declined from a high of 45% in 1995, to only 5% in 1997 and 1% in 2000. However, the increase in young plants in 2000 still points to an increasing population. Although 35% of the decadent plants were classified as dying in 2000 (360 plants/acre), recruitment from young plants (1,260 plants/acre) is currently adequate to replace any of these plants that may die-off.

Fourwing saltbush, while noticeably less numerous, produces good quality forage. The population is currently estimated at 700 plants/acre and provides 11% of the browse cover. Use on fourwing saltbush has been light to moderate over all sampling periods with exception of 1995 in which half of the plants displayed moderate or heavy use. Currently, 29% of the population shows moderate use, and 3% heavy use. Seventeen percent of the population was classified as having poor vigor in 1997, with no plants classified as such in 2000. Percent decadency slightly decreased from 42% in 1997 to 40% in 2000, both of estimates much higher than the 13% estimated in 1995. Currently, recruitment and biotic potential are zero.

Winterfat on this site is a low growing browse averaging only 8 inches in height. Density estimates in 1982 and 1988 were comparable at around 3,500 plants/acre. Population estimates increased beginning in 1995 due to the larger sampling area instituted in 1992 which provides better population estimates for species having clumped and/or discontinuous distributions. Data from 1995 indicated a much larger population of 10,420 plants/acre. Currently, the population is estimated at 7,020 plants/acre. Utilization in 1995 was difficult to determine due to the abundant annual growth associated with the unusually wet spring. About 42% of the plants were classified as moderately hedged in 1997, with the rest being classified as lightly hedged. Currently, 43% of the population displays moderate use with an additional 21% of the population showing heavy use. Vigor is generally good, although percent decadency increased from 0% in 1995 and 1997, to 10% in 2000. Biotic potential (number of seedlings) and recruitment (number of young plants) are currently low at 1% and 3% respectively. Increased decadency, low recruitment, and biotic potential can be attributed in part to the drought experienced in 2000.

Other browse species encountered on the site include fringed sagebrush, broom snakeweed, and prickly pear cactus. Fringed sagebrush currently contributes 27% of the browse cover, with the population estimated at 9,800 plants/acre. Use is mostly light and vigor good. This population looks to be expanding with a biotic potential (number of seedlings) of 82%.

Perennial grasses are deficient and consist mostly of Sandberg bluegrass, bottlebrush squirreltail, and Indian ricegrass. All grasses had 30% to 60% of their current growth removed during the 1988 reading. Sandberg bluegrass has remained at a nearly constant frequency since 1995. It currently ('00) has a quadrat frequency of 47, a nested frequency of 118, and provides the most cover of any grass (just over 4%). Bottlebrush squirreltail significantly increased in nested frequency in 2000. There was no noticeable utilization on perennial species when the site was read in June 2000. Cheatgrass brome is also abundant. It accounted for 57% of the herbaceous cover in 1997, decreasing to 28% in 2000 due to the dry conditions.

If annual species are disregarded, forbs are less common than grasses. Scarlet globemallow is the most common forb, currently sampled in 47% of the quadrats. This species contributes just over 2% average cover.

1982 APPARENT TREND ASSESSMENT

Soil trend appears to be stable to declining. To a large degree, the soil surface is barren of vegetation or effective litter cover. Vegetation trend is perhaps slightly more stable but still declining. With the exception of fourwing saltbush, the shrub populations appear to be expanding with mostly light use. Perhaps the most serious concern is an apparent rapid increase of broom snakeweed. Perennial herbs are nearly absent from the site and show no evidence of increasing.

1988 TREND ASSESSMENT

Changes on the Lower McCook Ridge Exclosure study since establishment in 1982 include an increase in both sagebrush density and use. Density of big sagebrush has increased from 3,966 plants/acre to 5,865 plants/acre. A majority of the big sagebrush have a moderately hedged growth form, with 14% appearing heavily hedged. Other browse are only lightly used. In 1988, 30% of the big sagebrush were classified as decadent, as opposed to 6% in 1982. Still, there is an adequate number of young shrubs in the population. There are differences and difficulties in the identification of big sagebrush on this site. The 1982 study reported Wyoming big sagebrush on the base line. The sagebrush was all called basin big sagebrush in 1988. There is a great deal of hybridization between these two subspecies on this site. A few more young fourwing saltbush were found in 1988, but populations of saltbush and winterfat are basically unchanged. Fringed sagebrush has increased as predicted, along with the snakeweed, which is currently the most abundant woody species. The density estimate for snakeweed was 6,766 plants/acre in 1988, while there were only 2,999 plants/acre in 1982. With a large

number of seedlings, snakeweed continues to increase. Although cheatgrass still provides much of the ground cover, Sandberg bluegrass has increased in frequency. There continues to be a low diversity of forbs. Ground cover, in the form of mostly litter, has increased slightly. Total protective ground cover in 1988 was 64%, as opposed to 51% in 1982. Vegetative basal cover was low at 2.5%, due to a lack of understory herbaceous vegetation. Still, there was little evidence of erosion problems due to the level terrain.

TREND ASSESSMENT

soil - slightly improved (4)

browse - up for key species (5)

herbaceous understory - improved but with a very poor composition of annuals (4)

1995 TREND ASSESSMENT

The soil trend has improved slightly due to increased protective ground cover provided by herbaceous vegetation, litter, and cryptogamic crusts. Bare ground cover declined in 1995 as well. Browse trend is stable. Winterfat is abundant and lightly utilized. Fourwing saltbush is more heavily utilized but appears to have a stable mature population. Basin big sagebrush has declined in density from 5,865 plants/acre in 1988 to 3,860 plants/acre in 1995, but this is almost what it was originally in 1982. It should be noted that the sample size was greatly enlarged in 1995, giving much better population estimates for browse species. Therefore, the decrease is more from a better population estimate than actual losses, as few dead plants are present to explain this decline. Percent decadence has decreased from 30% to 11%. The density of broom snakeweed has shown a 53% decrease since the 1988 reading as well. Due to the drought, this trend is consistent throughout most of the state. The herbaceous understory is in poor condition, produces little forage and is dominated by annual cheatgrass. Sandberg bluegrass is the most numerous perennial species. Forbs are not an important aspect of this site due to low frequencies, but they have shown increased sum of nested and quadrat frequency values on each successive reading. The most common forb is still scarlet globemallow. Overall, the herbaceous trend is slightly up due to increased nested and quadrat frequency values of perennials, but it is still in very poor condition because of its weedy composition.

TREND ASSESSMENT

soil - slightly improved (4)

browse - stable for key species (3)

herbaceous understory - improved but in very poor condition due to the dominance of annuals (4)

1997 TREND ASSESSMENT

Rock and pavement cover have increased since 1995 to nearly 19%. This is likely a result of the decrease in litter and vegetation cover due to extended drought. Percent bare ground has stayed nearly the same at 25%. Erosion on the site does not appear to be increasing at this time and the soil trend appears stable. Winterfat shows higher utilization in 1997 compared to 1995. The plants show good vigor with no decadent or dead plants reported. Fourwing saltbush vigor has declined and decadency rate has increased. The basin big sagebrush population has shifted to a more mature age structure with more decadent and dead plants reported. Basin big sagebrush contributes 60% of the total browse cover. Broom snakeweed density has decreased by nearly 50% with a mostly mature age structure. The browse trend appears to be slightly down with the consideration of extended drought. Herbaceous understory has changed very little since 1995. Nested and quadrat frequencies have remained nearly the same. The herbaceous understory trend is stable, and as reported in 1995, still in very poor condition.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is stable. Since 1997, cover of vegetation and litter have increased. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil decreased, but remains high enough not to warrant a downward trend. Erosion is currently minimal. Trend for browse is stable. Basin big sagebrush, which makes up half of the browse cover, shows increases in density and recruitment as well as decreased use. Percent decadency, the proportion of decadent plants classified as dying, and plants displaying poor vigor all increased in 2000. However, these parameters are likely caused, at least in part, to drought and should improve with normal precipitation. Fourwing saltbush shows improved vigor from the 1997 reading, and a slight decrease in decadency. Winterfat shows increases in use and decadency, but this species only contributes 9% of the browse cover. Trend for the herbaceous understory is slightly improving. Even with drought, sum of nested frequency for perennial species increased significantly since 1997. Also, cheatgrass decreased in nested and quadrat frequencies in 2000 due to the lack of moisture in the fall, winter, and spring. Composition is still weedy in nature, but perennials appear to be stable to increasing.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly improving (4)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 2

T y p e	Species	Nested Frequency				Quadrat Frequency					Average Cover %		
		'88	'95	'97	'00	'82	'88	'95	'97	'00	'95	'97	'00
G	Agropyron dasystachyum	-	-	-	4	-	-	-	-	1	-	-	.38
G	Bromus tectorum (a)	-	c288	b263	a171	-	-	85	77	58	15.91	5.44	4.17
G	Festuca ovina	4	-	-	1	2	2	-	-	1	-	-	.00
G	Oryzopsis hymenoides	1	7	15	10	-	1	4	5	4	.24	.22	.62
G	Poa secunda	a30	b106	b120	b118	1	13	38	43	47	2.04	1.35	4.42
G	Sitanion hystrix	a17	b52	ab42	c114	2	8	23	19	47	.50	.70	2.50
Total for Annual Grasses		0	288	263	171	0	0	85	77	58	15.91	5.44	4.17
Total for Perennial Grasses		52	165	177	247	5	24	65	67	100	2.79	2.29	7.93
Total for Grasses		52	453	440	418	5	24	150	144	158	18.71	7.73	12.11
F	Allium spp.	-	2	-	2	-	-	1	-	1	.00	-	.00
F	Carduus nutans (a)	-	2	-	-	-	-	1	-	-	.00	-	-
F	Delphinium bicolor	-	2	2	-	-	-	1	1	-	.00	.00	-
F	Descurainia pinnata (a)	-	b32	a13	a-	-	-	14	7	-	.29	.08	.00

Type	Species	Nested Frequency				Quadrat Frequency					Average Cover %		
		'88	'95	'97	'00	'82	'88	'95	'97	'00	'95	'97	'00
F	Draba spp. (a)	-	_b 11	_a -	_a -	-	-	5	-	-	.02	-	-
F	Erigeron flagellaris	-	1	-	-	-	-	1	-	-	.01	-	-
F	Erigeron pumilus	32	40	42	33	-	16	22	20	18	.25	.40	.29
F	Lappula occidentalis (a)	-	_b 55	_{ab} 38	_a 21	-	-	25	16	10	.27	.29	.20
F	Machaeranthera spp.	-	-	-	-	5	-	-	-	-	-	-	-
F	Penstemon spp.	-	-	2	-	-	-	-	1	-	-	.03	-
F	Schoenocrambe linifolia	_a -	_b 25	_a 2	_a -	-	-	10	1	-	.05	.00	-
F	Sisymbrium altissimum (a)	-	_b 6	_a -	_a -	-	-	4	-	-	.07	-	-
F	Sphaeralcea coccinea	98	100	105	119	-	39	40	44	47	.75	.95	2.24
F	Tragopogon dubius	_a -	_a 2	_a -	_b 21	-	-	2	-	10	.01	-	.18
Total for Annual Forbs		0	106	51	21	0	0	49	23	10	0.67	0.38	0.20
Total for Perennial Forbs		130	172	153	175	5	55	77	67	76	1.08	1.39	2.71
Total for Forbs		130	278	204	196	5	55	126	90	86	1.75	1.77	2.92

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 2

Type	Species	Strip Frequency			Average Cover %		
		'95	'97	'00	'95	'97	'00
B	Artemisia frigida	69	53	70	3.04	2.94	6.44
B	Artemisia tridentata tridentata	56	57	58	10.39	9.15	12.00
B	Atriplex canescens	26	10	24	1.99	.73	2.55
B	Ceratoides lanata	71	62	61	4.31	2.08	2.20
B	Gutierrezia sarothrae	39	31	40	1.41	.38	.95
B	Opuntia spp.	3	0	4	.18	-	.03
Total for Browse		264	213	257	21.34	15.30	24.19

BASIC COVER --

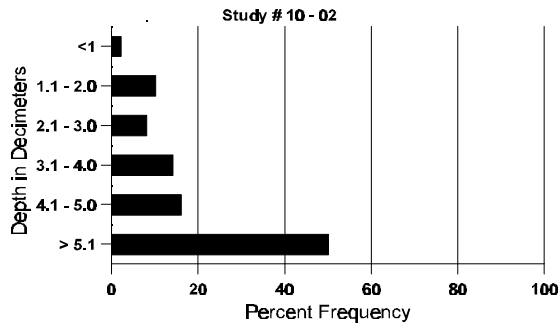
Herd unit 10 , Study no: 2

Cover Type	Nested Frequency			Average Cover %				
	'95	'97	'00	'82	'88	'95	'97	'00
Vegetation	356	351	331	2.30	2.50	41.63	23.80	39.90
Rock	177	117	41	0	0	1.49	.56	.21
Pavement	259	327	232	0	0	3.29	18.23	3.52
Litter	391	389	356	48.5	60.75	40.01	25.04	38.48
Cryptogams	143	246	81	0	.50	3.93	4.90	3.13
Bare Ground	292	301	301	49.25	36.25	26.30	25.04	35.13

SOIL ANALYSIS DATA --
Herd Unit 10, Study no: 02

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.4	61 (17.5)	7.6	35.0	38.8	26.2	1.9	5.46	185.6	0.51

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 2

Type	Quadrat Frequency		
	'95	'97	'00
Rabbit	11	3	15
Elk	18	26	24
Deer	17	21	18
Cattle	-	1	-

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
9	148	N/A	N/A
661	357	51 (126)	28 (68)
496	348	38 (94)	27 (67)
139	-	12 (29)	-

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 2

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total		
		1	2	3	4					
Artemisia frigida										
S	82	1	-	-	-	-	-	-	1	1
	88	7	-	-	-	-	-	-	7	7
	95	126	-	-	-	-	-	-	126	126
	97	4	-	-	-	-	-	-	4	4
	00	402	-	-	-	-	-	-	402	402
Y	82	-	-	-	-	-	-	-	0	0
	88	7	-	-	-	-	-	-	7	7
	95	140	-	-	12	-	-	-	152	152
	97	44	-	-	10	-	-	-	54	54
	00	49	-	-	-	-	1	-	50	50
M	82	9	-	-	-	-	-	-	9	9
	88	23	-	-	4	-	-	2	29	29
	95	321	4	4	3	-	-	-	332	332
	97	340	-	-	1	-	-	-	341	341
	00	319	75	27	2	2	-	3	425	428
D	82	-	-	-	-	-	-	-	0	0
	88	-	-	-	-	-	-	-	0	0
	95	-	-	-	-	-	-	-	0	0
	97	-	-	-	-	-	-	-	0	0
	00	2	4	4	-	-	2	-	10	12
X	82	-	-	-	-	-	-	-	0	0
	88	-	-	-	-	-	-	-	0	0
	95	-	-	-	-	-	-	-	0	0
	97	-	-	-	-	-	-	-	0	0
	00	-	-	-	-	-	-	-	20	1
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>					<u>%Change</u>	
'82		00%	00%	00%					+75%	
'88		00%	00%	00%					+88%	
'95		.82%	.82%	00%					-18%	
'97		00%	00%	00%					+19%	
'00		17%	07%	.40%						
Total Plants/Acre (excluding Dead & Seedlings)						'82	300	Dec:	0%	
						'88	1199		0%	
						'95	9680		0%	
						'97	7900		0%	
						'00	9800		2%	

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
		1	2	3	4		1	2		
Artemisia tridentata tridentata										
S	82	5	-	-	-	-	-	-	5	5
	88	45	-	-	8	-	-	-	53	53
	95	86	-	-	-	-	-	-	86	86
	97	8	-	-	-	-	-	-	8	8
	00	1	-	-	-	-	-	-	1	1
Y	82	18	-	-	-	-	-	-	18	18
	88	40	28	8	1	-	-	-	77	77
	95	44	1	-	15	-	-	-	60	60
	97	18	1	-	2	-	-	-	21	21
	00	30	3	-	-	-	-	30	63	63
M	82	94	-	-	-	-	-	-	94	94
	88	13	26	7	-	-	-	-	45	46
	95	21	87	3	-	-	-	-	110	111
	97	29	65	7	-	-	-	-	101	101
	00	41	28	16	-	-	-	-	85	85
D	82	1	6	-	-	-	-	-	-	7
	88	14	29	10	-	-	-	-	49	53
	95	4	15	2	-	-	1	-	17	22
	97	5	18	6	-	-	1	-	24	30
	00	22	18	9	-	2	-	-	33	51
X	82	-	-	-	-	-	-	-	0	0
	88	-	-	-	-	-	-	-	0	0
	95	-	-	-	-	-	-	-	180	9
	97	-	-	-	-	-	-	-	360	18
	00	-	-	-	-	-	-	-	180	9
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>		
'82		05%		00%		06%		+32%		
'88		47%		14%		02%		-34%		
'95		53%		03%		03%		-21%		
'97		55%		09%		04%		+24%		
'00		26%		13%		09%				
Total Plants/Acre (excluding Dead & Seedlings)						'82	3966	Dec:	6%	
						'88	5865		30%	
						'95	3860		11%	
						'97	3040		20%	
						'00	3980		26%	

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total								
		1	2	3	4		1	2									
Atriplex canescens																	
S	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	6	-	-	-	-	-	-	-	6	-	-	-	200		6	
	95	5	1	-	-	-	-	-	-	6	-	-	-	120		6	
	97	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	12	-	-	-	-	-	-	-	12	-	-	-	400	27	21	12
	88	15	-	-	-	-	-	-	-	15	-	-	-	500	26	29	15
	95	9	9	6	1	2	-	-	-	27	-	-	-	540	26	33	27
	97	5	-	-	1	-	-	-	-	6	-	-	-	120	29	28	6
	00	14	3	-	3	1	-	-	-	21	-	-	-	420	31	35	21
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	1	-	-	-	-	-	-	5	-	-	-	100		5	
	97	3	1	1	-	-	-	-	-	3	-	-	2	100		5	
	00	7	3	1	-	3	-	-	-	14	-	-	-	280		14	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	1	-	-	-	80		4	
	97	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>% Change</u>							
'82		00%		00%		00%				+43%							
'88		00%		00%		00%				+ 8%							
'95		34%		16%		00%				-68%							
'97		08%		08%		17%				+66%							
'00		29%		03%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'82	400	Dec:	0%				
										'88	700		0%				
										'95	760		13%				
										'97	240		42%				
										'00	700		40%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Ceratoides lanata																		
S	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	'82	22	-	-	-	-	-	-	-	-	22	-	-	-	733		22	
	'88	32	-	-	-	-	-	-	-	-	32	-	-	-	1066		32	
	'95	70	-	-	2	-	-	-	-	-	72	-	-	-	1440		72	
	'97	27	6	-	5	-	-	-	-	-	38	-	-	-	760		38	
	'00	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
M	'82	82	-	-	-	-	-	-	-	-	82	-	-	-	2733	5	5	82
	'88	53	-	-	-	-	-	-	-	-	53	-	-	-	1766	7	4	53
	'95	396	34	3	2	-	-	3	-	-	438	-	-	-	8760	10	10	438
	'97	178	154	-	11	-	-	-	-	-	343	-	-	-	6860	8	9	343
	'00	109	128	61	-	-	7	-	-	-	305	-	-	-	6100	8	9	305
D	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	24	2	-	-	-	-	-	-	-	23	-	3	-	866		26	
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	5	22	7	1	1	-	-	-	-	34	-	-	2	720		36	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%			+ 6%							
'88		02%			00%			03%			+64%							
'95		07%			.58%			00%			-25%							
'97		42%			00%			00%			- 8%							
'00		43%			21%			.56%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	3466	Dec:	0%			
												'88	3698		23%			
												'95	10220		0%			
												'97	7620		0%			
												'00	7020		10%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total						
		1	2	3	4		1	2							
Gutierrezia sarothrae															
S	82	21	-	-	-	-	-	-	21	-	-	-	700		21
	88	152	-	-	-	-	-	-	152	-	-	-	5066		152
	95	10	-	-	-	-	-	-	10	-	-	-	200		10
	97	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	5	-	-	-	-	-	-	5	-	-	-	100		5
Y	82	40	-	-	-	-	-	-	40	-	-	-	1333		40
	88	49	-	-	-	-	-	-	49	-	-	-	1633		49
	95	57	-	-	-	-	-	-	57	-	-	-	1140		57
	97	4	-	-	-	-	-	-	4	-	-	-	80		4
	00	30	-	-	-	-	-	-	30	-	-	-	600		30
M	82	50	-	-	-	-	-	-	50	-	-	-	1666	10 7	50
	88	148	1	1	1	-	-	-	151	-	-	-	5033	5 5	151
	95	96	-	-	4	-	-	-	100	-	-	-	2000	9 9	100
	97	82	-	-	-	-	-	-	82	-	-	-	1640	7 7	82
	00	114	-	-	-	-	-	-	114	-	-	-	2280	5 7	114
D	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	3	-	-	-	-	-	-	3	-	-	-	100		3
	95	3	-	-	-	-	-	-	3	-	-	-	60		3
	97	1	-	-	-	-	-	-	-	-	1	-	20		1
	00	7	-	-	-	-	-	-	5	-	-	2	140		7
X	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	40		2
	97	-	-	-	-	-	-	-	-	-	-	-	80		4
	00	-	-	-	-	-	-	-	-	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>					<u>%Change</u>				
'82		00%		00%		00%					+56%				
'88		.49%		.49%		00%					-53%				
'95		00%		00%		00%					-46%				
'97		00%		00%		01%					+42%				
'00		00%		00%		01%									
Total Plants/Acre (excluding Dead & Seedlings)										'82	2999	Dec:	0%		
										'88	6766		1%		
										'95	3200		2%		
										'97	1740		1%		
										'00	3020		5%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	7	-	-	-	-	-	-	-	-	7	-	-	-	233	3	4	7
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100	4	9	3
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	12	4
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	2	-	-	-	1	-	-	-	-	3	-	-	-	60	4	11	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%			+12%							
'88		00%			00%			00%			-70%							
'95		00%			00%			00%										
'97		00%			00%			00%										
'00		20%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	233	Dec:	0%			
												'88	266		0%			
												'95	80		0%			
												'97	0		0%			
												'00	100		20%			
Pinus edulis																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			00%										
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	33		-			
												'95	0		-			
												'97	0		-			
												'00	0		-			

Trend Study 10-3-00

Study site name: Lower McCook Ridge Chaining .

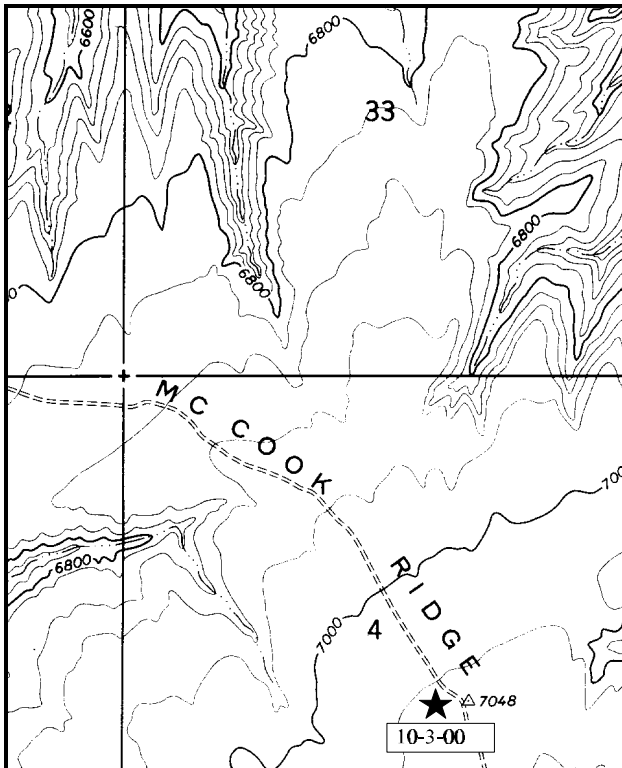
Range type: Chained, Seeded PJ .

Compass bearing: frequency baseline 149°M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

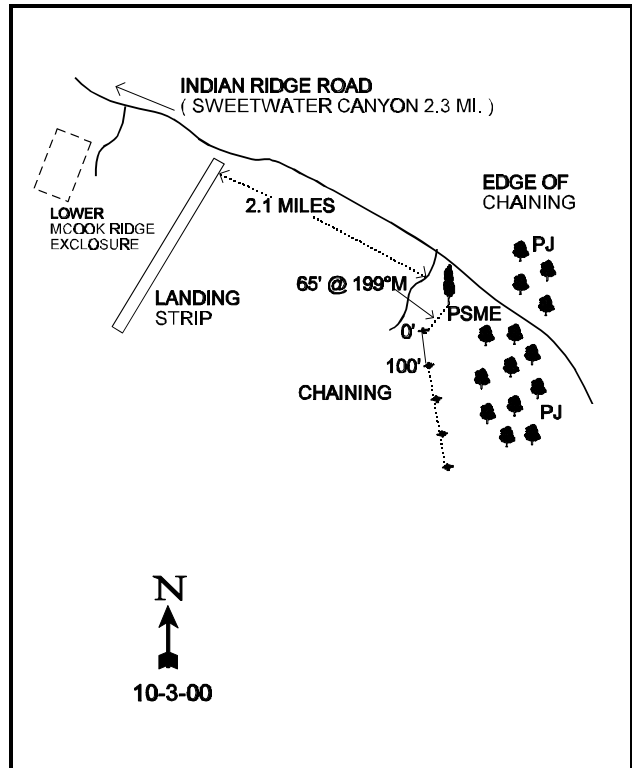
LOCATION DESCRIPTION

From the intersection of the Indian Ridge and McCook Ridge roads, go southeast on McCook Ridge for 2.3 miles to a landing strip on the right side of the road (just past enclosure). Proceed an additional 2.1 miles up McCook Ridge into a chained area. Turn right off the main road before the edge of the chaining, and proceed over to a large, lone douglas fir. The 0-foot baseline stake, marked by browse tag # 9036, is 13 paces from the tree at a bearing of 199°M. The frequency baseline is marked by a green, 12-18 inch tall fenceposts.



Map Name: Burnt Timber Canyon .

Township 14S , Range 24E , Section 4



Diagrammatic Sketch

UTM. 4387335.339 N, 651730.709 E

DISCUSSION

Trend Study No. 10-3 (16A-3)

The Lower McCook Ridge Chaining study is located on a chained pinyon-juniper area about 2 miles southeast of the Lower McCook Ridge enclosure at approximately 7,030 feet in elevation. The prevailing terrain is a broad, flat ridge. The study site monitors important deer and elk winter range that is also grazed by livestock. Cattle use the area on a rotational deferred management system during the spring or fall, with selective periods for rest. Wildlife use is currently light with an estimated 25 deer days use/acre (62 ddu/ha) and 19 elk days use/acre (47 edu/ha) from 2000 pellet group transect data. A large wildfire started in the area in late May of 2000. The firefighters were finishing putting the blaze out when the site was read during the first week of June 2000.

Soils are intermediate in texture on the surface, but increasing in clay content a few inches below the surface. Texture is a clay loam with an estimated effective rooting depth of nearly 16 inches. Soil reaction is neutral (pH of 7.1). Penetrometer readings estimate the majority of the rockiness to be between 5 and 15 inches below the surface. Average soil temperature is 56°F at over 16 inches in depth. Phosphorus levels (7.8 ppm) are slightly lower than the 10 ppm determined necessary for normal plant growth and development. Organic matter is moderately high at 4%. There is evidence of shrinking clays in the soil with surface cracks present. Mountain big sagebrush occupies areas of deeper soils (15 inches) with dwarf rabbitbrush occupying areas with more shallow soils (11 inches). Erosion is minimal because of level terrain, a fair vegetative cover, and the presence of large amounts of persistent, well distributed litter and chaining debris.

The shrub community is still developing following the chaining treatment. Mountain big sagebrush is the key species currently ('00) estimated at 2,980 plants/acre. This is a slight decrease from the 3,160 plants/acre estimated in 1995. There are some individual sagebrush plants that appear to be hybrids between mountain big sagebrush (*Artemisia tridentata vaseyana*) and basin big sagebrush (*Artemisia tridentata tridentata*) or black sagebrush (*Artemisia nova*). However, the majority of the population resembles mountain big sagebrush so all sagebrush was classified as such. Currently, the majority of the sagebrush population consists of mature and decadent plants. Percent decadency is moderate at 34% in 2000, up from 3% in 1995. Fifty-five percent of the decadent plants were classified as dying in 2000 (560 plants/acre), which may result in a population decrease in the future due to low recruitment (160 young plants/acre) and no seedlings sampled in 2000. The proportion of plants displaying poor vigor increased from less than 1% in 1995 to 19% in 2000. Forty percent of the population currently shows moderate use with an additional 9% displaying heavy use. The drought experienced over the last year has likely caused, at least in part, many of these negative factors in the sagebrush population. A return to normal precipitation patterns should reverse many of these trends.

Other preferred species include: rubber rabbitbrush, winterfat, and fourwing saltbush. However, these species are infrequent and in low densities. If more preferred shrubs such as antelope bitterbrush, true mountain mahogany or fourwing saltbush were a part of the original seed mixture, they have failed to become established.

The most numerous browse species is dwarf rabbitbrush. This small prostate shrub numbered 6,266 plants/acre in 1982 and 27,266 by 1988. Densities have since dropped to 13,660 plants/acre in 1995 and 15,500 plants/acre in 2000. These large changes in density for this shrub are likely due to the much larger sample size used beginning in 1992 which better estimates shrub populations with clumped and/or discontinuous distributions. Use on dwarf rabbitbrush increased in 2000 to a mostly moderate level. Percent decadency increased from 0% in 1995 to 17% in 2000.

Surviving pinyon and juniper trees are increasing in size on this chaining. Point-center quarter data from 2000 estimate 127 pinyon trees/acre and 147 juniper trees/acre. Photos indicate that juniper and pinyon trees have

increased considerably in size since 1982. Line-intercept data estimated an average of 4% overhead canopy cover from pinyon and juniper trees in 2000. A follow up treatment might be warranted to eradicate the young trees and encourage more herbaceous vegetation.

Grass composition consists of 13 perennial species. The most common is crested wheatgrass which accounted for 53% of the grass cover in 1995, increasing to 71% with drought in 2000. Blue grama and muttongrass are the only other species which contribute more than 1% average cover. Sum of nested frequency for all grasses decreased considerably in 2000, most likely due to drought. Grasses were reportedly heavily grazed in the past. Smooth brome continues to decrease in frequency and is found primarily in the shelter of tree litter and often is physically protected from grazing. Forb composition is markedly deficient, especially for a seeded area. Combined, all forbs accounted for only 4% average cover in 1995, decreasing to just over 1% in 2000. The only seeded forb encountered was alfalfa which had a quadrat frequency of only 6% in 1995 and 4% in 2000. Sum of nested frequency for perennial forbs also decreased in 2000.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable with little evidence of soil loss. Vegetation trend also appears stable. The nearly total lack of forbs and the heavy use being made of grasses are negative factors which could result in rapid regrowth of pinyon and juniper and a dense sagebrush stand.

1988 TREND ASSESSMENT

Soil trend is up with basal vegetative cover more than doubling and percent bare ground decreasing from 20% in 1982 to only 10% this year. The browse trend is slightly down. The sagebrush population shows high levels of utilization and percent decadency. Dwarf rabbitbrush and broom snakeweed have increased dramatically since the last reading and appear to have expanding populations. Juniper has increased in density and both pinyon and juniper have increased considerably in size since the last reading. They appear to be regaining dominance of the treatment area. Trend for grasses is up due to increased quadrat frequencies. Forbs are still lacking and of little importance on this site.

TREND ASSESSMENT

soil - up (5)

browse - slightly down (2)

herbaceous understory - up (5)

1995 TREND ASSESSMENT

The soil trend is stable overall. Ground cover characteristics are slightly down due to increased bare ground and decreased litter values. Erosion is not currently a problem on the site due to the level terrain and adequate vegetation and litter cover. The decline in litter cover is primarily due to the decomposition of debris from the chaining. The browse trend has improved. The mountain big sagebrush density has nearly doubled since 1988. Vigor is good, percent decadency low, and most are lightly hedged. Dwarf rabbitbrush dropped in density by 50% and broom snakeweed declined 68% since 1988. Trend for the herbaceous understory is up with increased sum of nested frequencies of grasses and forbs. Nested frequency of crested wheatgrass, intermediate wheatgrass, and smooth brome declined significantly while frequency of slender wheatgrass, prairie junegrass and mutton grass increased significantly. Alfalfa, the only seeded forb encountered, increased in nested frequency.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - up (5)

2000 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics are similar to 1995 levels. Percent cover of bare soil increased in 2000, but percent cover of vegetation and litter remained nearly stable. Trend for browse is slightly down due to downward trends in many key factors for mountain big sagebrush. The mountain big sagebrush population shows increases in percent decadency, poor vigor, and utilization. Also, there is a high proportion of decadent plants classified as dying. Currently, there are not enough young plants to replace the decadent, dying plants in the population. Many of these downward factors for sagebrush could improve with a return to normal precipitation patterns. Trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses and forbs decreased by nearly 30% in 2000 due to drought. Once again, an end to the drought will most likely will reverse this trend in the future.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down for mountain big sagebrush (2)

herbaceous understory - slightly down due to drought (2)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 3

Type	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
G	Agropyron cristatum	_b 257	_a 168	_a 196	54	85	52	59	6.43	10.21
G	Agropyron dasystachyum	_a 2	_b 132	_b 104	1	2	48	38	.56	.64
G	Agropyron intermedium	_c 67	_b 21	_a -	-	27	7	-	.16	-
G	Agropyron trachycaulum	_b 13	_b 16	_a -	-	6	7	-	.16	-
G	Bouteloua gracilis	_a 6	_c 106	_b 86	-	2	39	31	1.25	1.59
G	Bromus inermis	_b 52	_a 22	_a 3	11	22	7	2	.28	.03
G	Carex spp.	_b 33	_a 11	_a 3	5	19	5	3	.36	.30
G	Elymus junceus	16	12	3	-	6	4	1	.33	.15
G	Koeleria cristata	_a 11	_b 54	_a 28	-	5	23	13	.48	.14
G	Oryzopsis hymenoides	_{ab} 6	_b 6	_a -	14	3	5	-	.07	-
G	Poa secunda	_a 18	_b 81	_b 73	1	8	31	28	2.02	1.40
G	Sitanion hystrix	_b 8	_{ab} 4	_a -	1	5	2	-	.01	-
G	Stipa comata	_{ab} 1	_b 9	_a -	-	1	3	-	.01	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		490	642	496	88	191	233	175	12.16	14.48
Total for Grasses		490	642	496	88	191	233	175	12.16	14.48

Type	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
F	<i>Antennaria rosea</i>	a-	c30	b12	-	-	15	6	.17	.03
F	<i>Arabis</i> spp.	a7	b29	a5	-	4	11	2	.87	.01
F	<i>Arenaria fendleri</i>	14	3	5	-	6	1	3	.03	.04
F	<i>Astragalus spatulatus</i>	b34	a-	a5	-	14	-	2	-	.03
F	<i>Caulanthus crassicaulis</i>	2	-	-	-	1	-	-	-	-
F	<i>Calochortus nuttallii</i>	-	6	-	-	-	3	-	.01	-
F	<i>Castilleja</i> spp.	-	22	-	-	-	11	-	.11	-
F	<i>Crepis acuminata</i>	-	6	-	-	-	2	-	.01	-
F	<i>Delphinium</i> spp.	-	2	-	-	-	1	-	.00	-
F	<i>Erigeron</i> spp.	-	-	5	-	-	-	2	-	.01
F	<i>Erigeron pumilus</i>	a-	ab3	b6	-	-	1	4	.04	.02
F	<i>Grindelia squarrosa</i>	-	-	-	-	-	-	-	.00	-
F	<i>Haplopappus acaulis</i>	11	8	15	-	6	3	6	.33	.54
F	<i>Hymenoxys acaulis</i>	a-	b12	ab1	-	-	5	1	.80	.00
F	<i>Lappula occidentalis</i> (a)	-	2	-	-	-	1	-	.00	-
F	<i>Machaeranthera grindelioides</i>	b62	a13	a23	-	25	7	10	.13	.17
F	<i>Medicago sativa</i>	a1	b14	ab8	-	1	6	4	1.24	.39
F	<i>Oenothera caespitosa</i>	-	-	1	-	-	-	1	-	.00
F	<i>Orthocarpus</i> spp. (a)	-	4	-	-	-	2	-	.01	-
F	<i>Penstemon pachyphyllus</i>	-	3	-	-	-	2	-	.02	-
F	<i>Phlox austromontana</i>	2	-	-	-	1	-	-	-	-
F	<i>Phlox longifolia</i>	a-	c41	b13	-	-	17	7	.08	.03
F	<i>Physaria</i> spp.	b9	a-	ab1	-	4	-	1	-	.00
F	<i>Polygonum douglasii</i> (a)	-	7	-	-	-	4	-	.02	-
F	<i>Sphaeralcea coccinea</i>	a-	b28	b19	-	-	12	9	.08	.04
F	<i>Streptanthus cordatus</i>	-	1	-	-	-	1	-	.00	-
F	<i>Taraxacum officinale</i>	-	6	-	-	-	3	-	.01	-
Total for Annual Forbs		0	13	0	0	0	7	0	0.03	0
Total for Perennial Forbs		142	227	119	0	62	101	58	3.99	1.34
Total for Forbs		142	240	119	0	62	108	58	4.02	1.34

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 3

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia frigida	1	1	-	.15
B	Artemisia nova	2	0	.01	-
B	Artemisia tridentata vaseyana	50	54	5.72	7.76
B	Ceratoides lanata	5	7	.09	.01
B	Chrysothamnus depressus	47	48	5.34	4.88
B	Chrysothamnus nauseosus hololeucus	1	1	-	.00
B	Gutierrezia sarothrae	31	29	.35	.36
B	Juniperus osteosperma	0	7	.93	1.14
B	Leptodactylon pungens	0	3	-	.15
B	Opuntia fragilis	1	0	.01	-
B	Pinus edulis	0	4	1.79	3.83
Total for Browse		138	154	14.25	18.32

CANOPY COVER --
Herd unit 10 , Study no: 3

Species	Percent Cover
	'00
Pinus edulis	4

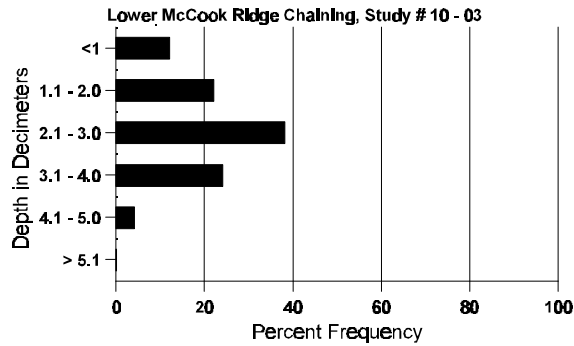
BASIC COVER --
Herd unit 10 , Study no: 3

Cover Type	Nested Frequency		Average Cover %			
	'95	'00	'82	'88	'95	'00
Vegetation	349	330	5.25	12.50	32.93	34.54
Rock	150	43	1.00	2.50	2.11	1.52
Pavement	137	134	.75	5.25	2.95	1.11
Litter	392	336	73.25	69.00	36.46	34.29
Cryptogams	151	123	0	.50	6.62	5.81
Bare Ground	287	308	19.75	10.25	26.86	37.16

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 3, Study Name: Lower McCook Ridge Chaining

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.70	56.6 (16.14)	7.1	34.0	31.4	34.6	4.0	7.8	144.0	0.8

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 3

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
			00	00
Rabbit	16	33	479	N/A
Elk	24	5	252	19 (48)
Deer	13	6	322	25 (62)
Cattle	2	1	-	-

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 3

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Artemisia frigida																		
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'95	3	-	-	-	-	-	-	-	-	-	-	3	60	9	11	3	
	'00	-	-	-	4	-	-	-	-	-	-	-	4	80	7	5	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'82			00%			00%			00%							
		'88			00%			00%			00%							
		'95			00%			00%			+25%							
		'00			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
												'00	80		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	1	5	-	-	-	-	-	-	-	6	-	-	-	120	19	22	6
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		71%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	140		-			
												'00	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4		1	2			
<i>Artemisia tridentata vaseyana</i>											
S	82	6	-	-	-	-	-	-	6	6	
	88	4	-	-	-	-	-	-	4	4	
	95	1	-	-	-	-	-	-	1	1	
	00	-	-	-	-	-	-	-	0	0	
Y	82	10	-	-	-	-	-	-	10	10	
	88	1	2	-	-	-	1	-	4	4	
	95	77	1	-	-	-	-	-	78	78	
	00	6	-	-	1	-	-	1	8	8	
M	82	-	14	5	-	-	-	-	17	2	19
	88	1	8	3	1	-	-	-	13	-	13
	95	34	33	-	1	-	-	-	68	-	68
	00	34	37	4	7	8	-	-	90	-	90
D	82	-	-	-	-	-	-	-	0	-	0
	88	3	3	-	-	-	-	-	4	2	6
	95	1	4	-	-	-	-	-	4	-	5
	00	16	11	7	10	4	2	1	22	1	28
X	82	-	-	-	-	-	-	-	0	-	0
	88	-	-	-	-	-	-	-	0	-	0
	95	-	-	-	-	-	-	-	0	-	0
	00	-	-	-	-	-	-	-	100	-	5
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'82		48%		17%		00%		-21%			
'88		57%		13%		09%		+49%			
'95		25%		00%		.66%		- 1%			
'00		40%		09%		19%					
Total Plants/Acre (excluding Dead & Seedlings)						'82	1932	Dec:	0%		
						'88	1532		26%		
						'95	3020		3%		
						'00	2980		34%		
<i>Atriplex canescens</i>											
M	82	-	-	-	-	-	-	-	0	-	0
	88	-	-	-	-	-	-	-	0	-	0
	95	-	-	-	-	-	-	-	0	-	0
	00	-	-	-	-	-	-	-	0	26	24
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'82		00%		00%		00%					
'88		00%		00%		00%					
'95		00%		00%		00%					
'00		00%		00%		00%					
Total Plants/Acre (excluding Dead & Seedlings)						'82	0	Dec:	-		
						'88	0		-		
						'95	0		-		
						'00	0		-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Ceratoides lanata																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	15	5	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	6	8	
	00	3	3	-	-	-	-	1	-	-	7	-	-	-	140	9	8	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%			-40%							
'95		00%			00%			00%			+25%							
'00		38%			00%			13%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	199		0%			
												'95	120		0%			
												'00	160		13%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total								
		1	2	3	4											
Chrysothamnus depressus																
S	82	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	19	-	-	-	-	-	-	19	-	-	-	1266		19	
	95	3	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	179	3	-	1	-	-	-	183	-	-	-	12200		183	
	95	43	-	-	-	-	-	-	43	-	-	-	860		43	
	00	81	-	-	-	-	-	-	81	-	-	-	1620		81	
M	82	-	-	94	-	-	-	-	94	-	-	-	6266	3	9	94
	88	53	159	2	4	-	-	-	218	-	-	-	14533	4	9	218
	95	640	-	-	-	-	-	-	640	-	-	-	12800	5	11	640
	00	180	272	-	4	108	-	-	566	-	-	-	11320	3	10	566
D	82	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	3	-	-	-	-	-	7	-	1	-	533		8	
	95	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	85	31	-	2	4	-	6	108	-	-	20	2560		128	
X	82	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>						
'82		00%		100%		00%				+77%						
'88		40%		.48%		.24%				-50%						
'95		00%		00%		00%				+12%						
'00		54%		.25%		03%										
Total Plants/Acre (excluding Dead & Seedlings)										'82	6266	Dec:	0%			
										'88	27266		2%			
										'95	13660		0%			
										'00	15500		17%			
Chrysothamnus nauseosus																
M	82	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	0	35	34	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>						
'82		00%		00%		00%										
'88		00%		00%		00%										
'95		00%		00%		00%										
'00		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'82	0	Dec:	-			
										'88	0		-			
										'95	0		-			
										'00	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4		1	2			
Chrysothamnus nauseosus hololeucus											
S	82	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	0		0
	95	3	-	-	-	-	-	-	60		3
	00	-	-	-	-	-	-	-	0		0
Y	82	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	40		2
	00	1	-	-	-	-	-	-	20		1
M	82	-	-	-	-	-	-	-	0	-	0
	88	-	-	-	-	-	-	-	0	-	0
	95	1	-	-	-	-	-	-	20	36 43	1
	00	-	-	-	-	-	-	-	0	39 42	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'82		00%		00%		00%					
'88		00%		00%		00%					
'95		00%		00%		00%		-67%			
'00		00%		00%		00%					
Total Plants/Acre (excluding Dead & Seedlings)						'82	0	Dec:	-		
						'88	0		-		
						'95	60		-		
						'00	20		-		
Gutierrezia sarothrae											
S	82	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	40		2
	00	-	-	-	-	-	-	-	0		0
Y	82	-	-	-	-	-	-	-	0		0
	88	10	-	-	6	-	-	-	1066		16
	95	17	-	-	-	-	-	-	340		17
	00	18	-	-	-	-	-	-	360		18
M	82	1	-	-	-	-	-	-	66	4 1	1
	88	49	-	-	3	-	-	-	3466	8 5	52
	95	57	-	-	-	-	-	-	1140	7 7	57
	00	45	-	-	-	-	-	-	900	4 5	45
D	82	-	-	-	-	-	-	-	0		0
	88	1	-	-	-	-	-	-	66		1
	95	-	-	-	-	-	-	-	0		0
	00	6	-	-	-	-	-	-	120		6
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'82		00%		00%		00%		+99%			
'88		00%		00%		00%		-68%			
'95		00%		00%		00%		- 7%			
'00		00%		00%		01%					
Total Plants/Acre (excluding Dead & Seedlings)						'82	66	Dec:	0%		
						'88	4598		1%		
						'95	1480		0%		
						'00	1380		9%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	1	-	-	-	-	1	-	-	-	66	118	79	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%			+50%							
'88		50%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	132		-			
												'95	0		-			
												'00	140		-			
Leptodactylon pungens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	8	11	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
												'00	80		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Opuntia fragilis</i>																		
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	14	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%			-70%							
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	20		-			
												'00	0		-			
<i>Pediocactus simpsonii</i>																		
M	'82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	1	4	1
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Pinus edulis																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400	33 18	6	
	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133	94 73	2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	00	-	-	-	1	-	-	1	-	-	2	-	-	-	40	- -	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%			- 0%							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	-			
												'88	399		-			
												'95	0		-			
												'00	80		-			

Trend Study 10-4-00

Study site name: Wirefence Point .

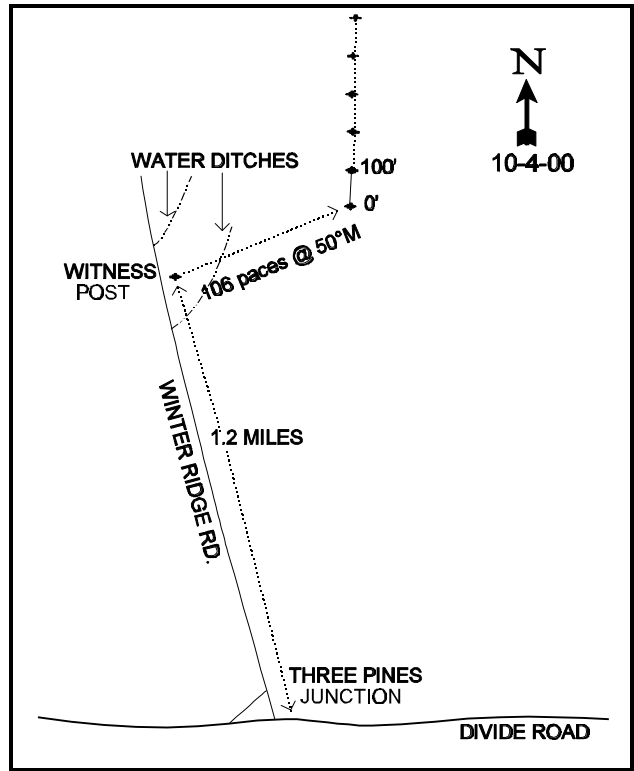
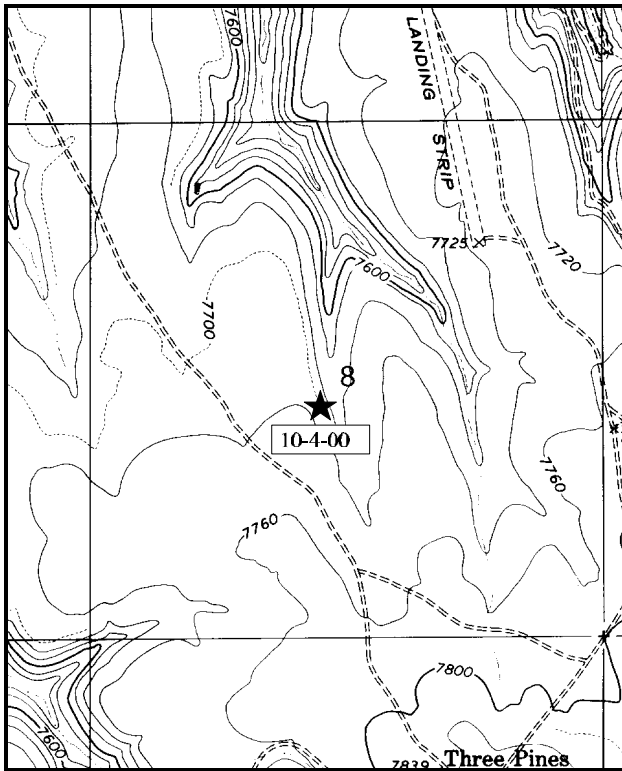
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 345°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From the Book Cliffs Summit road near Three Pines, turn right on the Winter Ridge Road. Travel 1.2 miles towards Winter Ridge to a witness point. There may be an old drainage ditch or faint fork on the right hand side of the road. From the witness post, walk out 106 paces bearing 50°M to the 0-foot baseline stake. The frequency baseline is marked by green fenceposts 12-18 inches in height.



Map Name: Cedar Camp Canyon

Diagrammatic Sketch

Township 16S , Range 23E , Section 8

UTM. 4365702.535 N, 637052.332 E

DISCUSSION

Trend Study No. 10-4 (16A-4)

The Wirefence Point study is located on summer range near the head of Wirefence Canyon. Elevation is 7,640 feet on nearly level terrain. In addition to the regular rotation schedule, this site was re-read in 1997 as a special studies site to monitor perceived conflicts over elk and livestock use in the North Book Cliffs. The vegetative composition of the site is sagebrush-grass mixed with mountain brush. A spray treatment with 2,4-D was done in the 1980's to thin sagebrush, however, sagebrush is again the dominant overstory species at Wirefence Point. This area is grazed by cattle on a rotation deferred system between spring and summer. Pellet group data from 2000 estimates 33 deer days use/acre (82 ddu/ha), 19 elk days use/acre (47 edu/ha), and 5 cow days use/acre (12 cdu/ha).

Soils are moderately deep with an average effective rooting depth of 18 inches. Soil temperature averaged 57°F at an average depth of 16 inches in 1997. Texture analysis indicates the soil to be a clay loam with a neutral soil reaction (pH of 6.7). The soil surface is cracked from drying indicating the abundance of clay in the soil. Percent bare ground was estimated at 18% in 1997, with very little rock or pavement cover (3%). Abundant litter and vegetation cover adequately protect the soil from erosion. Relative percent bare soil increased in 2000, with a slight decrease in relative percent vegetation cover. Also, the proportion of protective ground cover (vegetation, litter, and cryptogams) to bare soil decreased in 2000. This is due to drought which has caused a decrease in the sum of nested frequency for herbaceous species and an increase in nested frequency of bare soil. In 2000, there is some evidence of overland flow and slight pedestaling around shrubs.

In 1988, there was little evidence of the thinning 2,4-D spray treatment of browse on this state-owned rangeland as only a few sagebrush skeletons or resprouted serviceberry were found. Mountain big sagebrush is again the dominant species and most abundant browse species on the site in both density and cover. In 2000, it makes up 76% of the total browse cover and is estimated at 5,640 plants/acre. The initial reading of this transect in 1982 estimated the sagebrush population to be 4,666 plants/acre. Thirty-one percent of the population was classified as young, while the seedlings numbered 6,666 plants/acre. Hedging was very light and vigor was good. In 1988, the site had a slightly larger population (7,732 plants/acre) with an increase in percent decadence and fewer seedlings, yet a healthy proportion of young plants (60%). The number of mature plants declined from 3,200 to 2,266 plants/acre. Study site stakes could not be located in 1995, so new posts were placed as close as possible to the old baseline using photographs from previous readings. However, trends can still be determined by examining age class composition, form class, vigor, and percent decadence, with less emphasis placed on population densities. Data from 1995 estimated 5,180 plants/acre for sagebrush, a decrease from the 1988 estimate. A much larger sample size was implemented beginning in mid-1992 which lengthened the baseline which more effectively estimates shrub populations using shrub strips. The decrease in density between 1988 and 1995 can be attributed in part to the change in sample size giving better estimates for shrubs with clumped and/or discontinuous distributions. In 1995, reproductive potential (number of seedlings) was still high at 32%, with 40% of the population consisting of young plants. Utilization was light and vigor was good with a low number of decadent plants (6%). In 1997, when this site was read as a special studies site, the density of sagebrush was estimated at 4,380 plants/acre. Reproductive potential decreased from 32% in 1995 to 9% in 1997, but the proportion of young plants remained high at 1,440 plants/acre (33% of the population). Percent decadency was at 9%, with 42% of these plants classified as dying. Utilization was light to moderate with mostly good vigor. In 2000, the density of sagebrush was estimated at 5,640 plants/acre, with good recruitment of young plants (29%), light to moderate use, and good vigor. Percent decadency slightly increased to 14%, although the proportion of decadent plants classified as dying decreased from 42% in 1997 to 30% in 2000. Currently ('00), there are an adequate number of young plants to replace the decadent dying individuals within the population.

Other browse species present in the area include: squaw apple, snowberry, serviceberry, bitterbrush, and gray horsebrush. These species occur in low densities and some were not sampled in the shrub density strips, but were measured for height/crown. Dwarf rabbitbrush is present and appears to be stable with the majority of the population consisting of mature plants.

Grasses are currently abundant and consist exclusively of perennial native species. These species would have been expected to increase considerably after the initial herbicide treatment. The dominant species consists of thickspike wheatgrass, muttongrass, prairie junegrass, and Sandberg bluegrass. Grasses have contributed between 8 and 9% average cover since 1995. Due to extended drought, sum of nested frequency decreased for grasses in 2000. Forbs are also diverse with 28 perennial species identified in 1997 and 30 perennial species in 2000. Forbs accounted for 55% of the herbaceous cover in 1997, increasing to 64% in 2000. Nested frequency of annual forbs has steadily decreased since 1995. Unfortunately, low growing increasers such as pussytoes, mat penstemon, desert phlox, and lance-leaved sedum make up a large proportion of the forb cover. Sum of nested frequency for the forbs also decreased in 2000 due to drought.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable. There is minimal soil movement even though there is a significant amount of bare ground. Vegetative trend depends mostly upon the management objectives. If a high level of livestock forage (i.e., grasses) is desired, trend is probable stable to slightly declining. The browse population, especially mountain big sagebrush, is increasing and will provide considerably more browse forage in the future. However, the forb-grass component is more important for summer range and should be enhanced if possible, even if shrub growth is inhibited.

1988 TREND ASSESSMENT

Due to a slight increase in vegetative "basal" cover from 7% to 12%, and an apparent increase in cryptogamic cover (from 0% in 1982 to 8% ground cover in 1988), the amount of bare soil decreased from 39% to 23%. Trend for soil is slightly up. The browse trend is up for the key species, mountain big sagebrush, which has increased by 40% since 1982. Reproductive potential is still high at 22% with 60% of the population consisting of young plants. Trend for the herbaceous understory is up due to increased quadrat frequency of both grasses and forbs.

TREND ASSESSMENT

soil - slightly up (4)

browse - up (5)

herbaceous understory - up (5)

1995 TREND ASSESSMENT

Even though the original study stakes could not be located, the new study is very close to the old one and trends can still be determined. The soil trend is considered stable. Relative cover values for litter and cryptogamic cover have declined, but values for percent bare ground are similar. Erosion is not a problem because herbaceous cover is abundant. Trend for sagebrush is stable. The number of estimated mature plants/acre has remained relatively stable. The difference in density between 1988 and 1995 is due to the reduced number of young plants which declined from 4,666 plants/acre to 2,060, as well as the increased sample sized used in 1995. This is still a more than adequate number of young. Percent decadence has declined, vigor is good, and proportion of individuals showing heavy use has declined from 16% to less than 1%. Trend for the herbaceous understory is stable. Sum of nested frequency for grasses and forbs have declined slightly, but not enough to warrant a downward trend. This has most likely been the result of extended drought. Thickspike wheatgrass,

Carex, and needle-and-thread have declined significantly in nested frequency, while prairie junegrass and Sandberg bluegrass increased significantly.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

1997 TREND ASSESSMENT

As in 1995, the soil trend is stable with a decrease in bare ground cover. Vegetation and litter are still abundant and provide protection from wind and water erosion. The mountain big sagebrush population has slightly declined since 1995, but not significantly. The age class structure has stayed nearly the same with a decrease in the number of seedlings encountered this year. Decadency has slightly increased as has the ratio of dead to live plants. The proportion of the decadent plants classified as dying or in poor vigor is moderately high at 42%, however there is an adequate number of young plants to replace those individuals that may die-off. Trend for browse is slightly down. Nested frequency for muttongrass has steadily increased since 1988, while Sandberg bluegrass has steadily decreased. Thickspike wheatgrass and needle-and-thread grass have significantly increased since 1995. Trend for the herbaceous understory is stable.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down. Relative percent cover of bare soil increased coupled with a decrease in relative percent cover of vegetation. The ratio of protective ground cover to bare soil also decreased as nested frequency values for herbaceous species are down due to drought. There was some evidence of overland flow and pedestaling around the base of shrubs. Trend for browse is stable. Mountain big sagebrush density appears stable and recruitment remains high at 29%. Although percent decadency slightly increased in 2000 (from 9% to 14%), the proportion of decadent plants classified as dying decreased. Also, the ratio of dead to live plants improved from 1:6 to 1:10 in 2000. Vigor remains generally good, and use is light to moderate. Trend for the herbaceous understory is slightly down. Sum of nested frequency values for perennial grasses and forbs decreased in 2000 due to drought.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 4

T y p e	Species	Nested Frequency				Quadrat Frequency					Average Cover %		
		'88	'95	'97	'00	'82	'88	'95	'97	'00	'95	'97	'00
G	<i>Agropyron dasystachyum</i>	b ₁₉₅	b ₁₇₄	c ₂₇₁	a ₇₄	8	73	66	90	36	1.58	2.80	.48
G	<i>Bouteloua gracilis</i>	b ₂₅	a ⁻	ab ₁	a ⁻	-	12	-	1	-	-	.00	-
G	<i>Carex</i> spp.	b ₅₃	a ₂₂	ab ₃₃	ab ₃₃	3	22	11	13	16	.05	.06	.39
G	<i>Koeleria cristata</i>	a ₉₂	b ₁₇₂	a ₁₀₆	b ₁₆₈	56	34	63	44	65	2.52	.86	2.50
G	<i>Oryzopsis hymenoides</i>	-	-	-	1	-	-	-	-	1	-	-	.00
G	<i>Poa fendleriana</i>	a ⁻	b ₈₄	c ₂₁₄	c ₁₈₂	-	-	32	75	63	1.37	2.53	4.40
G	<i>Poa pratensis</i>	-	-	6	-	-	-	-	2	-	-	.18	-
G	<i>Poa secunda</i>	c ₁₃₃	c ₁₃₇	a ₃₄	b ₈₅	48	57	50	14	31	2.75	.66	.69
G	<i>Sitanion hystrix</i>	-	-	-	2	-	-	-	-	2	-	-	.01
G	<i>Stipa comata</i>	c ₂₂₅	a ₄₂	b ₉₄	a ₃₇	50	81	18	42	15	.58	1.14	.50
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		723	631	759	582	165	279	240	281	229	8.89	8.26	9.00
Total for Grasses		723	631	759	582	165	279	240	281	229	8.89	8.26	9.00
F	<i>Agoseris glauca</i>	a ⁻	b ₂₅	b ₃₉	b ₃₅	-	-	13	20	17	.11	.13	.18
F	<i>Allium</i> spp.	-	-	-	-	1	-	-	-	-	-	-	-
F	<i>Antennaria rosea</i>	b ₁₉₆	a ₉₉	a ₁₁₂	a ₁₀₃	34	66	41	47	39	2.40	2.34	3.19
F	<i>Androsace septentrionalis</i> (a)	-	b ₆₅	a ₉	a ₁₆	-	-	31	6	6	.18	.05	.05
F	<i>Arabis</i> spp.	b ₄₇	a ⁻	a ₆	a ₁	-	22	-	3	1	-	.01	.00
F	<i>Arenaria congesta</i>	c ₂₅₆	ab ₆₆	a ₅₄	b ₉₆	-	87	26	23	40	.82	.48	1.68
F	<i>Arabis drummondi</i>	-	5	-	-	-	-	3	-	-	.01	-	-
F	<i>Astragalus convallarius</i>	a ₁	ab ₁₉	ab ₂₁	b ₃₃	6	1	10	9	16	.07	.09	.42
F	<i>Astragalus spatulatus</i>	-	1	6	5	-	-	1	3	3	.03	.21	.06
F	<i>Aster</i> spp.	a ⁻	ab ₁₁	ab ₄₃	b ₁₀	-	-	6	18	7	.08	.14	.08
F	<i>Astragalus</i> spp.	5	11	4	1	-	2	4	2	1	.59	.03	.03
F	<i>Castilleja flava</i>	a ₈	b ₄₁	ab ₂₉	ab ₂₂	-	6	18	14	13	.31	.24	.19
F	<i>Carduus nutans</i> (a)	-	b ₉	a ⁻	a ⁻	-	-	5	-	-	.02	-	-
F	<i>Chaenactis douglasii</i>	-	4	-	4	-	-	1	-	2	.00	-	.01
F	<i>Cirsium</i> spp.	3	-	-	-	-	1	-	-	-	-	-	-
F	<i>Comandra pallida</i>	b ₂₂₂	a ₉₇	a ₁₀₇	a ₁₂₇	25	77	41	47	54	.45	.48	1.39
F	<i>Collinsia parviflora</i> (a)	-	b ₃₀	a ⁻	a ⁻	-	-	10	-	-	.12	-	-
F	<i>Crepis acuminata</i>	a ₆	b ₅₆	b ₅₄	b ₄₅	-	5	32	26	24	.36	.23	.54
F	<i>Cryptantha</i> spp.	b ₇	a ⁻	a ⁻	a ⁻	29	4	-	-	-	-	-	-
F	<i>Delphinium bicolor</i>	a ⁻	ab ₆	b ₁₀	a ⁻	-	-	3	6	-	.01	.03	-
F	<i>Eriogonum alatum</i>	a ⁻	b ₁₇	a ⁻	b ₁₀	-	-	8	-	6	.15	-	.05
F	<i>Erigeron eatonii</i>	a ⁻	a ⁻	a ⁻	b ₃₁	-	-	-	-	20	-	-	.18
F	<i>Erigeron</i> spp.	a ⁻	a ⁻	b ₈₃	a ⁻	-	-	-	41	-	-	.28	-

T y p e	Species	Nested Frequency				Quadrat Frequency					Average Cover %		
		'88	'95	'97	'00	'82	'88	'95	'97	'00	'95	'97	'00
F	<i>Erigeron pumilus</i>	_d 174	_c 109	_a -	_b 35	48	69	50	-	16	.58	-	.25
F	<i>Eriogonum racemosum</i>	-	-	-	4	-	-	-	-	2	-	-	.01
F	<i>Eriogonum umbellatum</i>	41	55	41	30	12	21	22	17	15	.98	.28	.25
F	<i>Gayophytum ramosissimum</i> (a)	-	1	-	-	-	-	1	-	-	.00	-	-
F	<i>Hymenopappus filifolius</i>	_a -	_b 31	_c 47	_b 31	-	-	11	16	13	.71	.33	.47
F	<i>Hymenoxys richardsonii</i>	-	-	-	2	-	-	-	-	1	-	-	.03
F	<i>Lesquerella ludoviciana</i>	_a -	_c 39	_b 10	_b 21	-	-	16	6	10	.23	.08	.05
F	<i>Linum lewisii</i>	_a -	_c 40	_c 27	_b 9	-	-	19	13	4	.18	.11	.05
F	<i>Lithospermum</i> spp.	-	6	-	-	-	-	3	-	-	.01	-	-
F	<i>Lomatium</i> spp.	_a -	_a 1	_b 21	_a -	-	-	1	9	-	.01	.04	-
F	<i>Lupinus argenteus</i>	_a 31	_b 59	_b 55	_{ab} 45	2	16	29	30	19	1.80	1.85	.92
F	<i>Orthocarpus</i> spp. (a)	-	1	-	3	-	-	1	-	1	.00	-	.00
F	<i>Penstemon caespitosus</i>	_a 14	_b 99	_b 75	_b 70	4	7	40	34	28	3.32	.72	1.24
F	<i>Penstemon humilis</i>	_b 16	_a -	_a -	_a 5	-	8	-	-	2	-	-	.30
F	<i>Penstemon</i> spp.	_a -	_a 2	_a -	_b 7	2	-	1	-	3	.00	-	.06
F	<i>Phlox austromontana</i>	_a 58	_b 137	_b 107	_b 124	18	23	51	43	48	1.89	.81	3.11
F	<i>Phlox longifolia</i>	36	47	44	29	7	17	19	21	15	.19	.20	.07
F	<i>Polygonum douglasii</i> (a)	-	_b 85	_b 57	_a 3	-	-	31	23	1	.25	.11	.00
F	<i>Senecio integerrimus</i>	_a -	_b 17	_c 41	_{ab} 1	-	-	7	16	1	.06	.14	.00
F	<i>Sedum lanceolatum</i>	_b 164	_a 111	_a 112	_a 113	16	60	40	40	41	2.38	.72	1.13
F	<i>Senecio multilobatus</i>	_a -	_b 15	_a -	_a -	-	-	7	-	-	.22	-	-
F	<i>Sphaeralcea coccinea</i>	-	4	2	-	-	-	2	1	-	.01	.00	-
F	<i>Taraxacum officinale</i>	1	14	13	4	-	1	6	6	2	.05	.03	.01
F	Unknown forb-annual (a)	-	-	1	-	-	-	-	1	-	-	.00	-
F	<i>Zigadenus paniculatus</i>	-	3	4	-	-	-	2	2	-	.01	.01	-
Total for Annual Forbs		0	191	67	22	0	0	79	30	8	0.59	0.17	0.06
Total for Perennial Forbs		1286	1247	1167	1053	230	493	533	513	463	18.15	10.09	16.05
Total for Forbs		1286	1438	1234	1075	230	493	612	543	471	18.74	10.27	16.12

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 4

Type	Species	Strip Frequency			Average Cover %		
		'95	'97	'00	'95	'97	'00
B	Artemisia tridentata tridentata	0	3	0	-	-	-
B	Artemisia tridentata vaseyana	84	83	87	13.93	11.59	13.30
B	Ceratoides lanata	3	0	0	-	-	-
B	Chrysothamnus depressus	66	56	65	1.72	1.55	1.26
B	Chrysothamnus viscidiflorus viscidiflorus	57	47	44	.82	.42	.65
B	Gutierrezia sarothrae	10	4	2	.51	.01	-
B	Juniperus scopulorum	0	1	1	.03	.63	.15
B	Peraphyllum ramosissimum	9	13	10	2.31	1.15	1.95
B	Pediocactus simpsonii	0	2	2	.03	.03	.03
B	Pinus edulis	0	1	1	-	-	-
B	Symphoricarpos oreophilus	1	1	1	-	-	-
B	Tetradymia canescens	4	4	9	-	.03	.07
Total for Browse		234	215	222	19.38	15.42	17.41

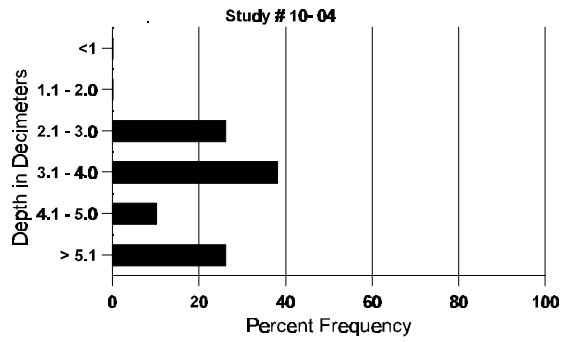
BASIC COVER --
Herd unit 10 , Study no: 4

Cover Type	Nested Frequency			Average Cover %				
	'95	'97	'00	'82	'88	'95	'97	'00
Vegetation	372	370	351	7.25	12.25	47.23	38.17	43.97
Rock	47	32	6	0	0	.16	.15	.04
Pavement	72	154	97	0	0	.56	2.65	.85
Litter	391	395	362	61.50	56.75	44.75	33.25	46.00
Cryptogams	107	169	92	0	8.00	1.20	1.98	2.07
Bare Ground	304	242	308	39.00	23.00	26.94	18.45	35.99

SOIL ANALYSIS DATA --
Herd Unit 10, Study no: 04

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
18.6	57.2 (16)	6.7	31.8	32.4	35.8	2.4	6.9	124.8	0.46

Stoniness Index



PELLET GROUP FREQUENCY -- Herd unit 10 , Study no: 4

Type	Quadray Frequency		
	'95	'97	'00
Rabbit	1	1	19
Elk	4	9	13
Deer	18	11	21
Cattle	4	5	1

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
2	314	N/A	N/A
287	244	22 (55)	19 (47)
339	426	26 (64)	33 (82)
287	61	24 (59)	5 (13)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 4

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier alnifolia																		
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	1	-	-	-	-	-	-	-	-	1	-	66		1	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'82	-	1	-	-	-	-	-	-	-	1	-	-	-	66	26	10	1
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		100%			00%			00%			+ 0%							
'88		00%			100%			100%										
'95		00%			00%			00%										
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
												'97	0		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata tridentata																		
S	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	64	76	3
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
X	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			00%										
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
												'97	60		-			
												'00	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total							
		1	2	3	4										
Artemisia tridentata vaseyana															
S	82	100	-	-	-	-	-	-	100	-	-	-	6666		100
	88	21	3	-	-	-	1	-	25	-	-	-	1666		25
	95	84	-	-	-	-	-	-	84	-	-	-	1680		84
	97	18	-	-	1	-	-	-	19	-	-	-	380		19
	00	10	-	-	5	-	-	-	15	-	-	-	300		15
Y	82	22	-	-	-	-	-	-	22	-	-	-	1466		22
	88	40	25	3	-	-	2	-	70	-	-	-	4666		70
	95	102	-	-	1	-	-	-	102	-	1	-	2060		103
	97	68	2	1	1	-	-	-	72	-	-	-	1440		72
	00	76	-	-	5	-	-	-	81	-	-	-	1620		81
M	82	48	-	-	-	-	-	-	48	-	-	-	3200	29 29	48
	88	11	12	11	-	-	-	-	34	-	-	-	2266	27 24	34
	95	96	44	1	-	-	-	-	140	-	1	-	2820	30 35	141
	97	75	50	3	-	-	-	-	124	-	4	-	2560	29 37	128
	00	98	56	1	6	-	-	-	154	1	6	-	3220	31 34	161
D	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	3	4	3	-	-	2	-	12	-	-	-	800		12
	95	7	7	1	-	-	-	-	14	-	1	-	300		15
	97	15	4	-	-	-	-	-	11	-	-	8	380		19
	00	19	14	1	3	2	1	-	23	1	4	12	800		40
X	82	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	720		36
	97	-	-	-	-	-	-	-	-	-	-	-	700		35
	00	-	-	-	-	-	-	-	-	-	-	-	560		28
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>				
'82		00%			00%			00%			+40%				
'88		35%			16%			00%			-33%				
'95		20%			.77%			01%			-15%				
'97		26%			02%			05%			+22%				
'00		26%			01%			08%							
Total Plants/Acre (excluding Dead & Seedlings)										'82	4666	Dec:	0%		
										'88	7732		10%		
										'95	5180		6%		
										'97	4380		9%		
										'00	5640		14%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Ceratoides lanata																	
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'95	-	3	-	-	-	-	-	-	-	3	-	-	-	60	-	3
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
D	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'82		00%			00%			00%									
'88		00%			00%			00%									
'95		60%			00%			20%									
'97		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%		
												'88	0		0%		
												'95	100		20%		
												'97	0		0%		
												'00	0		0%		

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total					
		1	2	3	4								
Chrysothamnus depressus													
S	82	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	1	-	1	
	95	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	0		0	
	88	13	7	-	-	-	-	1	-	20	-	21	
	95	18	-	-	-	-	-	-	-	18	-	18	
	97	5	-	-	-	-	-	-	-	5	-	5	
	00	24	-	-	-	-	-	-	-	24	-	24	
M	82	175	-	-	-	-	-	-	-	175	-	175	
	88	24	2	-	-	-	-	-	-	26	-	26	
	95	266	-	-	-	-	-	-	-	266	-	266	
	97	176	2	-	1	-	-	-	-	179	-	179	
	00	198	1	-	5	-	-	-	-	204	-	204	
D	82	-	-	-	-	-	-	-	-	0		0	
	88	3	2	1	-	-	-	1	-	6	-	8	
	95	5	-	-	-	-	-	-	-	3	-	5	
	97	2	-	-	-	-	-	-	-	2	-	2	
	00	6	-	-	-	-	-	-	-	-	-	6	
X	82	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	20		1	
	97	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>				<u>% Change</u>					
'82		00%	00%	00%				-69%					
'88		20%	04%	05%				+37%					
'95		00%	00%	.69%				-36%					
'97		01%	00%	00%				+21%					
'00		.42%	00%	03%									
Total Plants/Acre (excluding Dead & Seedlings)										'82	11666	Dec:	0%
										'88	3666		15%
										'95	5780		2%
										'97	3720		1%
										'00	4680		3%

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4		1	2			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>											
Y	82	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	0		0
	95	48	-	-	1	-	-	-	49	-	49
	97	12	-	-	-	-	-	-	12	-	12
	00	35	-	-	-	-	-	-	35	-	35
M	82	-	-	-	-	-	-	-	0	-	0
	88	-	-	-	-	-	-	-	0	-	0
	95	85	-	-	1	-	-	-	86	9	86
	97	64	-	-	4	-	-	-	68	8	68
	00	44	-	-	7	-	-	1	52	9	52
D	82	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	0		0
	97	-	-	-	-	-	-	-	0		0
	00	-	-	-	2	-	-	-	1	1	2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>			
'82		00%		00%		00%					
'88		00%		00%		00%					
'95		00%		00%		00%		-41%			
'97		00%		00%		00%		+10%			
'00		00%		00%		01%					
Total Plants/Acre (excluding Dead & Seedlings)						'82	0	Dec:	0%		
						'88	0		0%		
						'95	2700		0%		
						'97	1600		0%		
						'00	1780		2%		
<i>Gutierrezia sarothrae</i>											
Y	82	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	1	-	1
	97	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	0		0
M	82	-	-	-	-	-	-	-	0	-	0
	88	-	-	-	-	-	-	-	0	-	0
	95	24	-	-	-	-	-	-	24	6	24
	97	6	-	-	-	-	-	-	6	4	6
	00	4	-	-	-	-	-	-	4	3	4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>			
'82		00%		00%		00%					
'88		00%		00%		00%					
'95		00%		00%		00%		-76%			
'97		00%		00%		00%		-33%			
'00		00%		00%		00%					
Total Plants/Acre (excluding Dead & Seedlings)						'82	0	Dec:	-		
						'88	0		-		
						'95	500		-		
						'97	120		-		
						'00	80		-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Juniperus osteosperma																	
S	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	'82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'82		00%			00%			00%			+ 0%						
'88		00%			00%			00%									
'95		00%			00%			00%									
'97		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	66	Dec:	-			
											'88	66		-			
											'95	0		-			
											'97	0		-			
											'00	0		-			
Juniperus scopulorum																	
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'82		00%			00%			00%									
'88		00%			00%			00%									
'95		00%			00%			00%									
'97		00%			00%			00%			+ 0%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-			
											'88	0		-			
											'95	0		-			
											'97	20		-			
											'00	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Peraphyllum ramosissimum																		
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'88	4	-	-	-	-	-	-	-	-	-	-	-	266			4	
	'95	1	-	-	-	-	-	-	-	-	-	-	-	20			1	
	'97	3	-	-	-	-	-	-	-	-	-	-	-	60			3	
	'00	1	-	-	1	-	-	-	-	-	-	-	-	40			2	
M	'82	2	-	-	-	-	-	-	-	-	-	-	-	133	31	28	2	
	'88	1	1	1	-	1	-	-	-	-	-	-	-	266	26	25	4	
	'95	4	5	1	-	-	-	-	-	-	-	-	-	200	24	30	10	
	'97	1	2	4	1	2	1	-	-	-	-	-	-	220	23	34	11	
	'00	1	-	-	1	3	-	1	-	-	-	-	-	120	26	34	6	
D	'82	5	-	-	-	-	-	-	-	-	-	-	-	333			5	
	'88	1	-	-	-	-	-	-	-	-	-	-	-	66			1	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'97	-	1	-	-	-	-	-	-	-	-	-	-	20			1	
	'00	-	-	-	-	2	-	1	-	-	-	-	-	60			3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%			+22%							
'88		22%			11%			00%			-63%							
'95		45%			09%			00%			+27%							
'97		33%			33%			00%			-27%							
'00		45%			00%			18%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	466	Dec:	71%			
												'88	598		11%			
												'95	220		0%			
												'97	300		7%			
												'00	220		27%			
Pediocactus simpsonii																		
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'00	1	-	-	-	-	-	-	-	-	-	-	-	20			1	
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'97	3	-	-	-	-	-	-	-	-	-	-	-	60	2	4	3	
	'00	1	-	-	-	-	-	-	-	-	-	-	-	20	2	4	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			00%										
'97		00%			00%			00%			-33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
												'97	60		-			
												'00	40		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
S	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'82		00%			00%			00%									
'88		00%			00%			00%									
'95		00%			00%			00%									
'97		00%			00%			00%			+ 0%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-			
											'88	0		-			
											'95	0		-			
											'97	20		-			
											'00	20		-			
Purshia tridentata																	
S	'82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	20
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	24
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'82		00%			00%			00%									
'88		00%			00%			00%									
'95		00%			00%			00%									
'97		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-			
											'88	0		-			
											'95	0		-			
											'97	0		-			
											'00	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total							
		1	2	3	4										
Symphoricarpos oreophilus															
Y	'82	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	6	-	-	-	-	3	-	9	-	-	-	600		9
	'95	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	-	-	-	-	-	-	-	-	-	-	-	0		0
M	'82	3	-	-	-	-	-	-	3	-	-	-	200	8 12	3
	'88	-	3	-	-	-	-	-	2	-	1	-	200	20 12	3
	'95	1	-	-	-	-	-	-	1	-	-	-	20	7 10	1
	'97	1	-	-	-	-	-	-	1	-	-	-	20	- -	1
	'00	1	-	-	-	-	-	-	1	-	-	-	20	13 19	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>							
'82		00%		00%		00%		+75%							
'88		25%		00%		08%		-98%							
'95		00%		00%		00%		+ 0%							
'97		00%		00%		00%		+ 0%							
'00		00%		00%		00%									
Total Plants/Acre (excluding Dead & Seedlings)										'82	200	Dec:	-		
										'88	800		-		
										'95	20		-		
										'97	20		-		
										'00	20		-		
Tetradymia canescens															
Y	'82	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	2	-	-	-	-	-	-	2	-	-	-	40		2
	'97	1	-	-	-	-	-	-	1	-	-	-	20		1
	'00	1	-	-	-	-	-	-	1	-	-	-	20		1
M	'82	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	'88	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	'95	3	-	1	-	-	-	-	4	-	-	-	80	7 13	4
	'97	5	1	-	-	-	-	-	6	-	-	-	120	7 10	6
	'00	12	-	-	-	-	-	-	12	-	-	-	240	7 10	12
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>							
'82		00%		00%		00%									
'88		00%		00%		00%									
'95		00%		17%		00%		+14%							
'97		14%		00%		00%		+46%							
'00		00%		00%		00%									
Total Plants/Acre (excluding Dead & Seedlings)										'82	0	Dec:	-		
										'88	0		-		
										'95	120		-		
										'97	140		-		
										'00	260		-		

Trend Study 10-5-00

Study site name: Willow Flat .

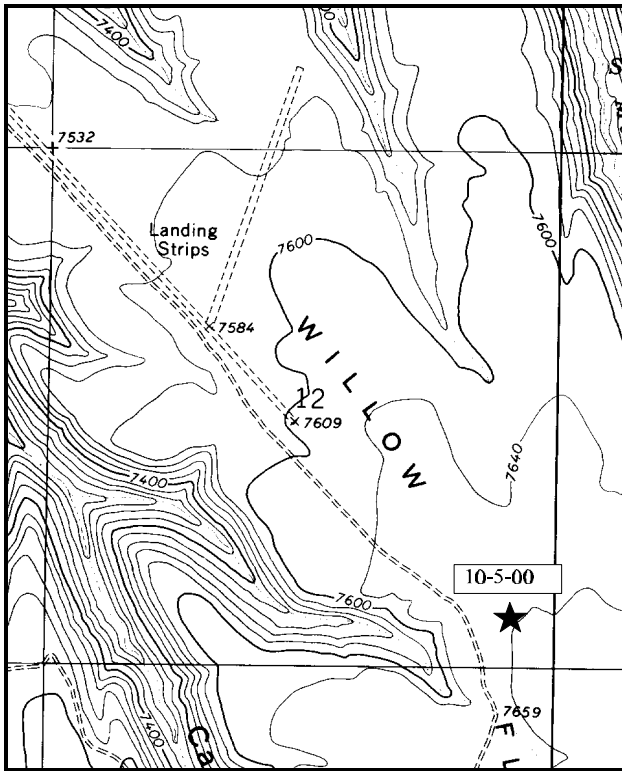
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 350°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

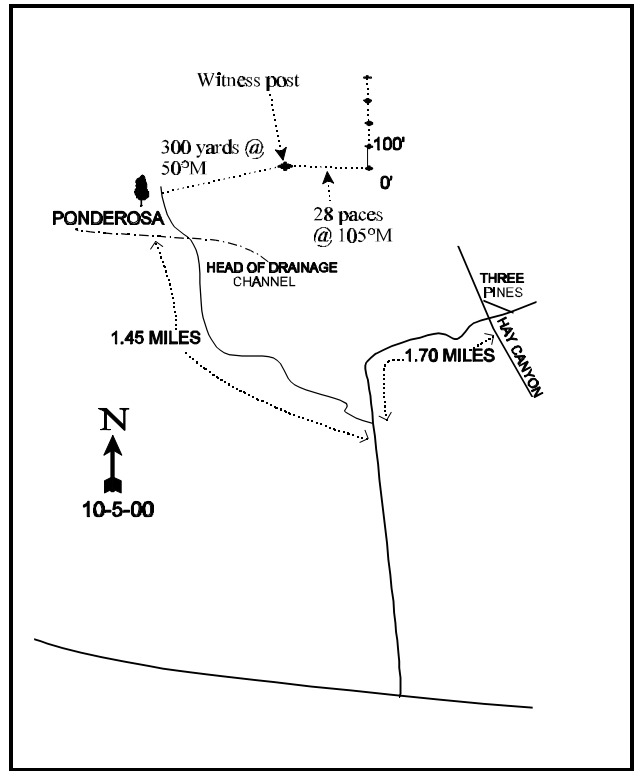
LOCATION DESCRIPTION

From the intersection of the Seep Ridge and Book Cliff Divide road, proceed west along the divide for 9.4 miles to the major Three Pines - Hay Canyon intersection. Continue straight for 1.7 miles to a road to the right to Willow Flat. Turn right here and go 1.45 miles until you see a large ponderosa pine (with other conifers at the head of a small canyon) on the left side of the road. From the ponderosa, walk 300 yards at 50°M to a full high witness post. From the witness post walk 28 paces at 105°M to the 0-foot baseline stake. The frequency baseline is marked by green steel fenceposts, 12 to 18 inches in height.



Map Name: Cedar Camp Canyon

Township 16S, Range 22E, Section 12



Diagrammatic Sketch

UTM. 4364798.520 N, 635034.481 E

DISCUSSION

Trend Study No. 10-5 (16A-5)

The Willow Flat trend study samples a sprayed area of state land similar to that monitored by study number 10-4, Wirefence Point. The area is used by deer, elk and livestock during the summer. Pellet group transect data from 2000 estimated 6 deer days use/acre (15 ddu/ha), 32 elk days use/acre (79 edu/ha), and 8 cow days use/acre (20 cdu/ha). Elevation is 7,700 feet with a slight westerly aspect on nearly level terrain.

Soils at the site are of clay loam texture with an average temperature of 52°F at 15 inches. Effective rooting depth is estimated at nearly 13 inches. Soil reaction is neutral (pH of 7.1) with very low phosphorus (1.8 ppm) as 10 ppm has been determined necessary for normal plant growth and development. The soil appears to be fairly uniform in depth down to 13 inches with a hard pan being present below that. This layer may be restrictive to roots. Currently, erosion appears light with some evidence of pedestaling and overland flow being noted in 2000. Most of the shrub interspaces are bare with the majority of the preferred herbaceous species being protected under shrub crowns. A small gully exists near the site, although at the present time it appears to be healing with small grasses and forbs becoming established within it's banks.

Mountain big sagebrush is the dominant species on the Willow Flat site even with the spraying treatment. At the time of initial study establishment in 1982, there was a high percentage of dead sagebrush from the original spraying treatment, especially along the baseline. However, with the death of many adult plants, there were many "safe sites" for shrub establishment as evidenced by a very large number of sagebrush seedlings (5,200 per/acre) in 1982. Density was estimated at 2,533 plants/acre, with 87% of these being mature. In 1988, estimated sagebrush density increased dramatically to 16,800 plants/acre, due to a sudden increase in the number of young plants (15,200 plants/acre). However, the percentage of mature plants in the population declined to only 8%, with the percentage of young making up 90% of the population. Estimated sagebrush cover in 1988 ranged from 3 to 13%, depending on the extent of the kill, with an overall average cover of 8%. During the 1995 reading, there were an estimated 8,840 plants/acre, 43% of which were classified as young. The number of mature plants increased to 56% of the population, indicating a more stable population. This change in sagebrush density and age class composition from 1988 to 1995 can be attributed in part to the much larger sample size utilized in 1995 which better estimates browse populations with clumped and/or discontinuous distributions. In 1995, percent decadency remained low, vigor was good, and use on sagebrush was mostly light. In 2000, the sagebrush population was estimated at 10,060 plants/acre, with continued high recruitment from the young age class (29%). Sagebrush makes up 86% of the browse cover and 54% of the total vegetative cover at the site. Although percent decadency increased from 1% to 15%, vigor remains good, and use remains light to moderate.

Dwarf rabbitbrush is also abundant. These short prostrate shrubs have declined from a high of 10,599 plants/acre in 1982 to 5,340 in 2000. This large change in density could be because of the much larger sample size and better sample distribution, especially for species that have clumped distributions. Use remains light to moderate on dwarf rabbitbrush as was the case in 1995. Other browse encountered on the site include rubber rabbitbrush, low rabbitbrush, broom snakeweed, and snowberry. Although, none of these are particularly abundant. Pinyon and juniper trees appear to be encroaching into the sagebrush flat, with trees still relatively sparse. Point-center quarter data from 2000 estimated 6 pinyon and 27 juniper trees/acre. Most of these are younger trees reaching 5-6 feet in height.

Eight species of perennial grasses were identified in 2000, providing 48% of the herbaceous cover. The most abundant grasses include: thickspike wheatgrass, mutton bluegrass, Sandberg bluegrass, and prairie junegrass. Forbs have been numerous and diverse at the Willow Flat site since it's establishment. Thirty-nine species, most of which are perennial, have been sampled in at least one reading since 1988. However, due to drought, forbs

declined by nearly half in both nested frequency and average cover in 2000. This is somewhat of a concern as these herbaceous species are important on this summer range. Yet, the abundance of forbs should increase with return to normal precipitation patterns in the future.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable but somewhat precarious. The heavy rains that occurred throughout the summer of 1982 may have resulted in above normal erosion. Vegetatively, the site appears to be returning to big sagebrush dominance at a fairly rapid rate. To a point, this is desirable but hopefully, density can be curtailed enough that a good grass cover can be maintained and a variety of desirable forbs can develop.

1988 TREND ASSESSMENT

Basal vegetative cover increased in 1988 which is consistent with the change in the herbaceous understory composition. Vegetative basal cover was calculated to be 17% in 1988, which is a significant increase over the 7.5% cover found in 1982. Percent litter cover declined slightly, but percent bare ground stayed about the same. Trend for soil is slightly up with the increase in frequency of grasses and forbs. The browse trend is up for the key species mountain big sagebrush. The number of mature shrubs actually declined from 2,200 plants/acre to 1,400. However, the number of young increased from 333 plants/acre to 15,200 indicating a young expanding population. Dwarf and low rabbitbrush populations follow the same general trend. Trend for herbaceous species is also up. Quadrat frequency of grasses and forbs has doubled since 1982.

TREND ASSESSMENT

soil - slightly up (4)

browse - up with abundant seedlings and young (5)

herbaceous understory - up (5)

1995 TREND ASSESSMENT

Ground cover characteristics have remained similar to those of 1988. The biggest difference is in the decline in percent litter cover, which has occurred statewide with the extended drought. Trend for soil is stable. Trend for browse is still up for the key species, mountain big sagebrush. Total density has declined since 1988, however the number of mature plants has increased from 1,400 to 4,920 plants/acre. Seedlings and young are still abundant while percent decadence is only 1%. Use is light and vigor is good. Dwarf rabbitbrush displays a similar trend. Quadrat frequency of grasses and forbs doubled between 1982 and 1988. Since 1988, sum of nested frequency of grasses has declined while that of forbs has increased. Overall, sum of nested frequency of grasses and forbs combined has remained stable.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - stable; slightly down for grasses and up for forbs (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down with percent cover of bare ground increasing. Also, the ratio of protective ground cover to bare soil decreased due to a decline in nested frequency of herbaceous plants and an increase in nested frequency for bare soil. There is also evidence of overland water flow occurring with many of the shrub interspaces being bare. Trend for browse is stable. The key species, mountain big sagebrush, increased in percent decadency from 1% to 15%, however this increase is within reasonable limits for sagebrush.

Recruitment remains high at 29%, vigor is good, and use remains light to moderate. Trend for grasses is stable, but down for forbs with the large decrease in sum of nested frequency for perennials forbs due to drought. Overall, trend is slightly down for the herbaceous understory.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - slightly down overall (2); stable for grasses and down for forbs

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 5

T y p e	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	_b 195	_a 131	_a 147	50	73	59	60	.78	.84
G	Carex spp.	_b 52	_a 11	_a 4	2	26	6	1	.05	.00
G	Koeleria cristata	_b 159	_a 115	_a 79	55	65	42	33	1.95	.84
G	Poa fendleriana	126	135	154	40	47	50	59	1.93	2.50
G	Poa nevadensis	_a -	_a -	_b 25	38	-	-	11	-	.35
G	Poa pratensis	-	1	-	-	-	1	-	.00	-
G	Poa secunda	142	120	130	-	57	44	57	1.89	1.56
G	Stipa comata	73	75	55	-	32	26	21	.60	.64
G	Stipa lettermani	-	-	-	1	-	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		747	588	594	184	300	228	242	7.23	6.75
Total for Grasses		747	588	594	184	300	228	242	7.23	6.75
F	Agoseris glauca	_a -	_b 6	_{ab} 2	-	-	4	2	.02	.04
F	Allium spp.	-	2	-	-	-	1	-	.00	-
F	Antennaria rosea	_b 203	_b 163	_a 102	45	73	63	44	4.20	1.38
F	Androsace septentrionalis (a)	-	79	10	-	-	37	5	.23	.20
F	Arabis drummondi	_a -	_b 10	_a 2	-	-	5	1	.02	.00
F	Astragalus convallarius	5	15	15	-	3	7	6	.18	.10
F	Aster spp.	_b 92	_b 77	_a 41	10	30	29	15	.87	.27
F	Astragalus spp.	12	31	28	6	9	13	11	.60	.42
F	Astragalus utahensis	_a -	_a -	_b 7	-	-	-	4	-	.04
F	Castilleja flava	_{ab} 58	_b 85	_a 39	-	31	38	20	.63	.34
F	Calochortus nuttallii	_a -	_b 17	_a -	-	-	6	-	.03	-
F	Crepis acuminata	_a -	_b 37	_b 33	-	-	16	15	.28	.30
F	Cruciferae	-	3	-	-	-	2	-	.01	-
F	Cryptantha spp.	_b 57	_a -	_a -	4	29	-	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
F	<i>Delphinium nuttallianum</i>	a-	b61	a1	-	-	33	1	.19	.00
F	<i>Eriogonum alatum</i>	a-	b14	b21	4	-	7	10	.08	.11
F	<i>Erigeron eatonii</i>	b145	a84	a88	47	66	37	44	1.25	.60
F	<i>Eriogonum racemosum</i>	1	-	-	-	1	-	-	-	-
F	<i>Eriogonum umbellatum</i>	18	24	27	-	12	15	14	.39	.26
F	<i>Ipomopsis aggregata</i>	1	5	-	-	1	3	-	.06	-
F	<i>Lappula occidentalis</i> (a)	-	-	3	-	-	-	1	-	.00
F	<i>Lesquerella ludoviciana</i>	a19	b62	b65	12	10	25	34	.83	.29
F	<i>Linum lewisii</i>	7	5	12	-	4	3	6	.04	.08
F	<i>Lomatium</i> spp.	-	6	-	-	-	2	-	.01	-
F	<i>Lupinus argenteus</i>	49	60	43	5	26	30	24	1.40	.74
F	<i>Lygodesmia</i> spp.	-	-	1	-	-	-	1	-	.00
F	<i>Machaeranthera</i> spp.	-	-	-	8	-	-	-	-	-
F	<i>Orthocarpus</i> spp. (a)	-	1	1	-	-	1	1	.00	.03
F	<i>Penstemon caespitosus</i>	3	3	6	-	1	3	2	.09	.15
F	<i>Penstemon</i> spp.	15	6	10	2	6	2	5	.04	.10
F	<i>Phlox austromontana</i>	b52	b60	a-	15	22	25	-	1.10	-
F	<i>Phlox longifolia</i>	44	50	101	2	24	25	41	.18	1.68
F	<i>Polygonum douglasii</i> (a)	a-	b227	a-	-	-	77	-	.80	-
F	<i>Potentilla gracilis</i>	-	3	4	-	-	2	2	.18	.06
F	<i>Senecio integerrimus</i>	a-	b29	a1	-	-	14	1	.07	.00
F	<i>Sedum lanceolatum</i>	4	5	11	-	1	2	4	.03	.02
F	<i>Senecio multilobatus</i>	-	5	2	-	-	3	1	.01	.00
F	<i>Sphaeralcea coccinea</i>	7	2	-	3	3	1	-	.00	-
F	<i>Taraxacum officinale</i>	b20	a12	a4	1	12	5	3	.42	.04
F	<i>Tragopogon dubius</i>	-	-	3	-	-	-	1	-	.03
Total for Annual Forbs		0	307	14	0	0	115	7	1.04	0.23
Total for Perennial Forbs		812	942	669	164	364	421	312	13.27	7.16
Total for Forbs		812	1249	683	164	364	536	319	14.32	7.39

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 5

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata vaseyana	95	99	16.11	20.49
B	Chrysothamnus depressus	60	66	3.34	1.88
B	Chrysothamnus nauseosus	1	0	-	-
B	Chrysothamnus viscidiflorus	17	11	.02	.18
B	Gutierrezia sarothrae	8	5	.21	.03
B	Juniperus osteosperma	0	2	.48	.94
B	Pediocactus simpsonii	1	3	.00	-
B	Pinus edulis	0	2	-	.03
B	Symphoricarpos oreophilus	1	2	.38	.30
Total for Browse		183	190	20.54	23.87

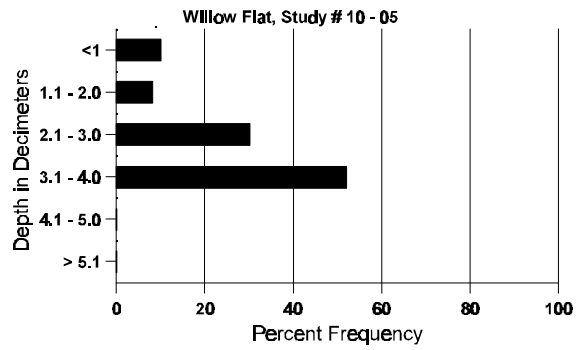
BASIC COVER --
Herd unit 10 , Study no: 5

Cover Type	Nested Frequency		Average Cover %			
	'95	'00	'82	'88	'95	'00
Vegetation	360	329	7.50	16.75	40.15	39.23
Rock	68	5	0	0	.66	.04
Pavement	99	80	0	0	.34	.66
Litter	389	347	53.50	46.75	34.04	34.51
Cryptogams	157	111	.75	1.50	3.01	3.45
Bare Ground	327	352	38.25	35.00	34.59	53.58

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 5, Study Name: Willow Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.83	52.4 (15.04)	7.1	30.0	40.0	30.0	2.3	1.8	204.8	0.8

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 5

Type	Quadrat Frequency	
	'95	'00
Rabbit	3	9
Elk	14	20
Deer	7	6
Cattle	-	2

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
287	N/A
418	32 (79)
78	6 (15)
96	8 (20)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 5

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia tridentata vaseyana																	
S	'82	78	-	-	-	-	-	-	-	-	78	-	-	-	5200		78
	'88	20	-	-	-	-	-	-	-	-	20	-	-	-	1333		20
	'95	68	-	-	13	-	-	-	-	-	81	-	-	-	1620		81
	'00	30	-	-	-	-	-	-	-	-	30	-	-	-	600		30
Y	'82	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5
	'88	210	6	-	2	-	-	10	-	-	225	-	3	-	15200		228
	'95	189	-	-	2	-	-	-	-	-	191	-	-	-	3820		191
	'00	130	13	-	1	-	-	3	-	-	147	-	-	-	2940		147
M	'82	23	10	-	-	-	-	-	-	-	33	-	-	-	2200	24 17	33
	'88	17	4	-	-	-	-	-	-	-	21	-	-	-	1400	30 22	21
	'95	209	37	-	-	-	-	-	-	-	246	-	-	-	4920	25 28	246
	'00	199	53	2	16	9	-	-	-	-	279	-	-	-	5580	24 28	279
D	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	'95	2	1	2	-	-	-	-	-	-	4	-	-	1	100		5
	'00	35	29	-	7	6	-	-	-	-	75	-	1	1	1540		77
X	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	260		13
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	300		15
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'82		26%			00%			00%			+85%						
'88		04%			00%			01%			-47%						
'95		09%			.45%			.22%			+12%						
'00		22%			.39%			.39%									
Total Plants/Acre (excluding Dead & Seedlings)											'82	2533	Dec:	0%			
											'88	16800		1%			
											'95	8840		1%			
											'00	10060		15%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Chrysothamnus depressus																	
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	8	-	-	-	-	-	-	-	-	-	-	-	-	533		8
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	3	-	-	-	-	-	-	-	-	-	-	-	-	60		3
Y	82	13	-	-	-	-	-	-	-	-	-	-	-	-	866		13
	88	55	12	-	1	-	-	-	1	-	-	-	-	-	4600		69
	95	34	-	-	-	-	-	-	-	-	-	-	-	-	680		34
	00	26	-	-	1	-	-	-	-	-	-	-	-	-	540		27
M	82	119	22	5	-	-	-	-	-	-	-	-	-	-	9733	4 9	146
	88	11	20	14	1	1	-	-	-	-	-	-	-	-	3133	4 6	47
	95	227	-	-	8	-	-	-	-	-	-	-	-	-	4700	5 7	235
	00	174	31	-	14	-	-	-	-	-	-	-	-	-	4380	3 8	219
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	13	6	9	-	-	-	-	-	-	-	-	-	-	1866		28
	95	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1
	00	19	2	-	-	-	-	-	-	-	-	-	-	-	420		21
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'82		14%			03%			00%			- 9%						
'88		27%			16%			07%			-44%						
'95		00%			00%			00%			- 1%						
'00		12%			00%			03%									
Total Plants/Acre (excluding Dead & Seedlings)												'82	10599	Dec:	0%		
												'88	9599		19%		
												'95	5400		0%		
												'00	5340		8%		
Chrysothamnus nauseosus																	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'82		00%			00%			00%									
'88		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-		
												'88	0		-		
												'95	20		-		
												'00	0		-		

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	2	4	-	1	-	-	-	-	-	-	-	-	466			7	
	95	2	-	-	-	-	-	-	-	-	-	-	-	40			2	
	00	1	-	-	-	-	-	-	-	-	-	-	-	20			1	
M	82	8	10	-	-	-	-	-	-	-	-	-	-	1200	9	12	18	
	88	-	-	3	-	-	-	-	-	-	-	-	-	200	8	6	3	
	95	23	-	-	-	-	-	-	-	-	-	-	-	460	8	11	23	
	00	11	-	-	1	-	-	-	-	-	-	-	-	240	7	8	12	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	1	-	1	-	-	-	-	-	-	-	-	-	133			2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	3	-	-	-	-	-	-	-	-	-	-	-	60			3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		56%			00%			00%			-33%							
'88		33%			33%			00%			-37%							
'95		00%			00%			00%			-36%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	1200	Dec:	0%			
												'88	799		17%			
												'95	500		0%			
												'00	320		19%			
Gutierrezia sarothrae																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	3	-	-	-	-	-	-	-	-	-	-	-	60			3	
	00	1	-	-	-	-	-	-	-	-	-	-	-	20			1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	2	-	-	-	-	-	-	-	-	-	-	-	133	5	1	2	
	95	15	-	-	-	-	-	-	-	-	-	-	-	300	6	7	15	
	00	5	-	-	-	-	-	-	-	-	-	-	-	100	4	3	5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'82		00%			00%			00%										
'88		00%			00%			00%			+63%							
'95		00%			00%			00%			-67%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	133		-			
												'95	360		-			
												'00	120		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	1	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'82	00%			00%			00%										
	'88	00%			00%			00%										
	'95	00%			00%			00%										
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
												'00	40		-			
Peraphyllum ramosissimum																		
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	30	32	2
	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66	28	37	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	21	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	24	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'82	00%			00%			00%			-50%							
	'88	00%			100%			00%										
	'95	00%			00%			00%										
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	66		-			
												'95	0		-			
												'00	0		-			
Pediocactus simpsonii																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	1	2	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'82	00%			00%			00%										
	'88	00%			00%			00%										
	'95	00%			00%			00%			+67%							
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	20		-			
												'00	60		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Pinus edulis</i>																		
Y	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	1	-	-	-	-	-	1	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'82	00%			00%			00%										
	'88	00%			00%			00%										
	'95	00%			00%			00%										
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	0		-				
											'95	0		-				
											'00	40		-				
<i>Symphoricarpos oreophilus</i>																		
M	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	35	1
	'00	2	-	-	1	-	-	-	-	-	3	-	-	-	60	-	-	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'82	00%			00%			00%										
	'88	00%			00%			00%										
	'95	00%			00%			00%			+67%							
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	0		-				
											'95	20		-				
											'00	60		-				
<i>Tetradymia canescens</i>																		
D	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'82	00%			00%			00%										
	'88	00%			100%			00%										
	'95	00%			00%			00%										
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	0%				
											'88	66		100%				
											'95	0		0%				
											'00	0		0%				

Trend Study 10-6-00

Study site name: Little Jim Canyon .

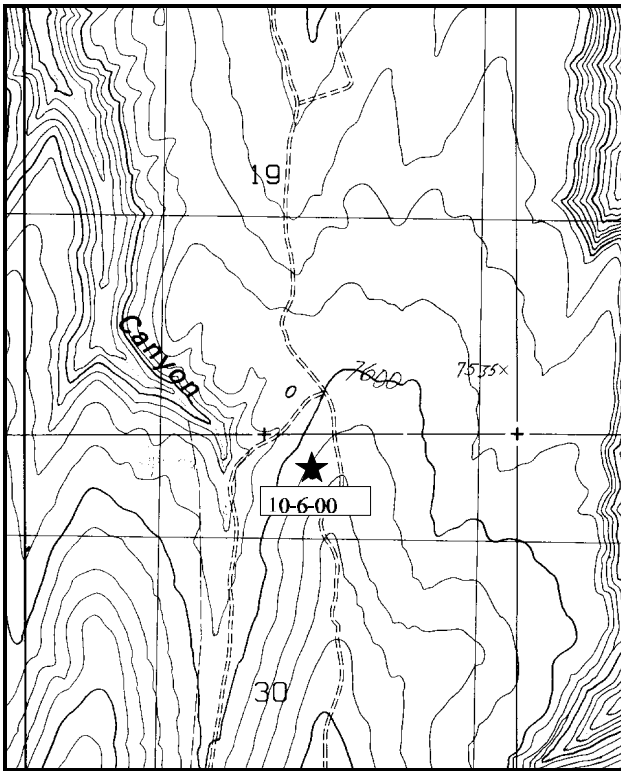
Range type: Chained, Seeded PJ .

Compass bearing: frequency baseline 204°M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

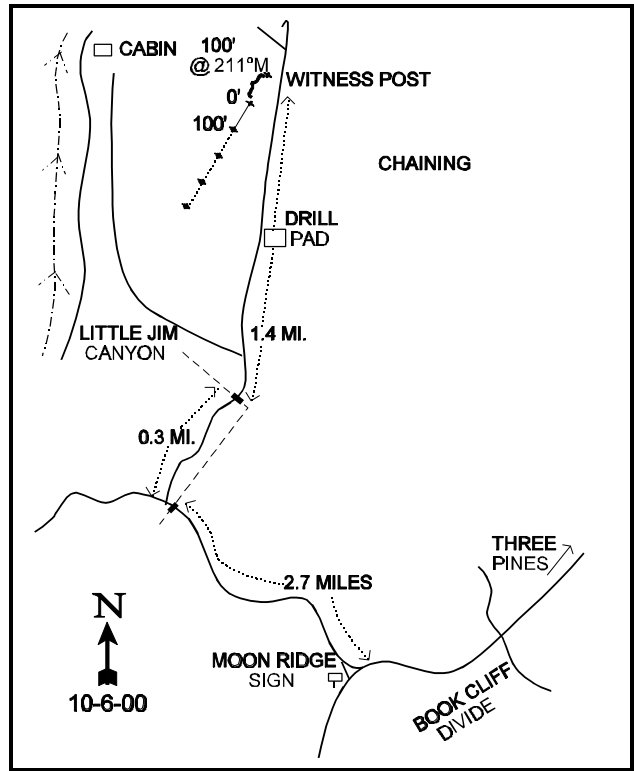
LOCATION DESCRIPTION

From Three Pines, proceed southwest along the divide road for about 10.5 miles to a major junction at Moon Ridge. Bear right here, and go 2.7 miles to a cattle guard. Just past the cattle guard and fence, turn right and drive down along the fence 0.3 miles to a gate. Stay to the left, and continue down the ridge 1.4 miles to the witness post on the left. From the witness post, the 0-foot baseline stake is 100 feet bearing 211° into the chaining. The 0-foot stake is marked by browse tag number 9099. The frequency baseline is marked by 2-foot tall green fenceposts.



Map Name: Tenmile Canyon North

Township 16S, Range 22E, Section 30



Diagrammatic Sketch

UTM. 4361159 N, 626411 E

DISCUSSION

Trend Study No. 10-6 (16A-6)

The Little Jim Canyon transect is placed within a chained and seeded area on the ridge east of Little Jim Canyon. The area is now occupied by a thick, tall stand of mixed mountain brush. This is part of a large block of land under the management of State Lands and Forestry. It is grazed by cattle from June through September on a rotation deferred system. In the past, this area was especially important for early winter deer use with a longer season of use for elk. However, pellet group quadrat frequency data indicated very little big game use of the site in 1995. Pellet group transect data taken in 2000 also indicate light use by big game with only 7 deer days use/acre (17 ddu/ha) and 6 elk days use/acre (15 edu/ha) being estimated.

The study is located at 7,700 feet in elevation, on a southwest facing, moderately steep slope (15%). In the bottom of the canyon, an intermittent stream has cut a deep channel. There are no gullies at the study site near the top of the ridge, yet there is evidence of substantial run-off and a heavy concentration of pavement in the open areas. The slope is broken by thick clumps of brush and piles of debris. Due to the depleted understory, the loose surface soil is exposed to erosion. Soils are of loam texture with an average temperature of 51°F at just over 16 inches. Effective rooting depth is estimated at just over 15 inches. Penetrometer readings show rock to be evenly distributed throughout the profile. Soils are neutral in reactivity (pH of 7.3) with phosphorus (8.3 ppm) being slightly lower than the 10 ppm thought necessary for normal plant growth and development. Organic matter is fairly high at 6.7%, likely due to the breakdown of chaining litter over the years. Shrub interspaces have minimal cover from herbaceous plants, but litter helps limit erosion.

The most preferred species at the Little Jim Canyon transect is true mountain mahogany which has averaged between 4 and 5 feet in height. There were an estimated 866 plants/acre in 1988, most of which were mature plants. Over half of the population displayed heavy use which is common for this species. Seedlings were found in the protection of the larger plants with 31% of the population consisting of young plants. The current years growth appeared often to be fully utilized, but the plants generally had normal vigor and seed production. With the much larger sample size implemented after mid-1992, there were an estimated 440 plants/acre in 1995, a 49% decrease from 1988. This population change can be explained mostly by the greatly increased sample size and much better sampling design. This design gives better population estimates with browse populations that are discontinuous and/or clumped in their respective distributions. No seedlings were encountered and young plants numbered 40 plants/acre. Utilization of mahogany was considered light to moderate. In 2000, mahogany density remained stable at 460 plants/acre. Twenty-six percent of these are young plants, with the remainder being mature. Vigor remains good, use is mostly light to moderate with only 9% of the population displaying heavy use. No decadent plants were sampled in 2000. The light use of the area by wildlife in the last two readings is apparent by the light to moderate use on the mahogany.

Other browse species include: basin big sagebrush, snowberry, currant, and white-stemmed rabbitbrush. Basin big sagebrush has a higher density and provides more cover than true mountain mahogany, but it is less preferred. The population is currently estimated at 520 plants/acre, with good vigor, and light use. Snowberry is the most numerous shrub by density (estimated at 2,080 plants/acre in 2000), and currently shows light to moderate use with good vigor. White-stemmed rabbitbrush is currently estimated at 200 plants/acre. Use on this species is mostly light with 10% of the population displaying poor vigor.

Young pinyon and juniper trees are scattered throughout the chaining. Point-center quarter data in 2000 estimate 231 pinyon and 58 juniper trees/acre. Average diameter of juniper is 6.1 inches, while that of pinyon is 2.2 inches. Forty percent of the juniper trees sampled were mature surviving trees which were tipped over but not killed during the chaining process.

For a chained area at this elevation, the herbaceous component of the vegetative community is lacking. Grasses and forbs made up only 24% of the total vegetative cover in 1995, decreasing to only 12% in 2000. Identification of grasses was very difficult in 1988, due to a lack of seed heads after heavy grazing by cattle. Native perennial species are the most abundant, namely bottlebrush squirreltail and Indian ricegrass. Cheatgrass was the most abundant grass in 1995, but decreased in 2000 due to drought. Overall, grasses slightly decreased in sum of nested frequency in 2000 due to drought. Forbs provide little forage and species richness is low compared to similar communities in other areas. Forbs provide just over 1% average cover in 2000, and only 7 perennial species were sampled. Low precipitation greatly limited the forb component in many areas of the state in 2000.

1988 APPARENT TREND ASSESSMENT

The rather sparse understory accounts for the low level of basal vegetative cover on the site, only 4%. Shrubs and trees provide 76% of the total vegetative cover. Litter is found associated with heavy browse stands. The open areas have a nearly complete covering of pavement, almost 35% of the ground cover. Exposed soil is quickly eroded away and only 6% of the surface is bare soil. Trend for soil appears stable due to the nearly complete protective ground cover of litter and pavement. The key browse species, mountain mahogany, appears to have a stable population with adequate numbers of seedlings and young. The herbaceous understory is lacking and will likely decline as shrubs and trees become more dominant.

1995 TREND ASSESSMENT

Basic ground cover conditions are similar to those of 1988. Percent bare ground continues to be low while cover from litter has declined slightly. The biggest change is in the estimated cover of pavement, 34.5% to 19.3%. The modified Daubenmire method used in 1995, more accurately estimates ground cover of pavement, rock and litter than the point system used previously. In addition, the baseline was lengthened in 1995 to obtain a better representative sample of the area. These changes may be partly responsible for the differences in pavement cover values, plus a high intensity storm will move soil and can cover some of the pavement. Even with these changes, the trend for soil appears stable.

Trend for the most preferred species, true mountain mahogany, appears slightly down. The number of mature plants/acre declined from 866 to 440, and due to the lack of dead plants, this change would be more a result of the larger and better distributed sample used in 1995 giving much better population estimates and not representative of a die-off of mahogany. Trend is slightly down due to a decline in reproductive potential (number of seedlings) and the reduction in the proportion of young plants in the population. On the positive side, percent heavy use declined from 54% to 0%. Sagebrush and rubber rabbitbrush display stable trends while snowberry displays a slightly downward trend with a shift toward an older, more mature population.

The herbaceous trend is down. Sum of nested frequency of perennial grasses and forbs has declined considerably. Nested frequency of grasses has declined by 56% while forbs have declined by 61%. The herbaceous understory only contributes a total of 7.6% cover, which is very low for a treated pinyon-juniper woodland.

TREND ASSESSMENT

soil - stable, but poor condition with high percent cover for rock and pavement (3)

browse - stable to slightly down for key species (2)

herbaceous understory - down, contributing very little protective cover (1)

2000 TREND ASSESSMENT

Trend for soil is stable, but remains in poor condition with a lot of pavement on the soil surface and bare interspaces between shrubs. Ground cover characteristics are similar to 1995 levels, with slight increases in pavement and bare ground values. Although vegetation cover slightly decreased, litter cover increased. The ratio of protective ground cover to bare soil is good. Pedestaling around the base of shrubs and bunch grasses is apparent, but erosion does not appear to be as severe as it was in the past following treatment. Trend for browse is stable. True mountain mahogany remains at a stable density, with no decadence and good vigor. Use is light to moderate which is surprising for this species as it commonly is heavily utilized from year to year. The other browse species are in generally good health with mostly good vigor and light to moderate use by wildlife. The herbaceous understory has a slightly downward trend as sum of nested frequency for perennials is down in 2000 due to drought.

TREND ASSESSMENT

soil - stable, but remains in poor condition (3)

browse - stable (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 6

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	-	-	2	-	-	2	-	.01
G	Artemisia frigida	-	-	3	-	-	1	-	.03
G	Bromus tectorum (a)	-	b70	a34	-	25	14	1.61	.14
G	Carex spp.	b34	a19	a8	19	9	4	.41	.39
G	Elymus junceus	1	5	-	1	2	-	.53	-
G	Oryzopsis hymenoides	b85	a37	b66	39	17	30	1.33	1.63
G	Orzyopsis micrantha	c73	b26	a-	31	10	-	.20	-
G	Poa fendleriana	-	3	2	-	1	2	.03	.01
G	Poa pratensis	a-	ab4	b14	-	2	5	.03	.12
G	Sitanion hystrix	b139	a53	a32	59	23	17	.67	.41
Total for Annual Grasses		0	70	34	0	25	14	1.61	0.14
Total for Perennial Grasses		332	147	127	149	64	61	3.21	2.60
Total for Grasses		332	217	161	149	89	75	4.83	2.75
F	Antennaria rosea	-	-	3	-	-	1	-	.00
F	Arabis spp.	22	15	9	11	5	4	.02	.02
F	Aster chilensis	1	-	-	1	-	-	-	-
F	Chaenactis douglasii	6	1	-	3	1	-	.00	-
F	Cryptantha spp.	b8	ab3	a-	4	2	-	.01	-
F	Delphinium bicolor	-	1	-	-	1	-	.00	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
F	Descurainia spp. (a)	-	_b 66	_a -	-	27	-	1.54	-
F	Draba spp. (a)	-	_b 20	_a -	-	9	-	.09	-
F	Erigeron pumilus	4	1	-	2	1	-	.00	-
F	Gilia latifolia (a)	-	_b 11	_a -	-	5	-	.16	-
F	Lappula occidentalis (a)	-	_b 26	_a 3	-	12	2	.06	.01
F	Lesquerella spp.	-	-	6	-	-	2	-	.06
F	Lupinus argenteus	_a -	_b 19	_a -	-	8	-	.09	-
F	Machaeranthera canescens	6	-	-	3	-	-	-	-
F	Machaeranthera grindelioides	_b 45	_a 15	_a 21	24	8	9	.61	.23
F	Melilotus alba	-	7	-	-	3	-	.04	-
F	Penstemon spp.	_c 111	_a -	_b 26	52	-	12	-	.77
F	Phlox longifolia	2	-	-	1	-	-	-	-
F	Physaria newberryi	_b 30	_b 29	_a 9	14	13	5	.06	.10
F	Polygonum douglasii (a)	-	5	-	-	2	-	.01	-
F	Senecio multilobatus	_a -	_b 22	_a 1	-	10	1	.05	.00
F	Unknown forb-perennial	3	-	-	1	-	-	-	-
Total for Annual Forbs		0	128	3	0	55	2	1.88	0.00
Total for Perennial Forbs		238	113	75	116	52	34	0.90	1.20
Total for Forbs		238	241	78	116	107	36	2.78	1.21

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 6

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia frigida	1	6	-	.04
B	Artemisia tridentata tridentata	13	15	3.57	6.78
B	Cercocarpus montanus	17	23	3.30	4.22
B	Chrysothamnus nauseosus	0	6	-	.03
B	Chrysothamnus nauseosus hololeucus	14	10	2.01	1.12
B	Chrysothamnus viscidiflorus	3	0	-	-
B	Gutierrezia sarothrae	0	2	.00	-
B	Juniperus osteosperma	0	3	2.32	1.78
B	Juniperus scopulorum	0	2	-	.15
B	Mahonia repens	5	4	1.41	.33
B	Opuntia spp.	4	7	.56	.18
B	Pinus edulis	1	10	1.73	1.77

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Pseudotsuga menziesii</i>	0	1	-	.15
B	<i>Purshia tridentata</i>	1	1	.15	-
B	<i>Quercus gambelii</i>	1	9	1.22	2.82
B	<i>Ribes cereum cereum</i>	4	5	1.66	1.29
B	<i>Symphoricarpos oreophilus</i>	45	50	6.42	8.06
Total for Browse		109	154	24.38	28.78

CANOPY COVER --

Herd unit 10 , Study no: 6

Species	Percent Cover '00
<i>Pinus edulis</i>	2
<i>Quercus gambelii</i>	5

BASIC COVER --

Herd unit 10 , Study no: 6

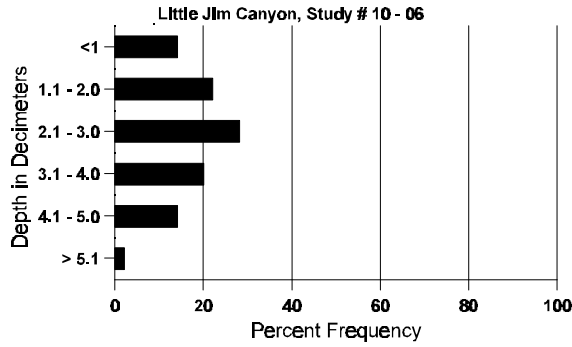
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'88	'95	'00
Vegetation	285	201	3.75	33.42	31.84
Rock	150	95	2.50	3.23	3.13
Pavement	230	236	34.50	19.30	25.39
Litter	380	373	53.25	49.20	54.47
Cryptogams	7	8	0	.64	1.03
Bare Ground	157	152	6.00	3.25	7.91

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 6, Study Name: Little Jim Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.45	51.0 (16.3)	7.3	38.0	37.4	24.6	6.7	8.3	96.0	0.8

Stoniness Index



PELLET GROUP FREQUENCY -- Herd unit 10 , Study no: 6

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	9	33	635	N/A
Elk	4	11	78	6 (15)
Deer	3	3	96	7 (17)

BROWSE CHARACTERISTICS -- Herd unit 10 , Study no: 6

A G E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia frigida																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	10	1
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240	5	8	12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+94%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
												'00	320		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata tridentata																		
Y	88	3	-	-	1	-	-	1	-	-	5	-	-	-	333		5	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	17	-	-	1	-	-	-	-	-	18	-	-	-	360	22	18	
	00	17	1	-	5	-	-	-	-	-	23	-	-	-	460	32	23	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%			+21%							
'95		00%			00%			00%			+19%							
'00		04%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	333	Dec:	0%				
											'95	420		5%				
											'00	520		0%				
Cercocarpus montanus																		
S	88	-	-	-	-	-	-	7	-	-	7	-	-	-	466		7	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	-	-	3	1	-	-	-	-	-	4	-	-	-	266		4	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	2	1	1	2	-	-	-	-	-	6	-	-	-	120		6	
M	88	-	1	4	1	-	-	-	3	-	8	-	1	-	600	58	9	
	95	16	3	-	-	-	-	-	-	-	19	-	-	-	380	47	19	
	00	5	4	1	1	2	-	4	-	-	17	-	-	-	340	45	17	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		08%			54%			08%			-49%							
'95		14%			00%			00%			+ 4%							
'00		30%			09%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	866	Dec:	0%				
											'95	440		5%				
											'00	460		0%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus nauseosus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120	29	32	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	140		-			
Chrysothamnus nauseosus hololeucus																		
Y	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66	31	10	
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240	25	33	
	00	7	-	-	1	-	-	-	-	-	8	-	-	-	160	34	33	
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
	00	-	-	1	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		20%			00%			00%			+ 2%							
'95		00%			00%			06%			-41%							
'00		00%			10%			10%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	332	Dec:	20%			
												'95	340		12%			
												'00	200		10%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	1	-	-	-	-	1	-	-	-	20	22	23	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24	15	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		67%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
												'00	0		-			
Gutierrezia sarothrae																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	40		-			
Juniperus osteosperma																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	60		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma (chained)																		
M	'88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	69	295	2
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:	-			
												'95	0		-			
												'00	0		-			
Juniperus scopulorum																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	40		-			
Mahonia repens																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	2	-	-	20	-	-	-	-	-	22	-	-	-	440			22
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	20	-	-	50	-	-	-	-	-	70	-	-	-	1400	3	7	70
	'00	36	-	-	-	-	-	-	-	-	36	-	-	-	720	2	4	36
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			-61%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	1840		-			
												'00	720		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	15	4
	00	11	-	-	1	-	-	-	-	-	12	-	-	-	240	3	11	12
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			33%			+50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'95	120		33%				
											'00	240		0%				
Pinus edulis																		
S	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	2	-	-	-	-	-	1	-	-	3	-	-	-	200			3
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	4	-	-	2	-	-	1	-	-	7	-	-	-	140	-	-	7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-80%							
'95		00%			00%			00%			+88%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	200	Dec:	-				
											'95	40		-				
											'00	320		-				
Pseudotsuga menziesii																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	0		-				
											'00	20		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	27	44	1
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	38	47	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+ 0%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	20		-				
											'00	20		-				
Quercus gambelii																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	11	-	-	-	-	-	-	-	-	11	-	-	-	220			11
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	15	31	3
	00	59	-	-	-	-	-	-	-	-	59	-	-	-	1180	64	28	59
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+96%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	60		-				
											'00	1400		-				
Ribes cereum cereum																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	36	48	4
	00	2	1	-	2	-	-	-	-	-	5	-	-	-	100	34	41	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+20%							
'00		20%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	80		-				
											'00	100		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
S	'88	2	-	-	-	-	-	1	-	-	3	-	-	-	200		3	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	'88	12	3	-	4	-	-	3	-	-	20	-	2	-	1466		22	
	'95	14	-	-	-	-	-	-	-	14	-	-	-	280		14		
	'00	27	-	-	3	-	-	1	-	31	-	-	-	620		31		
M	'88	13	-	-	9	-	-	-	-	16	-	6	-	1466	35	38	22	
	'95	48	-	-	3	2	-	-	-	53	-	-	-	1060	22	42	53	
	'00	38	15	2	10	-	-	6	-	71	-	-	-	1420	22	38	71	
D	'88	3	-	-	-	-	-	-	-	1	-	2	-	200		3		
	'95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'00	1	-	-	-	-	-	1	-	1	-	-	1	40		2		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		06%			00%			21%			-57%							
'95		03%			00%			00%			+36%							
'00		14%			02%			.96%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	3132	Dec:	6%				
											'95	1340		0%				
											'00	2080		2%				

Trend Study 10-7-00

Study site name: Cherry Mesa .

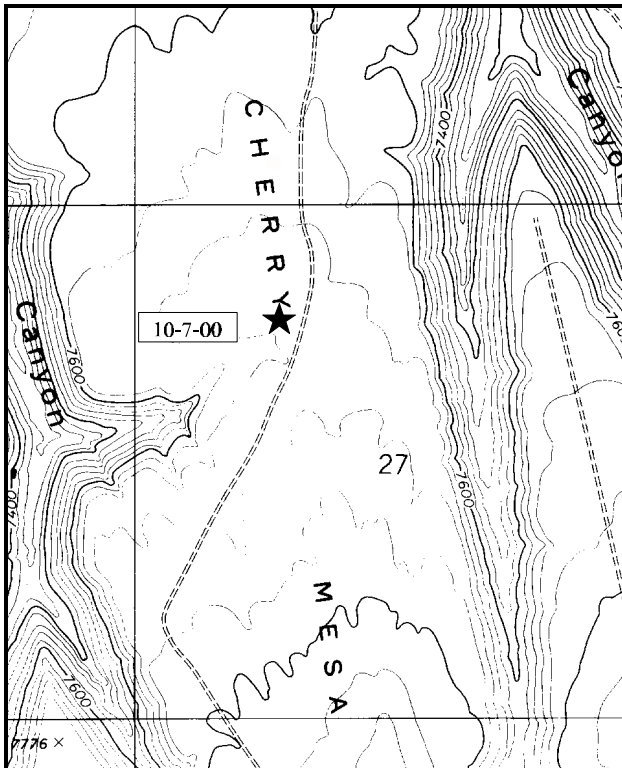
Range type: Chained, Seeded PJ .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

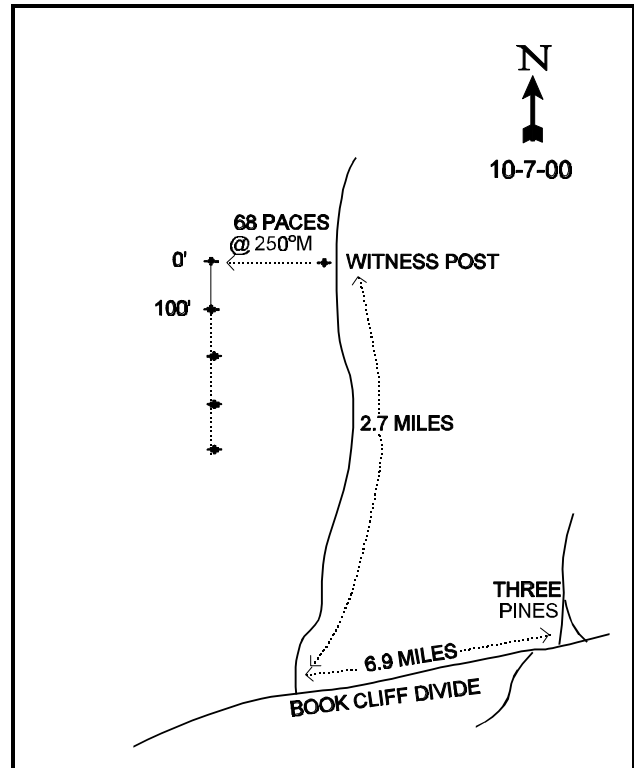
LOCATION DESCRIPTION

From the major intersection at Three Pines, continue southwest along the Book Cliff summit for 7.0 miles. Turn right off the main road onto the Cherry Mesa road. Go down through the spraying 2.7 miles to a witness post on the left side of the road. Stop, then walk to the west up the ridge, 68 paces at 250°M to the 0-foot baseline stake. It is marked by browse tag #9097. The rest of the 18" green fenceposts marking the study are found to the south at 100 foot intervals.



Map Name: Cedar Camp Canyon

Township 16S , Range 22E , Section 27



Diagrammatic Sketch

UTM. 4361326.612 N, 630728.231 E

DISCUSSION

Trend Study No. 10-7 (16A-7)

The Cherry Mesa trend study samples an extensive pinyon-juniper chaining on a large block of state land. This site was re-read in 1997 as a special studies site to address perceived conflicts over elk and livestock use on the North Book Cliffs. Cattle graze this area on a rotational, deferred system from June through September. Water is a limiting factor on this mesa. There was fresh deer sign and also evidence of winter use during the 1988 reading. Elk were also seen in the general area in 1988. Pellet group frequency data from 1997 indicated 7 deer days use/acre (17 ddu/ha), 29 elk days use/acre (72 edu/ha), and 21 cow days use/acre (52 cdu/ha). In 2000, pellet group transect data estimated 21 deer days use/acre (52 ddu/ha), 15 elk days use/acre (37 edu/ha), and 6 cow days use/acre (15 cdu/ha).

Elevation at the site is 7,650 feet with a northerly aspect and a gentle slope ranging from 3-7%. The fine-textured loam soil is moderately shallow with an average effective rooting depth of just over 11 inches. The surface horizon is extremely gravelly with many of the rocks located in the upper 6 inches. There is a fair amount of litter associated with the plants and also debris and litter left from the chaining. Many plants are slightly pedestalled and there has been obvious soil movement following high intensity rainstorms in the past. Average soil temperature is 55°F at an average depth of nearly 13 inches. Soils are high in organic matter (5.2%) and are neutral in reactivity (pH of 7.3).

Mountain big sagebrush is the dominant species on the site. Some of the sagebrush have characteristics of basin big sagebrush, indicating hybridization between the two subspecies. There were an estimated 1,866 mature and 4,400 young plants/acre in 1988. Percent decadency was low at 3% and vigor was generally good. Utilization of the sagebrush was light to moderate with a few individuals displaying heavy use (1%). In 1995, the population declined overall due to a reduced number of young being encountered (4,400 to 1,540). The number of mature plants actually increased to 2,620 plants/acre. Much of this change in population is associated with the greatly increased sample size and much better sampling distribution implemented in 1992 which provides considerably more reliable estimates for shrub densities. Percent decadency was less than 1% in 1995, with good vigor and light to moderate use. In 1997, sagebrush density was estimated to be slightly lower at 3,360 plants/acre. The age structure stayed relatively the same with about 2/3 of the population classified as mature and 1/3 classified as young. Utilization shifted to slightly more moderate use, yet the plants still exhibited good vigor. There was a large decrease in the number of seedlings encountered in 1997 compared to 1995 (760 to 80 plants/acre). In 2000, sagebrush provided 56% of the browse cover and appears to be slightly increasing with an estimated 4,240 plants/acre. It seems that many of the young plants sampled in 1995 and 1997 developed to mature plants as the mature age class increased. Although recruitment from young plants decreased in 2000, 16% of the population is still in the young age class (660 plants/acre) which is adequate. The level of use continues to slowly increase with 24% displaying moderate use, and an additional 17% showing heavy use in 2000. Seventeen percent of the population displayed poor vigor in 2000, and percent decadency increased from 1% to 10%. This level of decadency is still within a reasonable limit for sagebrush. Leader growth averaged approximately 5 inches in length in 2000, with abundant seed from last year being present throughout the population.

The small dwarf rabbitbrush is fairly numerous with an estimated 2,200 plants/acre in 1995, a similar amount (2,240 plants/acre) in 1997, increasing to 3,240 plants/acre in 2000. Use was mostly light in 1995 and 1997. However, use increased in 2000 with 21% of the population displaying moderate use, and an additional 10% showing heavy use. Utilization of this species appears to be primarily from rabbits. Percent decadency is high for dwarf rabbitbrush during the last 3 readings. Decadent plants made up 44% of the population in 1995, 50% in 1997, and 46% in 2000. Fifteen percent of the population displayed poor vigor in 2000.

Preferred species like bitterbrush and true mountain mahogany are scattered throughout the site in low numbers. Bitterbrush is currently estimated at 240 plants/acre. Use is moderate to heavy as evidenced by the “clubbed” appearance on the majority of the population. Even with this appearance, vigor remains good and no decadent plants have been sampled in any year. Average leader growth in 2000 was approximately 4 inches.

Pinyon and juniper trees are present, but at relatively low densities. Point-center quarter data from 2000 estimate 86 juniper and 41 pinyon trees/acre. About 20% of the pinyon and juniper trees consist of old trees that were tipped over during the chaining process but were not killed.

Herbaceous vegetation is sparse for a higher elevation chaining which provides little usable forage. Grass composition is mainly from native perennial species with the most abundant being thickspike wheatgrass, mutton bluegrass, a Carex, and blue grama. Grasses currently ('00) provide 22% of the total vegetative cover with sum of nested frequency remaining nearly stable since 1997. Forbs are diverse, but contribute only 2% average cover in 2000. Useful species are present in low numbers. The most abundant species includes pussy toes, desert phlox, long leaf phlox, and tapertip hawksbeard. Forb sum of nested frequency substantially decreased in 2000 due to drought conditions.

1988 APPARENT TREND ASSESSMENT

Although vegetative cover appears better on this site than at the previous site (#10-6), basal vegetative cover was estimated to be lower at 3.3%. Pavement (20%) constitutes a large portion of the highly variable surface terrain. Litter covers an additional 65% of the ground surface leaving 11% bare soil. The key browse species, mountain big sagebrush, is vigorous and moderately utilized. A majority of the population consists of young plants (68%) and seedlings are common. Trend appears up. The herbaceous understory is diverse and fairly abundant. The most common grasses include thickspike wheatgrass, a sedge, and mutton grass.

1995 TREND ASSESSMENT

Basic ground cover characteristics have changed somewhat since 1988. Litter cover has declined from 65% to 41%. This is likely a reflection of the effects of extended drought combined with the decomposition of litter from the original chaining. Percent bare ground declined slightly but not enough to warrant an improving trend. In addition, grasses and forbs contribute 37% of the total vegetative cover. Therefore, trend for soil is considered stable. Trend for mountain big sagebrush is up slightly even though total density has declined. However, with no evidence of die-off, the change is more reflective of the much larger sample size giving more accurate population estimates for shrub species. The number of mature plants has increased from 1,866 plants/acre to 2,620. The proportion of young plants declined from 68% to 37% but this is still high. Percent decadence is low and average height/crown measurements have increased considerably. However, this upward trend in the number of mature plants and increases in size could have a depressing effect on the herbaceous understory. Trend for the herbaceous understory is stable to slightly declining, but composition has changed since the last reading. Sum of nested frequency for grasses declined considerably while that of forbs increased. All perennial grasses encountered in 1988 have declined significantly.

TREND ASSESSMENT

soil - stable (3)

browse - up slightly for sagebrush (4)

herbaceous understory - stable to slightly declining; down for grasses and up for forbs (2)

1997 TREND ASSESSMENT

Total vegetative cover has decreased to 21% since 1995, when it was estimated at 32%. In contrast, pavement cover has increased to 28% since 1995 when it was estimated at 18%. Percent bare ground has also increased from 9% in 1995 to 15% in 1997. Cover is still adequate to protect from erosion, although there is some evidence of recent soil movement. Soil trend is stable for now. Mountain big sagebrush density continues to decline with 3,360 plants/acre estimated in 1997. Percent decadence is still low with few dead plants in the area. Browse trend is stable for now, but should continue to be monitored. Sum of nested frequency for grasses and forbs has decreased since 1995. All grasses have declined since 1995 except for thickspike wheatgrass which has increased slightly. Trend for herbaceous understory is slightly downward.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly downward (2)

2000 TREND ASSESSMENT

Trend for soil is slightly down. Ground cover characteristics are mixed with vegetation and bare soil both increasing, litter cover remaining stable, and pavement decreasing. The ratio of protective ground cover to bare soil decreased in 2000 but may still be adequate to limit high erosive events, and erosion appears minimal at the present time. Trend for browse is stable. The key species, mountain big sagebrush, has increased in density, and the population still has moderate recruitment from the young age class (16%). Use has increased slightly since 1997, with moderate use remaining the same, but heavy use increasing from 3% to 17% of the population. Percent decadency increased from 1% to 10%, however, this is within the reasonable range for sagebrush. Poor vigor increased to 17% of the population, due most likely to the drought experienced in spring and summer of 2000. Trend for the herbaceous understory is slightly down due to drought. With the dry conditions of 2000, sum of nested frequency decreased for perennial grasses and forbs. Herbaceous species provide little usable forage compared to other chained sites at this elevation.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - slightly down due to drought (2)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 7

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %		
		'88	'95	'97	'00	'88	'95	'97	'00	'95	'97	'00
G	<i>Agropyron dasystachyum</i>	_b 180	_b 158	_b 179	_a 86	69	54	67	38	1.16	1.32	.52
G	<i>Andropogon scoparius</i>	-	-	7	-	-	-	3	-	-	.01	-
G	<i>Bouteloua gracilis</i>	74	54	42	50	27	22	18	17	.83	.39	.72
G	<i>Bromus tectorum</i> (a)	-	2	3	-	-	1	1	-	.00	.00	-
G	<i>Carex</i> spp.	_b 139	_a 83	_a 66	_b 148	52	28	23	50	.39	.48	2.16
G	<i>Koeleria cristata</i>	_a -	_c 80	_b 37	_a 3	-	31	15	1	1.11	.58	.03
G	<i>Oryzopsis hymenoides</i>	_c 33	_b 11	_{ab} 2	_a -	15	4	1	-	.07	.03	-
G	<i>Poa fendleriana</i>	_b 116	_a 67	_{bc} 131	_c 177	51	27	54	67	1.71	1.29	3.17
G	<i>Poa secunda</i>	_a -	_a -	_b 8	_c 1	-	-	3	1	-	.21	.00
G	<i>Sitanion hystrix</i>	_b 82	_a 16	_a 11	_a 1	42	7	5	1	.07	.05	.03
G	<i>Stipa comata</i>	_b 79	_a 1	_a 6	_a 3	31	1	3	2	.00	.01	.03
Total for Annual Grasses		0	2	3	0	0	1	1	0	0.00	0.00	0
Total for Perennial Grasses		703	470	489	469	287	174	192	177	5.35	4.40	6.68
Total for Grasses		703	472	492	469	287	175	193	177	5.36	4.40	6.68
F	<i>Antennaria rosea</i>	_a 11	_a 23	_{ab} 30	_b 40	6	10	14	20	.10	.45	.39
F	<i>Androsace septentrionalis</i> (a)	-	_a -	_c 33	_b 6	-	-	16	3	-	.08	.04
F	<i>Arabis</i> spp.	_b 29	_a 1	_a 4	_a -	12	1	2	-	.03	.01	-
F	<i>Arenaria kingii</i>	-	-	4	-	-	-	2	-	-	.01	-
F	<i>Astragalus argophyllus</i>	_a 3	_b 32	_a -	_a 5	1	17	-	3	.70	-	.07
F	<i>Aster</i> spp.	12	3	1	5	4	1	1	3	.00	.00	.04
F	<i>Astragalus</i> spp.	_a -	_a -	_b 13	_a 3	-	-	8	1	-	.09	.00
F	<i>Calochortus flexuosus</i>	-	-	3	-	-	-	1	-	-	.00	-
F	<i>Castilleja flava</i>	9	12	9	4	5	7	6	2	.16	.08	.03
F	<i>Chaenactis douglasii</i>	_c 51	_b 20	_b 10	_a -	25	8	4	-	.04	.02	-
F	<i>Comandra pallida</i>	36	53	38	36	15	22	19	16	.38	.22	.33
F	<i>Crepis acuminata</i>	_a -	_{bc} 53	_c 59	_b 35	-	24	31	20	.30	.53	.22
F	<i>Cryptantha</i> spp.	3	6	2	1	1	4	1	1	.04	.00	.00
F	<i>Delphinium bicolor</i>	-	2	-	-	-	2	-	-	.01	-	-
F	<i>Eriogonum alatum</i>	-	-	-	2	-	-	-	2	-	-	.03
F	<i>Erigeron eatonii</i>	-	-	-	3	-	-	-	2	-	-	.06
F	<i>Erigeron</i> spp.	_b 47	_{ab} 37	_{ab} 21	_a 23	20	20	13	9	.30	.14	.07
F	<i>Eriogonum umbellatum</i>	_a 19	_a 15	_a 14	_b 34	8	6	8	18	.22	.16	.24
F	<i>Gayophytum ramosissimum</i> (a)	-	_b 54	_a -	_a 2	-	21	-	1	.42	-	.00
F	<i>Gilia</i> spp. (a)	-	_b 111	_a -	_a 3	-	40	-	2	.27	-	.01
F	<i>Lappula occidentalis</i> (a)	-	_b 8	_b 10	_a -	-	4	5	-	.02	.02	-
F	<i>Lesquerella</i> spp.	_b 50	_{ab} 41	_{ab} 35	_a 18	24	16	16	10	.19	.22	.10

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %		
		'88	'95	'97	'00	'88	'95	'97	'00	'95	'97	'00
F	<i>Linum lewisii</i>	2	-	2	5	1	-	1	2	-	.00	.01
F	<i>Machaeranthera grindelioides</i>	15	17	12	6	8	7	6	4	.37	.10	.04
F	<i>Orthocarpus purpureo-albus</i> (a)	3	-	-	-	1	-	-	-	-	-	-
F	<i>Penstemon caespitosus</i>	_a 3	_b 26	_{ab} 11	_a 1	2	10	6	1	.59	.19	.00
F	<i>Pedicularis centranthera</i>	-	-	1	-	-	-	1	-	-	.00	-
F	<i>Penstemon pachyphyllus</i>	-	1	2	1	-	1	1	1	.00	.00	.00
F	<i>Phlox austromontana</i>	_a -	_b 26	_b 26	_b 23	-	10	10	10	.29	.32	.41
F	<i>Phlox longifolia</i>	_a 12	_c 104	_b 69	_a 37	6	43	35	17	.34	.25	.11
F	<i>Polygonum douglasii</i> (a)	-	_b 91	_b 62	_a 1	-	36	28	1	.25	.14	.00
F	<i>Senecio multilobatus</i>	3	3	-	-	2	2	-	-	.01	-	-
F	<i>Tragopogon dubius</i>	2	-	-	-	2	-	-	-	-	-	-
Total for Annual Forbs		3	264	105	12	1	101	49	7	0.97	0.24	0.06
Total for Perennial Forbs		307	475	366	282	142	211	186	142	4.13	2.88	2.20
Total for Forbs		310	739	471	294	143	312	235	149	5.10	3.13	2.27

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 7

T y p e	Species	Strip Frequency			Average Cover %		
		'95	'97	'00	'95	'97	'00
B	<i>Artemisia tridentata vaseyana</i>	77	81	80	9.96	8.26	11.78
B	<i>Cercocarpus montanus</i>	1	1	3	.18	.00	.38
B	<i>Chrysothamnus depressus</i>	35	26	39	1.00	.84	.80
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	0	10	8	-	.42	.00
B	<i>Gutierrezia sarothrae</i>	7	9	1	.18	.08	.00
B	<i>Juniperus osteosperma</i>	0	6	6	.93	1.48	2.32
B	<i>Opuntia</i> spp.	2	2	6	.00	-	-
B	<i>Pinus edulis</i>	0	4	4	3.03	3.23	4.15
B	<i>Purshia tridentata</i>	5	11	8	.03	.12	.15
B	<i>Symphoricarpos oreophilus</i>	20	22	25	3.01	1.63	1.62
Total for Browse		147	172	180	18.37	16.07	21.22

CANOPY COVER --
Herd unit 10 , Study no: 7

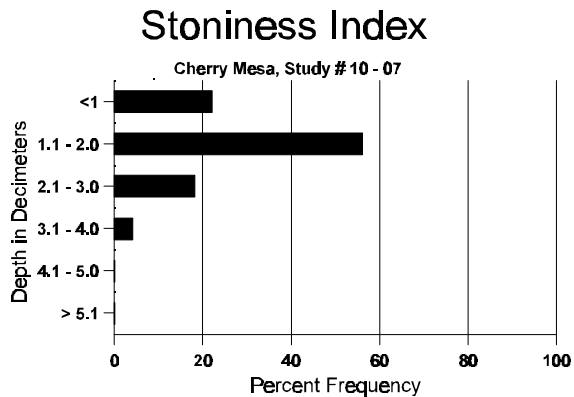
Species	Percent Cover
	'00
Pinus edulis	6

BASIC COVER --
Herd unit 10 , Study no: 7

Cover Type	Nested Frequency				Average Cover %			
	'88	'95	'97	'00	'88	'95	'97	'00
Vegetation	-	348	306	323	3.25	31.70	21.11	29.38
Rock	-	57	12	3	0	.88	.16	.00
Pavement	-	264	291	278	20.00	18.21	27.87	18.42
Litter	-	386	392	367	65.25	41.33	41.40	41.26
Cryptogams	-	24	27	12	.25	.20	1.19	.42
Bare Ground	-	249	232	269	11.25	9.14	15.18	25.53

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 7, Study Name: Cherry Mesa

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.15	55.0 (12.83)	6.8	48.0	30.0	22.0	4.1	9.4	89.6	0.8



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 7

Type	Quadray Frequency			Pellet Transect			
	'95	'97	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
				'97	'00	'97	'00
Rabbit	12	11	48	44	809	N/A	N/A
Elk	4	8	9	382	22	29 (72)	15 (37)
Deer	4	7	10	96	32	7 (17)	21 (53)
Cattle	1	7	2	252	70	21 (52)	6 (15)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 7

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
<i>Artemisia tridentata vaseyana</i>																		
S	'88	9	-	-	2	-	-	1	-	-	12	-	-	-	800		12	
	'95	38	-	-	-	-	-	-	-	-	38	-	-	-	760		38	
	'97	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	'00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	'88	61	4	-	1	-	-	-	-	-	66	-	-	-	4400		66	
	'95	76	-	-	1	-	-	-	-	-	77	-	-	-	1540		77	
	'97	55	1	-	-	-	-	-	-	-	56	-	-	-	1120		56	
	'00	28	2	1	2	-	-	-	-	-	33	-	-	-	660		33	
M	'88	14	13	1	-	-	-	-	-	-	26	1	1	-	1866	21 19	28	
	'95	121	5	2	3	-	-	-	-	-	131	-	-	-	2620	26 31	131	
	'97	67	35	5	2	1	-	-	-	-	105	-	5	-	2200	28 34	110	
	'00	78	40	18	2	4	15	1	-	-	131	-	27	-	3160	27 31	158	
D	'88	3	-	-	-	-	-	-	-	-	2	1	-	-	200		3	
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'97	1	1	-	-	-	-	-	-	-	1	-	-	1	40		2	
	'00	14	4	3	-	-	-	-	-	-	13	-	1	7	420		21	
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		18%			01%			01%			-35%							
'95		02%			.95%			00%			-20%							
'97		23%			03%			04%			+21%							
'00		24%			17%			17%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	6466	Dec:	3%				
											'95	4180		0%				
											'97	3360		1%				
											'00	4240		10%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	35	27	
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20	22	14	
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	33	38	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+ 0%							
'97		00%			00%			00%			+67%							
'00		00%			33%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
												'97	20		-			
												'00	60		-			
Chrysothamnus depressus																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	6	1	-	1	-	-	-	-	-	8	-	-	-	533		8	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	11	-	1	-	-	-	-	-	-	12	-	-	-	240		12	
M	88	45	16	-	1	-	-	2	-	-	64	-	-	-	4266	6	8	
	95	61	1	-	-	-	-	-	-	-	62	-	-	-	1240	6	12	
	97	55	1	-	-	-	-	-	-	-	56	-	-	-	1120	5	10	
	00	49	13	5	1	4	2	-	-	1	63	-	-	12	1500	3	5	
D	88	6	1	-	-	-	-	-	-	-	6	-	-	1	466		7	
	95	47	1	-	-	-	-	-	-	-	48	-	-	-	960		48	
	97	55	1	-	-	-	-	-	-	-	56	-	-	-	1120		56	
	00	49	13	5	1	4	2	-	-	1	63	-	-	12	1500		75	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		23%			00%			01%			-58%							
'95		02%			00%			00%			+ 2%							
'97		02%			00%			00%			+31%							
'00		21%			10%			15%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	5265	Dec:	9%			
												'95	2200		44%			
												'97	2240		50%			
												'00	3240		46%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total				
		1	2	3	4		1	2					
<i>Chrysothamnus viscidiflorus viscidiflorus</i>													
Y	88	2	-	-	-	-	-	-	2	133		2	
	95	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	2	40		2	
M	88	2	-	-	-	-	-	-	2	133	7 8	2	
	95	-	-	-	-	-	-	-	-	0	17 25	0	
	97	17	-	-	-	-	-	-	17	340	10 12	17	
	00	4	9	-	-	-	-	-	13	260	11 8	13	
D	88	2	-	-	-	-	-	-	2	133		2	
	95	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'88		00%			00%			00%					
'95		00%			00%			00%					
'97		00%			00%			00%		- 6%			
'00		56%			00%			06%					
Total Plants/Acre (excluding Dead & Seedlings)										'88	399	Dec:	33%
										'95	0		0%
										'97	340		0%
										'00	320		6%
<i>Gutierrezia sarothrae</i>													
Y	88	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	1	20		1	
M	88	4	-	-	-	-	-	-	4	266	6 7	4	
	95	10	-	-	-	-	-	-	10	200	7 12	10	
	97	11	-	-	-	-	-	-	11	220	6 7	11	
	00	-	-	-	-	-	-	-	-	0	- -	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'88		00%			00%			00%		-25%			
'95		00%			00%			00%		+ 9%			
'97		00%			00%			00%		-91%			
'00		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'88	266	Dec:	-
										'95	200		-
										'97	220		-
										'00	20		-

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100	-	5	
	00	5	-	-	-	-	-	1	-	-	5	-	1	-	120	-	6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'97		00%			00%			00%			+ 0%							
'00		00%			00%			17%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'97	120		-			
												'00	120		-			
Opuntia spp.																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	6	
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	8	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	11	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	-	-	1	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+ 0%							
'97		00%			00%			00%			+71%							
'00		00%			00%			14%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'95	40		0%			
												'97	40		0%			
												'00	140		14%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	4
	'00	2	1	-	-	-	-	1	-	-	4	-	-	-	80	-	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'95		00%			00%			00%									
'97		00%			00%			00%			+20%						
'00		20%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'95	0		-			
											'97	80		-			
											'00	100		-			
Purshia tridentata																	
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	'88	-	3	3	-	-	-	-	-	-	6	-	-	-	400	9 26	6
	'95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	13 34	5
	'97	3	3	2	1	2	-	-	-	-	11	-	-	-	220	14 27	11
	'00	5	1	1	-	3	2	-	-	-	12	-	-	-	240	12 33	12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		50%			50%			00%			-75%						
'95		00%			00%			00%			+64%						
'97		36%			14%			00%			-14%						
'00		33%			25%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	400	Dec:	-			
											'95	100		-			
											'97	280		-			
											'00	240		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
S	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	'97	5	-	-	3	-	-	-	-	-	8	-	-	-	160		8	
	'00	11	1	-	3	-	-	6	-	-	21	-	-	-	420		21	
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	20	2	-	1	-	-	-	-	-	23	-	-	-	460	20	34	23
	'97	16	7	2	2	-	-	-	-	-	27	-	-	-	540	15	27	27
	'00	16	2	-	3	3	1	4	-	-	29	-	-	-	580	17	27	29
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		08%			00%			00%			+29%							
'97		20%			06%			00%			+33%							
'00		12%			02%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'95	500		0%				
											'97	700		0%				
											'00	1040		4%				

Trend Study 10-8-00

Study site name: Black Horse .

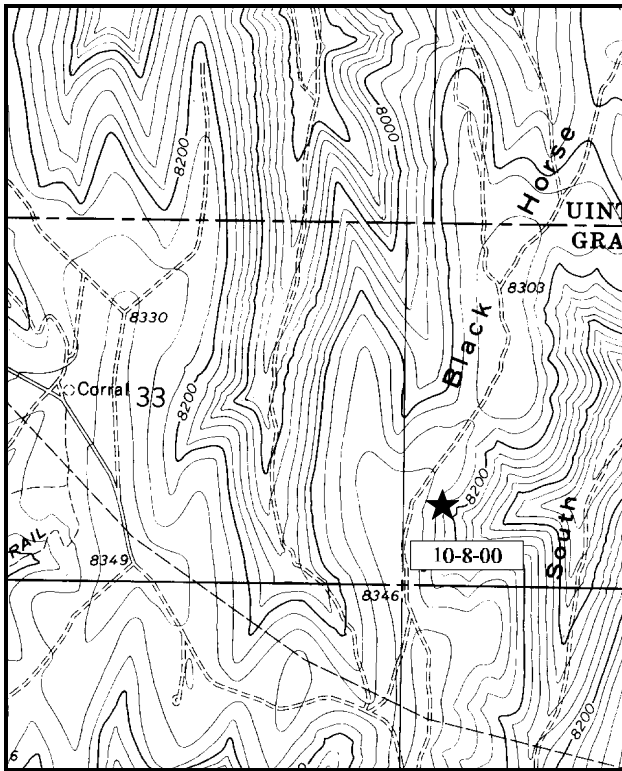
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 21°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft*), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). **Belt 1 centered at 40 feet.

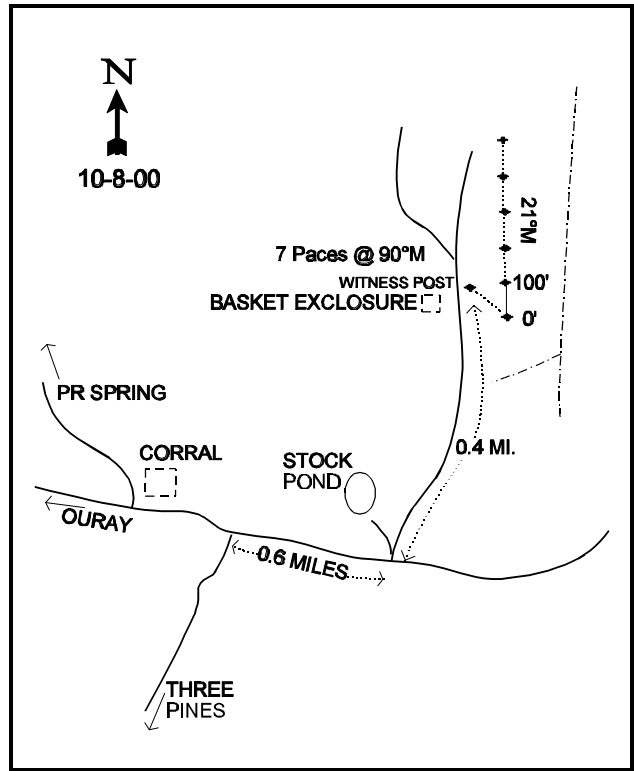
LOCATION DESCRIPTION

At a point 0.6 miles southeast of the intersection of the Seep Ridge road and the Book Cliff Summit road, a road turns north off the divide road and heads up Black Horse Ridge. Go up this road 0.4 miles to a witness post on the right side of the road. The study site is on the east slope of the ridge. From the witness post, walk 7 paces bearing 90°M to the 0-foot baseline stake. The baseline stake has browse tag #9039 attached. The frequency baseline runs parallel to the road. Study markers are 18" green metal fenceposts.



Map Name: PR Spring

Township 15 1/2S, Range 24E, Section 34



Diagrammatic Sketch

UTM. 4368403.474 N, 649407.220 E

DISCUSSION

Trend Study No. 10-8 (16A-8)

The Black Horse trend study is located near the Book Cliffs summit in the mountain brush type which is used by deer and elk as summer range. The study is just below the ridge, on a northeast facing, gentle slope at an elevation of 8,300 feet. This is one of the highest elevation trend studies on the unit. There are small stands of aspen and conifers in the drainages, but the dominant vegetation is scrub oak and associated mountain brush. Deer are commonly observed in the area. Cattle graze the ridge on a rotational deferred system between June and September. Pellet group transect data in 2000 estimate moderate use by deer (57 deer days use/acre, 141 ddu/ha), light use by elk (22 elk days use/acre, 54 edu/ha), and light use by cattle (4 cow days use/acre, 10 cdu/ha).

The soils are in the Seeprid-Utso loam complex. These soils typically are moderately deep and well-drained. On the study site, there appears to be a compacted clay horizon under 4-6 inches of loose, stony surface loam. This clay layer is quite variable as it was sampled as deep as 15 inches below the surface. Run-off and pedestaling occurs in open grazed areas and on steeper areas, but overall the vegetative cover is adequate to control most excessive erosion. This soil is grouped into the Mountain Stony Loam (Browse) ecological site, indicating a potential plant community of 30% grass, 10% forbs and 60% shrubs (composition by air-dry weight). Effective rooting depth is estimated at just over 13 inches with soil temperature averaging 49°F at nearly 15 inches in depth. Percent organic matter is quite high at 4.4% with soil reaction being neutral (pH of 6.8).

This mixed mountain brush community is composed of a variety of valuable shrubs. Large serviceberry and clones of Gambel oak are the primary overstory species. Mature serviceberry average over 4 feet in height with some individuals being over 5 feet in height. These shrubs are vigorous with the majority of the plants showing only light to moderate hedging in all years sampled. The prevalence of rust on the leaves led to a poor vigor classification for 22% of the plants in 1988. Vigor has since improved on most of the population. The population has remained fairly stable over all sampling years with 2,660 plants/acre being estimated in 2000. Recruitment from the young age class was extremely high in 1988 (94% of the population) and 1995 (65% of the population). Currently, recruitment is moderately high at 26%. The population appears to be stabilizing with two-thirds of the population being mature. In 2000, oak density was estimated at 4,580 stems/acre. The difference in 1995 and 2000 density estimates may be that individual patches were counted in 1995, whereas individual stems were counted in 2000. Currently, the young age class makes up 73% of the population pointing to an increasing population in the future. Use is mostly light and vigor is good, with mature plants averaging nearly 5 feet in height in 2000.

Other preferred browse species include: mountain big sagebrush, bitterbrush, true mountain mahogany, chokecherry, and snowberry. Of these species, most mahogany and bitterbrush are the heavily utilized. In 1988, only one mahogany was sampled. It was classified as decadent and heavily utilized. The new much larger sample design used in 1995, estimated an average of 1,140 plants/acre in 1995 and 1,160 plants/acre in 2000. The larger sampling design gives much better estimates for species with discontinuous and/or clumped distributions. Use is currently ('00) mostly moderate (40%) with an additional 19% displaying heavy use. Currently, all individuals sampled have good vigor although several individuals were noted as having insect damage. Mahogany looks to increase in the future with 45% of the population being young plants. Mature plants average over 3 feet in height and crown. Bitterbrush are uncommon, currently ('00) estimated at 240 plants/acre. Half of the population shows moderate or heavy use in 2000, with good vigor and no decadency. Snowberry and mountain big sagebrush provide the most browse cover of all species at Black Horse. Snowberry contributed 33% of the browse cover in 1995, decreasing to 26% in 2000. Mountain big sagebrush contributed 24% of the total browse cover in 1995, decreasing to 21% in 2000. Snowberry is currently estimated at 5,720

plants/acre, with sagebrush being estimated at 1,980 plants/acre. These species were mostly unutilized in 1988, but during the 1995 reading, both species displayed some moderate use. Use on sagebrush in 2000 slightly increased with 22% of the population displaying moderate use and an additional 8% showing heavy use. Use on snowberry remains nearly the same with 15% of the population displaying moderate use in 2000, an increase from 11% in 1995. Sagebrush plants are large and vigorous, although a majority were classified as decadent in 1988. With the improved sample implemented in 1995, percent decadency was estimated at 2% in 1995, and 11% in 2000.

Since the area is primarily summer range, herbaceous forage is especially important. Herbaceous vegetation is fairly abundant with grasses providing around 16% average cover in 1995 and 2000. Forbs are also moderately abundant and contribute about 10% average cover in 1995 and 2000. Combined, herbaceous species provide approximately 40% of the total vegetative cover in 1995 and 2000. Due to the abundance of browse at this site, herbaceous vegetation is somewhat suppressed and could increase with a reduction in browse density and cover. Most grasses were at least moderately utilized by cattle during the 1988 reading. Utilization was light, if any, in 2000. The most numerous species are a sedge, thickspike wheatgrass, Kentucky bluegrass, Lettermen needlegrass, and mutton bluegrass. The sedge is especially abundant, accounting for 59% of the total grass cover in 1995 and 2000. Sum of nested frequency for grasses has slightly increased during all sampling periods.

Forbs comprised 16% of the total vegetative cover in 1995, decreasing to 14% in 2000. Thirty-four species were encountered in 1995, and 28 in 2000. The drought during the spring and summer of 2000 undoubtedly decreased the presence of forbs as sum of nested frequency substantially decreased in 2000. Weedy milkvetch, ballhead sandwort, mat penstemon, and Eaton fleabane are currently ('00) the most abundant. Several valuable forb species occur on the site including Pacific aster, arrowleaf balsamroot, penstemon, Indian paintbrush, and sulfur buckwheat.

1988 APPARENT TREND ASSESSMENT

Basal vegetative cover accounts for 12% of the basic ground cover. Litter cover (55.5%) was found only in association with the shrubs. Rock and pavement cover combined for about 10%. Percent bare ground was at almost 23%. Soil trend appears stable. Browse trend also appears stable. The most preferred browse species including true mountain mahogany and antelope bitterbrush occur in low numbers and are heavily utilized. Snowberry, mountain big sagebrush, and serviceberry showed light to moderate hedging and appear to have stable to expanding populations. The herbaceous trend appears stable.

1995 TREND ASSESSMENT

Percent bare ground has declined considerably since the last reading from almost 23% to 11%. Soil trend is considered slightly improving. The browse trend is slightly up with many of the preferred species displaying lighter utilization, improved vigor, and low decadency rates. Density numbers for many of the shrubs are different due to the larger sample size giving much better population estimates for the shrubs. Trend for grasses and forbs is stable. Sum of nested frequency of grasses increased slightly with significant increases for sedge and Kentucky bluegrass. Sum of nested frequency of forbs remained about the same.

TREND ASSESSMENT

soil - stable to slightly improving (4)

browse - slightly up (4)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics remain relatively stable compared to 1995 estimates. The ratio of protective ground cover to bare soil is very good with minimal erosion. Trend for the key browse species, serviceberry and true mountain mahogany, is stable. Serviceberry and mahogany show stable densities, high recruitment, low decadency, and good vigor. Use on these preferred species is not as extreme as is sometimes the case. Mountain big sagebrush provides additional palatable forage, although this species is not considered the key species on summer range, and is less preferred compared to mahogany, serviceberry, and low densities of bitterbrush on the site. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses slightly increased while that of forbs decreased. Combined, sum of nested frequency of perennial species slightly decreased, but not enough to warrant a downward trend.

TREND ASSESSMENT

soil - stable (3)

browse - stable for the key species (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 8

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
G	Agropyron cristatum	-	-	6	-	-	2	-	.03
G	Agropyron dasystachyum	ab108	a103	b128	47	35	52	1.58	1.92
G	Bromus anomalus	b71	b67	a27	30	24	11	.95	.23
G	Bromus tectorum (a)	-	3	-	-	1	-	.00	-
G	Carex spp.	215	234	235	77	80	79	9.30	9.65
G	Koeleria cristata	a-	a3	b15	-	1	6	.00	.27
G	Phleum pratense	-	-	7	-	-	2	-	.30
G	Poa fendleriana	35	29	40	14	9	14	1.18	.46
G	Poa pratensis	39	54	63	16	18	21	1.74	2.42
G	Sitanion hystrix	a3	b13	ab6	1	7	2	.28	.03
G	Stipa lettermani	a4	a23	b62	2	11	22	.70	1.13
Total for Annual Grasses		0	3	0	0	1	0	0.00	0
Total for Perennial Grasses		475	526	589	187	185	211	15.76	16.47
Total for Grasses		475	529	589	187	186	211	15.76	16.47
F	Achillea millefolium	a15	b44	ab30	6	17	14	.60	.19
F	Agoseris glauca	a-	a3	b26	-	1	13	.00	.19
F	Androsace septentrionalis (a)	-	1	3	-	1	1	.00	.00
F	Arabis spp.	-	-	6	-	-	3	-	.21
F	Arenaria congesta	b141	ab104	a74	54	39	31	1.27	.65
F	Artemisia ludoviciana	4	-	-	2	-	-	-	-
F	Aster chilensis	b89	a51	a29	38	22	12	.45	.21

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
F	<i>Astragalus miser</i>	78	95	112	40	35	46	3.54	4.46
F	<i>Balsamorhiza sagittata</i>	_b 79	_a 18	_a 21	35	11	9	.73	.66
F	<i>Castilleja flava</i>	_b 27	_a 6	_{ab} 17	15	3	8	.01	.09
F	<i>Calochortus nuttallii</i>	_a -	_b 7	_{ab} 3	-	5	1	.05	.00
F	<i>Chenopodium</i> spp. (a)	-	3	-	-	1	-	.00	-
F	<i>Cirsium</i> spp.	28	23	11	13	12	9	.41	.37
F	<i>Comandra pallida</i>	_b 120	_a 37	_a 18	50	19	7	.17	.09
F	<i>Collinsia parviflora</i> (a)	-	4	-	-	2	-	.01	-
F	<i>Crepis acuminata</i>	_a 3	_b 48	_b 29	2	19	13	.26	.26
F	<i>Cymopterus</i> spp.	_a -	_a -	_b 8	-	-	4	-	.09
F	<i>Delphinium bicolor</i>	_a -	_b 8	_a -	-	4	-	.03	-
F	<i>Eriogonum alatum</i>	-	-	1	-	-	1	-	.00
F	<i>Erigeron eatonii</i>	_a -	_c 101	_b 47	-	41	22	.67	.28
F	<i>Erigeron flagellaris</i>	_c 53	_a -	_b 25	25	-	11	-	.32
F	<i>Eriogonum umbellatum</i>	_b 20	_b 36	_a 6	11	17	2	.24	.03
F	<i>Gayophytum ramosissimum</i> (a)	-	8	-	-	3	-	.04	-
F	<i>Gilia</i> spp. (a)	-	2	-	-	1	-	.00	-
F	<i>Hymenoxys acaulis</i>	-	8	1	-	3	1	.04	.03
F	<i>Ipomopsis aggregata</i>	2	-	-	2	-	-	-	-
F	<i>Lathyrus brachycalyx</i>	_a -	_b 14	_b 21	-	6	9	.60	.34
F	<i>Linum lewisii</i>	-	3	7	-	1	3	.01	.04
F	<i>Lomatium</i> spp.	_a -	_b 7	_{ab} 4	-	4	2	.02	.06
F	<i>Lupinus argenteus</i>	_{ab} 3	_b 11	_a -	1	5	-	.12	-
F	<i>Oenothera</i> spp.	2	-	-	1	-	-	-	-
F	<i>Penstemon caespitosus</i>	61	43	57	28	19	26	.21	.47
F	<i>Pedicularis centranthera</i>	_a -	_b 8	_a -	-	4	-	.10	-
F	<i>Penstemon pachyphyllus</i>	3	6	2	1	3	1	.04	.00
F	<i>Phlox longifolia</i>	_{ab} 37	_b 41	_a 20	17	20	8	.15	.04
F	<i>Polygonum douglasii</i> (a)	-	_b 28	_a -	-	13	-	.14	-
F	<i>Senecio integerrimus</i>	-	3	2	-	2	1	.03	.00
F	<i>Taraxacum officinale</i>	_a 1	_c 36	_b 12	1	18	9	.26	.09
F	<i>Tragopogon dubius</i>	3	-	-	1	-	-	-	-
F	Unknown forb-annual (a)	-	3	-	-	1	-	.00	-
F	Unknown forb-perennial	5	8	-	3	4	-	.04	-
F	<i>Viguiera multiflora</i>	3	15	4	1	6	2	.13	.01
Total for Annual Forbs		0	49	3	0	22	1	0.21	0.00
Total for Perennial Forbs		777	784	593	347	340	268	10.28	9.26
Total for Forbs		777	833	596	347	362	269	10.49	9.27

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 8

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Amelanchier alnifolia</i>	43	55	3.55	4.26
B	<i>Artemisia tridentata vaseyana</i>	31	56	9.49	8.51
B	<i>Cercocarpus montanus</i>	27	30	4.30	4.50
B	<i>Chrysothamnus depressus</i>	5	4	.01	-
B	<i>Chrysothamnus nauseosus</i>	0	1	-	-
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	68	71	3.51	2.12
B	<i>Gutierrezia sarothrae</i>	4	8	.19	.10
B	<i>Mahonia repens</i>	25	43	1.05	2.43
B	<i>Opuntia spp.</i>	2	2	-	-
B	<i>Prunus virginiana</i>	8	9	.51	.33
B	<i>Purshia tridentata</i>	3	8	.68	1.03
B	<i>Quercus gambelii</i>	10	44	2.83	6.07
B	<i>Rosa woodsii</i>	2	1	.18	.00
B	<i>Symphoricarpos oreophilus</i>	75	86	13.24	10.39
B	<i>Tetradymia canescens</i>	3	4	.00	.15
Total for Browse		306	422	39.60	39.93

CANOPY COVER --
Herd unit 10 , Study no: 8

Species	Percent Cover '00
<i>Amelanchier alnifolia</i>	2
<i>Quercus gambelii</i>	2

BASIC COVER --
Herd unit 10 , Study no: 8

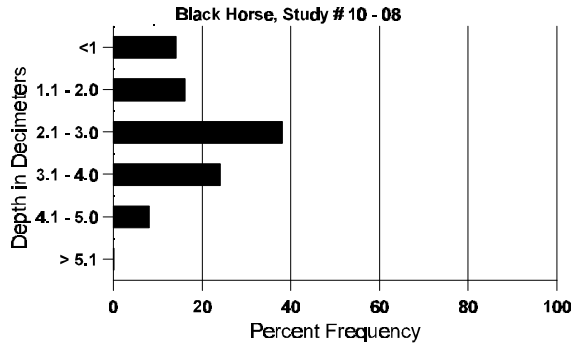
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'88	'95	'00
Vegetation	373	372	11.75	55.30	61.88
Rock	139	96	4.25	6.09	4.62
Pavement	51	114	6.00	.51	1.54
Litter	390	381	55.50	53.79	56.37
Cryptogams	9	3	0	.07	.00
Bare Ground	176	178	22.50	10.82	12.18

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 8, Study Name: Black Horse

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
13.23	48.6 (14.80)	6.8	26.0	33.4	40.6	4.4	10.8	252.8	0.8

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 8

Type	Quadrat Frequency	
	'95	'00
Rabbit	5	13
Elk	-	4
Deer	19	16
Cattle	6	-

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
52	N/A
287	22 (54)
740	57 (141)
44	4 (10)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 8

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total						
		1	2	3	4		1	2							
<i>Amelanchier alnifolia</i>															
S	88	5	-	-	2	-	-	-	-	7	-	-	466		7
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	2	-	-	5	-	-	8	-	-	160	
Y	88	41	5	3	2	-	-	-	-	42	-	9	3400		51
	95	32	4	-	25	17	-	-	-	78	-	-	1560		78
	00	25	-	-	4	3	-	3	-	35	-	-	700		35
M	88	-	-	1	-	-	-	-	-	-	-	1	66	54 55	1
	95	21	9	2	3	4	-	-	-	39	-	-	780	44 34	39
	00	40	-	3	18	12	10	1	2	86	-	-	1720	51 36	86
D	88	1	-	1	-	-	-	-	-	-	-	2	133		2
	95	2	-	1	-	-	-	-	-	2	-	-	60		3
	00	4	-	1	-	2	1	-	-	5	2	4	240		12
X	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	60		3
	00	-	-	-	-	-	-	-	-	-	-	-	100		5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>				
'88		09%			09%			22%			-33%				
'95		28%			03%			.83%			+10%				
'00		13%			14%			04%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	3599	Dec:	4%		
										'95	2400		3%		
										'00	2660		9%		
<i>Artemisia tridentata vaseyana</i>															
S	88	2	-	-	-	-	-	-	-	2	-	-	133		2
	95	6	-	-	-	-	-	-	-	6	-	-	120		6
	00	12	-	-	-	-	-	-	-	12	-	-	240		12
Y	88	2	-	-	-	-	-	-	-	2	-	-	133		2
	95	12	1	-	-	-	-	-	-	13	-	-	260		13
	00	13	2	-	1	-	-	-	-	16	-	-	320		16
M	88	7	-	-	-	-	-	-	-	7	-	-	466	34 31	7
	95	33	10	-	1	-	-	-	-	42	-	2	880	29 40	44
	00	44	14	8	3	3	-	-	-	72	-	-	1440	29 36	72
D	88	11	-	-	-	-	-	-	-	10	1	-	733		11
	95	1	-	-	-	-	-	-	-	1	-	-	20		1
	00	7	3	-	1	-	-	-	-	10	-	-	220		11
X	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	60		3
	00	-	-	-	-	-	-	-	-	-	-	-	100		5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>				
'88		00%			00%			00%			-13%				
'95		19%			00%			03%			+41%				
'00		22%			08%			01%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	1332	Dec:	55%		
										'95	1160		2%		
										'00	1980		11%		

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	-	-	1	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	12	7	-	2	-	-	-	-	-	21	-	-	-	420		21	
	00	7	11	-	5	3	-	-	-	-	16	10	-	-	520		26	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	4	23	4	2	1	-	-	-	2	36	-	-	-	720	44	49	
	00	7	1	2	4	7	8	1	-	-	30	-	-	-	600	41	37	
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	1	-	-	-	1	-	-	-	2	-	-	-	40		2	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			100%			00%			+94%							
'95		54%			11%			00%			+ 2%							
'00		40%			19%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	100%			
												'95	1140		0%			
												'00	1160		3%			
Chrysothamnus depressus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	4	1	-	-	-	-	-	-	-	5	-	-	-	100	4	7	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	14	5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		17%			00%			00%			+25%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	120		-			
												'00	160		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus nauseosus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	20		-			
Chrysothamnus viscidiflorus lanceolatus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	95	66	-	-	-	-	-	-	-	-	66	-	-	-	1320		66	
	00	13	-	-	3	-	-	-	-	-	16	-	-	-	320		16	
M	88	43	-	-	1	-	-	-	-	-	44	-	-	-	2933	14	9	44
	95	160	-	-	7	-	-	-	-	-	167	-	-	-	3340	12	14	167
	00	190	19	-	15	-	-	6	-	-	230	-	-	-	4600	15	16	230
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	1	-	-	-	-	-	-	-	3	-	-	1	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%			+11%							
'95		00%			00%			00%			+ 7%							
'00		08%			00%			.40%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	4133	Dec:	0%			
												'95	4660		0%			
												'00	5000		2%			
Gutierrezia sarothrae																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
	00	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200	6	7	10
	00	37	-	-	-	-	-	-	-	-	37	-	-	-	740	6	6	37
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			+71%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	300		-			
												'00	1020		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
S	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	0		-			
Mahonia repens																		
Y	'88	24	-	-	-	-	-	1	-	-	25	-	-	-	1666		25	
	'95	73	-	-	15	-	-	-	-	-	88	-	-	-	1760		88	
	'00	13	-	-	4	-	-	2	-	-	19	-	-	-	380		19	
M	'88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	10	6	8
	'95	49	-	-	21	3	-	-	-	-	73	-	-	-	1460	3	5	73
	'00	184	-	-	78	-	-	33	-	-	269	-	26	-	5900	3	6	295
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%			+32%							
'95		02%			00%			00%			+49%							
'00		00%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	2199	Dec:	-			
												'95	3220		-			
												'00	6280		-			
Opuntia spp.																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	9	3
	'00	1	-	-	1	-	-	-	-	-	2	-	-	-	40	4	8	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%			-33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
												'00	40		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Prunus virginiana</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	10	-	-	3	-	-	-	-	-	13	-	-	-	260		13	
Y	88	2	2	-	4	-	-	4	-	-	12	-	-	-	800		12	
	95	33	-	-	-	-	-	-	-	-	33	-	-	-	660		33	
	00	26	-	-	5	-	-	7	-	-	38	-	-	-	760		38	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	10	11	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	19	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		17%			00%			00%			-10%							
'95		00%			00%			00%			+ 5%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	800	Dec:	-			
												'95	720		-			
												'00	760		-			
<i>Purshia tridentata</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	2	-	-	-	-	-	-	2	-	-	-	133	7	15	
	95	3	-	-	1	-	-	-	-	-	4	-	-	-	80	8	23	
	00	6	2	-	-	-	1	-	-	2	11	-	-	-	220	10	29	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			67%			00%			-60%							
'95		00%			00%			00%			+67%							
'00		25%			25%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	-			
												'95	80		-			
												'00	240		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Quercus gambelii																		
S	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	53	12	-	1	-	-	-	-	-	65	-	1	-	4400			66
	95	9	-	1	-	-	-	-	-	-	10	-	-	-	200			10
	00	108	8	-	39	-	-	11	-	-	166	-	-	-	3320			166
M	88	2	1	-	5	-	-	-	1	-	9	-	-	-	600	70	56	9
	95	5	9	-	-	-	-	-	-	-	14	-	-	-	280	57	64	14
	00	39	-	-	8	2	-	-	6	-	55	-	-	-	1100	59	41	55
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	2	-	1	2	-	-	-	-	5	-	1	2	160			8
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	280			14
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		17%			00%			01%			-91%							
'95		38%			04%			00%			+90%							
'00		06%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	5066	Dec:	1%			
												'95	480		0%			
												'00	4580		3%			
Rosa woodsii																		
Y	88	16	-	-	-	-	-	-	-	-	15	-	1	-	1066			16
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	4	-	-	-	-	-	-	-	-	3	-	1	-	266	16	10	4
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	5	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			10%			-97%							
'95		00%			00%			00%			-50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	1332	Dec:	-			
												'95	40		-			
												'00	20		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
S	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
	00	9	-	-	1	-	-	-	-	-	10	-	-	-	200		10	
Y	88	63	-	-	1	-	-	-	-	-	41	-	23	-	4266		64	
	95	47	6	-	16	5	-	-	-	-	74	-	-	-	1480		74	
	00	13	-	-	1	-	-	-	-	-	14	-	-	-	280		14	
M	88	28	-	-	-	-	-	-	-	-	7	-	21	-	1866	15 12	28	
	95	157	17	2	23	1	-	-	-	-	200	-	-	-	4000	17 27	200	
	00	171	32	-	51	9	-	8	-	-	271	-	-	-	5420	14 23	271	
D	88	2	-	-	-	-	-	-	-	-	-	-	2	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20		1	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			49%			-13%							
'95		11%			.72%			00%			+ 4%							
'00		15%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	6265	Dec:	2%			
												'95	5480		0%			
												'00	5720		0%			
Tetradymia canescens																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	2	-	-	1	1	-	-	-	-	4	-	-	-	80	14 12	4	
	00	-	-	-	5	-	-	-	-	-	5	-	-	-	100	15 9	5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+18%							
'95		25%			00%			00%			+33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	80		-			
												'00	120		-			

Trend Study 10-9-00

Study site name: Agency Draw .

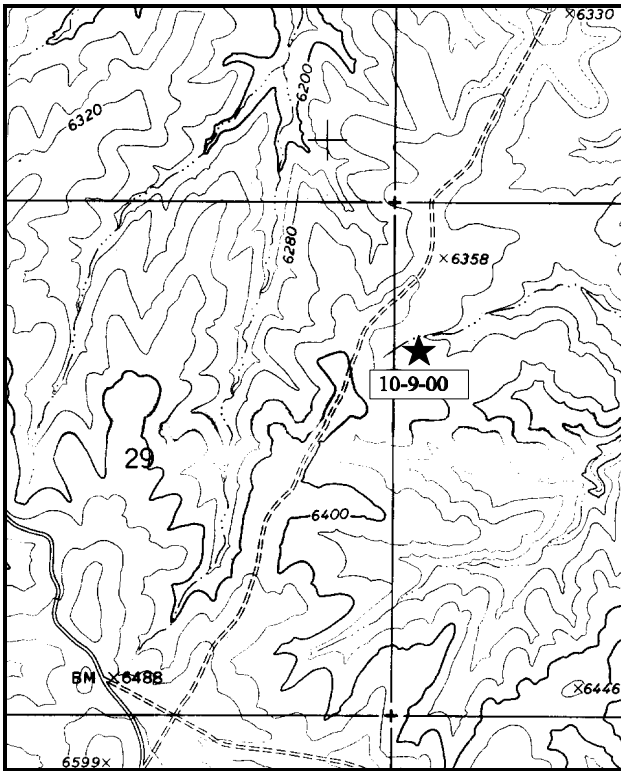
Range type: Desert Shrub .

Compass bearing: frequency baseline 45°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

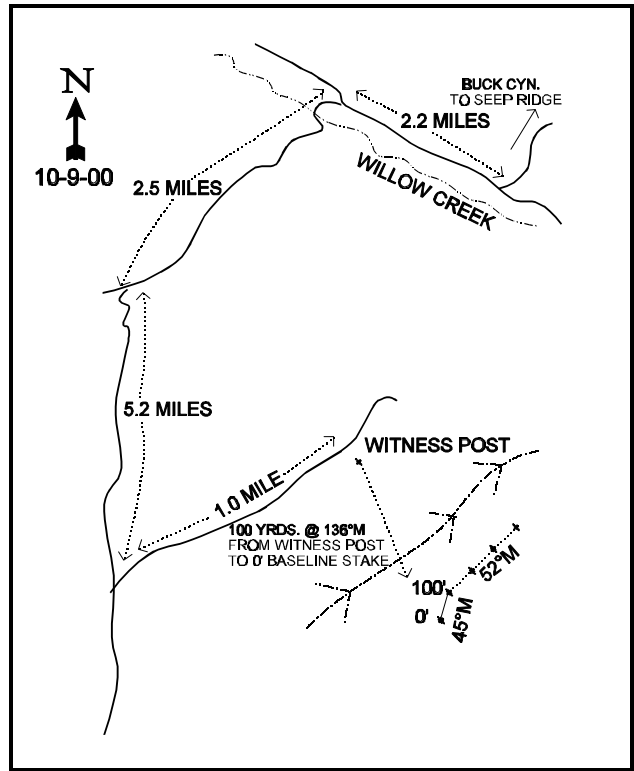
LOCATION DESCRIPTION

From the Seep Ridge Road, go down Buck Canyon to Willow Creek. Travel north down Willow Creek 2.2 miles to a fork. Bear left, cross Willow Creek then drive up out of the canyon 2.5 miles to a fork. Bear left. Continue 5.2 miles to an intersection. Turn left off the main road. Go down 0.1 miles to a small flat. Continue going straight (NE) down the ridge 0.9 miles to a witness post on the right side of the road. Walk 100 yards down into the draw, at a bearing of 136°. The 0-foot baseline stake is marked with a red browse tag, #9040. The frequency baseline is marked by green fenceposts, 12-18 inches in height.



Map Name: Agency Draw NE

Township 13S, Range 21E, Section 28



Diagrammatic Sketch

UTM. 4390832.556 N, 621735.983 E

DISCUSSION

Trend Study No. 10-9 (16A-9)

Actually located in the Willow Creek drainage, the Agency Draw study is representative of the big sagebrush and desert shrub communities found throughout the area. At 6,300 feet in elevation, Agency Draw is the lowest established site on the northern Book Cliffs and is managed by the BLM. The area has been grazed in the winter by cattle from January 1 to March 31. This is important winter range for deer and judging by the abundance of pellet groups, they spend most of their time in the draws. There has been abundant sign of winter use by sage grouse in the past, with a few birds being observed on an adjacent ridge at the time of study establishment in 1988. A small herd of elk has also been observed in the area. Pellet group transect data from 2000 estimate 49 deer days use/acre (121 ddu/ha) and 11 elk days use/acre (27 edu/ha). In addition, wild horses appear to be frequenting the area as 38 piles of horse droppings were sampled in the pellet transect in 2000. Several stud piles were also seen along the road to the site. No cattle pats were sampled in 2000.

The study site is located in the relatively flat bottom at the head of a draw. Drainage, via a three-foot deep gullied wash, is to the northeast on a 7% slope. Tall black greasewood and basin big sagebrush grow along the wash. The surrounding low ridges are occupied by pinyon- juniper, and black sagebrush.

The site occurs between the deep saline soil along the wash and the shallow, very rocky soil on the ridges. The soil on the study site is a shallow, stony clay loam. Limitations are the low annual precipitation (<10 inches) and the shallow, rocky soils which allow rapid runoff. Soil loss from the slopes and wash are evident with moderate pedestaling being noted around base of shrubs in 2000. Over most of the study site however, the vegetative cover helps keep erosion at low levels. The soil is light brown in color and quite variable in depth. Effective rooting depth is estimated at 16 inches, with a hard pan being present at about 9 inches in depth. A profile stoniness index estimated from penetrometer readings shows the majority of rock to be in the upper portion of the profile, but a few readings were near 36 inches in depth. Average soil temperature is 59°F at just over 17 inches. The soil is slightly alkaline (pH of 7.7) and low in phosphorus (4.1 ppm) where 10 ppm has been shown necessary for normal plant growth and development.

Shrubs are the visually dominant class of plants for this community. The key browse species includes Wyoming big sagebrush, black sagebrush, and shadscale. Fourwing saltbush and winterfat are both present, but each provide less than one percent average cover. All key species combined provide over 60% of the total browse cover in both 1995 and 2000. All provide winter forage, although winterfat may be unavailable due to snow depth in some years. Wyoming big sagebrush is the most abundant browse species in density, currently estimated at 2,760 plants/acre. Age class analysis indicates a stable to slightly increasing population with 40% mature, 35% young, and 25% decadent. Thirty-seven percent of the decadent plants were classified as dying in 2000. Percent decadency increased from 10% in 1995 to 25% in 2000. Use also increased to a mostly moderate level with 41% of the population displaying moderate use and an additional 17% showing heavy use. Wyoming big sagebrush showing poor vigor increased from 2% in 1995 to 12% in 2000. Black sagebrush is present at a low density, estimated at 1,280 plants/acre in 1995, and 1,120 plants/acre in 2000. In 1988, 40% of the black sagebrush displayed heavy use, decreasing to 6% in 1995 and 2% in 2000. Moderate use on black sagebrush is currently at 38%, a decrease from a high of 64% in 1995. Percent decadency increased from 9% in 1995 to 32% in 2000. Poor vigor also slightly increased to 11% in 2000, up from 6% in 1995. Recruitment from young plants is moderate at 16%. Increases in decadency and poor vigor for Wyoming big sagebrush and black sagebrush can be attributed in part to the drought experienced statewide in 2000.

Shadscale was estimated at 1,840 plants/acre in 1995, slightly decreasing to 1,600 plants/acre in 2000. Use is mostly light on this species, although 10% of the population shows heavy use. Poor vigor is currently estimated on 13% of the population, with percent decadency increasing from 25% in 1995 to 33% in 2000. Recruitment is

moderately low at 8%. Winterfat shows a stable population of 1,780 plants/acre in 1995 and 1,740 plants/acre in 2000. Use is mostly light, but 17% of the population currently ('00) shows heavy use. Plants classified as decadent and having poor vigor are low at 6% and 3% respectively.

Herbaceous plants composed 51% of the total vegetative cover in 1995 with most of this coming from grasses. Herbaceous cover decreased to 30% in 2000 with most of this loss in herbaceous cover being due to the lack of cheatgrass due to the drought. Cheatgrass contributed nearly 12% average cover and had a quadrat frequency of 63 in 1995. In 2000, cheatgrass provides less than 1% average cover and decreased in quadrat frequency from 63% to 37%. Perennial grasses are moderately low at this site. Thickspike wheatgrass is the most abundant and provides 50% of the grass cover in 2000. It was sampled in 47 of the 100 quadrats. Other species include: Sandberg bluegrass, Indian ricegrass, squirreltail, and needle-and-thread. Sum of nested frequency slightly declined in 2000 for perennial grasses. Forbs are fairly diverse, yet infrequent. Eighteen species were sampled in 1995, producing only 1.5% total cover. Thirteen species were sampled in 2000 with these species providing less than 1% total cover. Long-leaf phlox is the most abundant forb. In addition to cheatgrass, annual forbs also virtually disappeared in 2000 due to the drought.

1988 APPARENT TREND ASSESSMENT

The ephemeral cheatgrass was counted as litter in 1988 leading to the high value of 60%. Basal vegetative cover was low at 2.5%. Pavement cover was 2.5% and variable over the site. Percent bare ground was 33%. Erosion does not currently appear to be a problem on the site. The key browse species, black sagebrush and Wyoming big sagebrush, appear to have stable populations. Use is heavy but decadency rates are low and vigor is generally good. Composition of the understory is poor and dominated by annuals. Only 5 species of perennial grasses and 4 species of perennial forbs were encountered.

1995 TREND ASSESSMENT

Litter cover values are lower because cheatgrass was classified as litter during the 1988 reading. Percent cover for pavement has increased while percent bare ground declined slightly. Some surface erosion is evident where bare ground occurs, but it is not a major problem due to the gentle terrain and the abundance of cheatgrass cover. Trend for soil is slightly improved. Trend for black sagebrush and Wyoming big sagebrush is slightly improved. Utilization of black sagebrush is lower and density has increased. Wyoming big sagebrush density has declined slightly but so has percent decadency, and utilization is not as heavy. Reproductive potential and the proportion of the population that are young plants has increased. The herbaceous understory is in poor condition and composition is far from ideal. Cheatgrass dominates the understory by providing 61% of the herbaceous cover. Annual forbs account for 63% of the forb cover with halogeton being the most common. Sum of nested frequency of perennial grasses increased slightly due to a significant increase in frequency of thickspike and slender wheatgrass. Nested frequency of perennial forbs also increased slightly. Trend is slightly up.

TREND ASSESSMENT

soil - slightly improved, but dependant on annual species for protective cover (4)

browse - slightly up (4)

herbaceous understory - slightly up, but dominated by annual cheatgrass and halogeton (4)

2000 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics appear stable with slight increases in both percent litter and bare ground, and a decrease in percent cover of vegetation. Most of the decrease in vegetative cover is a result the drastic decrease in cheatgrass due to drought. Erosion is not severe due to the gentle slope, although

some pedestaling was observed. The ratio of protective ground cover to bare soil is still high enough to warrant a stable trend for soil at this time. Trend for browse is slightly down. The key species, Wyoming big sagebrush, black sagebrush, and shadscale all show increases in percent decadency and the proportion of plants displaying poor vigor. Heavy use slightly increased on Wyoming big sagebrush in 2000. Young recruitment is moderate for shadscale (8%), moderately high for black sagebrush (16%), and very high for Wyoming big sagebrush (35%). Increases in poor vigor and decadency are likely a result of drought and should improve with normal precipitation patterns. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial species decreased slightly in 2000, but not enough to warrant a downward trend, especially in a drought year.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 9

T y P e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	a7	b110	b132	3	41	47	1.83	3.28
G	Bromus tectorum (a)	-	b209	a97	-	63	37	11.78	.77
G	Carex spp.	-	3	-	-	2	-	.01	-
G	Oryzopsis hymenoides	b114	a54	a46	49	27	21	.84	.39
G	Poa secunda	a31	c125	b88	16	54	35	1.75	.81
G	Sitanion hystrix	b85	a56	a46	35	21	18	1.13	.63
G	Stipa comata	22	23	22	9	10	10	.34	.66
Total for Annual Grasses		0	209	97	0	63	37	11.78	0.77
Total for Perennial Grasses		259	371	334	112	155	131	5.93	5.79
Total for Grasses		259	580	431	112	218	168	17.71	6.57
F	Arenaria fendleri	-	-	3	-	-	1	.00	.00
F	Astragalus spp.	a-	b13	a1	-	7	1	.06	.00
F	Astragalus utahensis	-	-	1	-	-	1	-	.00
F	Cordylanthus kingii (a)	-	5	-	-	3	-	.01	-
F	Cryptantha spp.	2	5	-	2	2	-	.03	-
F	Descurainia pinnata (a)	-	b48	a18	-	23	10	.14	.15
F	Erigeron pumilus	-	4	4	-	2	2	.01	.01
F	Haplopappus acaulis	a-	ab2	b9	-	1	5	.00	.05
F	Halogeton glomeratus (a)	-	b13	a-	-	5	-	.71	-
F	Lappula occidentalis (a)	-	b25	a5	-	10	2	.12	.06
F	Lepidium montanum	b31	b26	a-	15	11	-	.11	-
F	Machaeranthera canescens	6	2	-	3	2	-	.01	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
F	<i>Machaeranthera grindelioides</i>	a-	b7	ab4	-	3	4	.04	.02
F	<i>Penstemon</i> spp.	-	-	4	-	-	2	-	.01
F	<i>Petradoria pumila</i>	-	1	-	-	1	-	.00	-
F	<i>Phlox austromontana</i>	-	8	6	-	3	3	.04	.16
F	<i>Phlox longifolia</i>	a-	b41	b37	-	18	15	.11	.10
F	<i>Polygonum douglasii</i> (a)	-	4	-	-	1	-	.00	-
F	<i>Sphaeralcea coccinea</i>	6	4	11	3	2	4	.03	.09
F	<i>Streptanthus cordatus</i>	-	1	-	-	1	-	.00	-
F	<i>Townsendia incana</i>	a-	b12	b14	-	5	8	.05	.04
Total for Annual Forbs		0	95	23	0	42	12	1.00	0.21
Total for Perennial Forbs		45	126	94	23	58	46	0.52	0.50
Total for Forbs		45	221	117	23	100	58	1.52	0.71

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 9

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia frigida</i>	33	22	.15	.17
B	<i>Artemisia nova</i>	24	20	2.13	1.35
B	<i>Artemisia tridentata wyomingensis</i>	44	50	5.95	5.68
B	<i>Atriplex canescens</i>	0	0	.00	-
B	<i>Atriplex confertifolia</i>	54	49	3.14	3.50
B	<i>Ceratoides lanata</i>	40	36	.69	.22
B	<i>Gutierrezia sarothrae</i>	11	12	.02	.01
B	<i>Juniperus osteosperma</i>	0	1	-	-
B	<i>Opuntia</i> spp.	2	2	-	.03
B	<i>Pinus edulis</i>	0	1	-	.03
B	<i>Sarcobatus vermiculatus</i>	19	20	6.06	6.24
Total for Browse		227	213	18.17	17.24

CANOPY COVER --

Herd unit 10 , Study no: 9

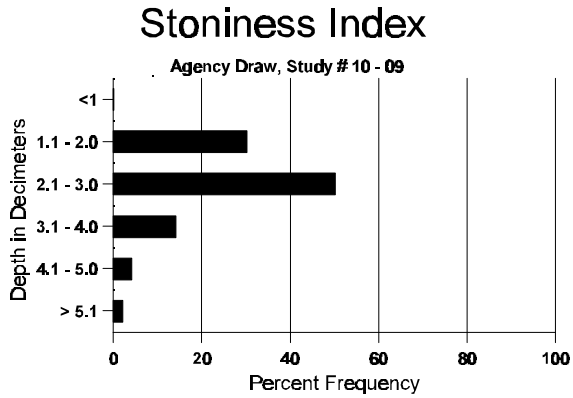
Species	Percent Cover
	'00
<i>Juniperus osteosperma</i>	.20

BASIC COVER --
Herd unit 10 , Study no: 9

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'88	'95	'00
Vegetation	339	289	2.50	36.44	26.27
Rock	174	124	.50	3.76	1.76
Pavement	242	283	2.50	8.98	11.08
Litter	382	365	60.00	33.42	39.20
Cryptogams	128	162	1.50	2.37	5.07
Bare Ground	298	320	33.00	25.00	32.34

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 9, Study Name: Agency Draw

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.22	58.8 (17.48)	7.7	29.0	40.4	30.6	1.4	4.1	329.6	0.9



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 9

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	4	10	209	N/A
Horse	5	8	331	N/A
Elk	1	3	148	11 (29)
Deer	19	29	635	49 (121)
Cattle	1	-	0	0 (0)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 9

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia frigida																	
S	88	13	-	-	-	-	-	-	-	-	13	-	-	-	866		13
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	88	21	-	-	-	-	-	-	-	-	21	-	-	-	1400		21
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8
M	88	57	-	-	-	-	-	-	-	-	57	-	-	-	3800	8 3	57
	95	43	-	-	4	-	-	-	-	-	47	-	-	-	940	11 7	47
	00	18	3	1	2	-	-	-	-	-	24	-	-	-	480	5 7	24
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-80%						
'95		00%			00%			00%			-38%						
'00		09%			03%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	5200	Dec:	0%			
											'95	1060		0%			
											'00	660		3%			
Artemisia nova																	
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	88	5	1	-	-	-	-	-	-	-	6	-	-	-	400		6
	95	5	4	-	-	-	-	-	-	-	9	-	-	-	180		9
	00	8	1	-	-	-	-	-	-	-	9	-	-	-	180		9
M	88	-	-	4	-	-	-	-	-	-	4	-	-	-	266	11 21	4
	95	12	34	3	-	-	-	-	-	-	49	-	-	-	980	15 18	49
	00	14	14	1	-	-	-	-	-	-	29	-	-	-	580	13 20	29
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	3	1	-	-	-	-	-	-	2	-	-	4	120		6
	00	7	6	-	5	-	-	-	-	-	12	-	-	6	360		18
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		10%			40%			00%			+48%						
'95		64%			06%			06%			-13%						
'00		38%			02%			11%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	666	Dec:	0%			
											'95	1280		9%			
											'00	1120		32%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
<i>Artemisia tridentata wyomingensis</i>																	
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	95	49	-	-	-	-	-	-	-	-	49	-	-	-	980		49
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9
Y	88	19	2	-	-	-	-	-	-	-	18	-	2	1	1400		21
	95	54	2	-	1	-	-	-	-	-	57	-	-	-	1140		57
	00	39	8	-	-	-	-	-	1	-	48	-	-	-	960		48
M	88	8	14	4	-	-	-	-	-	-	26	-	-	-	1733	21 25	26
	95	26	32	3	-	-	-	-	-	-	60	-	1	-	1220	21 29	61
	00	10	27	11	1	1	5	-	-	-	54	-	1	-	1100	23 30	55
D	88	4	2	5	-	-	-	-	-	-	11	-	-	-	733		11
	95	2	11	-	-	-	-	-	-	-	12	-	-	1	260		13
	00	5	16	5	2	4	2	1	-	-	19	-	3	13	700		35
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	340		17
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		31%			16%			05%			-32%						
'95		34%			02%			02%			+ 5%						
'00		41%			17%			12%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	3866	Dec:	19%			
											'95	2620		10%			
											'00	2760		25%			
<i>Atriplex canescens</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'95	0		-			
											'00	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total				
		1	2	3	4		1	2					
<i>Atriplex confertifolia</i>													
Y	88	3	-	-	-	-	-	-	3	-	3		
	95	9	-	-	-	-	-	-	9	-	9		
	00	4	-	-	2	-	-	-	6	-	6		
M	88	20	2	-	-	-	-	2	24	16	18	24	
	95	52	7	-	1	-	-	-	59	14	21	60	
	00	28	5	7	8	-	-	-	48	15	20	48	
D	88	6	-	-	-	-	-	-	6	-	-	6	
	95	20	3	-	-	-	-	-	14	-	4	23	
	00	16	2	1	6	-	-	1	16	-	10	26	
X	88	-	-	-	-	-	-	-	-	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	60	
	00	-	-	-	-	-	-	-	-	-	-	40	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		06%		00%		00%		-16%					
'95		11%		00%		11%		-13%					
'00		09%		10%		13%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	2200	Dec:	18%
										'95	1840		25%
										'00	1600		33%
<i>Ceratoides lanata</i>													
S	88	1	-	-	-	-	-	-	1	-	-	1	
	95	5	-	-	-	-	-	-	5	-	-	5	
	00	-	-	-	-	-	-	-	-	-	-	0	
Y	88	14	-	-	-	-	-	-	14	-	-	14	
	95	17	-	-	-	-	-	-	17	-	-	17	
	00	23	2	1	-	-	-	-	26	-	-	26	
M	88	2	1	-	-	-	-	-	2	6	6	3	
	95	67	4	-	-	-	-	-	71	10	9	71	
	00	28	6	14	5	-	-	3	56	11	9	56	
D	88	2	-	-	-	-	-	-	2	-	-	2	
	95	1	-	-	-	-	-	-	1	-	-	1	
	00	1	1	-	-	2	-	1	2	-	3	5	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		05%		00%		05%		+29%					
'95		04%		00%		00%		- 2%					
'00		13%		17%		03%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	1266	Dec:	11%
										'95	1780		1%
										'00	1740		6%

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4			
<i>Gutierrezia sarothrae</i>								
S	88	1	-	-	-	-	-	1
	95	12	-	-	-	-	-	12
	00	-	-	-	-	-	-	0
Y	88	-	-	-	-	-	-	0
	95	9	-	-	-	-	-	9
	00	4	-	-	-	-	-	4
M	88	12	-	-	-	-	-	12
	95	8	-	-	-	-	-	8
	00	16	-	-	-	-	-	16
D	88	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	0
	00	8	-	-	-	-	-	8
X	88	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	0
	00	-	-	-	-	-	-	20
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>			
'88		00%	00%	00%	-58%			
'95		00%	00%	00%	+39%			
'00		00%	00%	25%				
Total Plants/Acre (excluding Dead & Seedlings)				'88	800	Dec:	0%	
				'95	340		0%	
				'00	560		29%	
<i>Juniperus osteosperma</i>								
S	88	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	0
	00	-	-	1	-	-	-	20
Y	88	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	0
	00	-	-	1	-	-	-	20
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>			
'88		00%	00%	00%				
'95		00%	00%	00%				
'00		00%	00%	00%				
Total Plants/Acre (excluding Dead & Seedlings)				'88	0	Dec:	-	
				'95	0		-	
				'00	20		-	

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	3	1
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	14	1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	9	1
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-39%							
'95		00%			00%			00%			+ 0%							
'00		00%			00%			50%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'95	40		50%			
												'00	40		50%			
Pinus edulis																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Sarcobatus vermiculatus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	54	-	-	-	-	-	-	-	-	54	-	-	-	1080			54
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	54	63	1
	95	26	-	-	-	-	-	-	-	-	26	-	-	-	520	34	49	26
	00	5	-	-	23	-	-	-	-	-	28	-	-	-	560	37	54	28
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	-	-	-	2	-	-	-	-	-	1	-	-	1	40			2
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+90%							
'95		00%			00%			00%			+60%							
'00		00%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	0%				
											'95	680		6%				
											'00	1680		2%				
Sclerocactus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	3	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	0		-				
											'00	0		-				

Trend Study 10-10-00

Study site name: Sunday School #1.

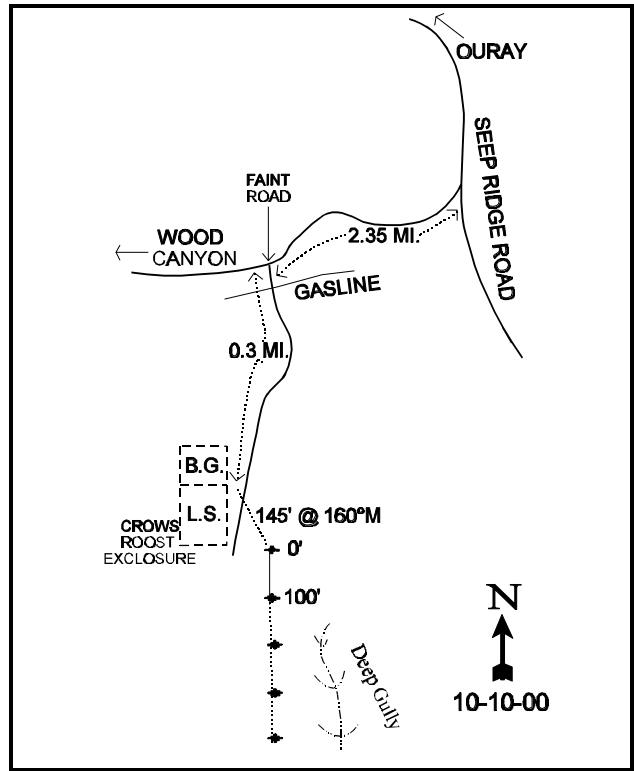
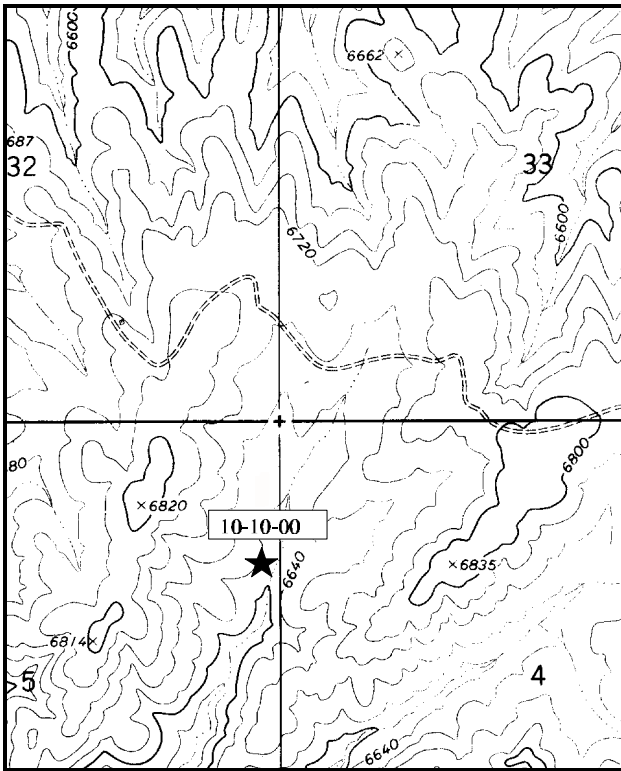
Range type: Fourwing Saltbush.

Compass bearing: frequency base line 182°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Seep Ridge Road, turn onto the Wood Canyon/Willow Creek road and proceed west 2.35 miles. Turn left onto a jeep trail and go 0.3 miles to the Crows Roost Enclosure. The study site is on the east side of the enclosure. The 0-foot baseline stake is 29 paces from the SE corner of the big game enclosure, at a bearing of 160°. The frequency baseline runs south from there, parallel to the livestock enclosure fence. The study is marked by 2-foot tall green metal fenceposts.



Map Name: Bates Knolls

Diagrammatic Sketch

Township 14S, Range 22E, Section 5

UTM. 4388016.158 N, 631433.688 E

DISCUSSION

Trend Study No. 10-10 (16A-10)

The Sunday School trend study is located in a fourwing saltbush/big sagebrush draw adjacent to the Crows Roost Enclosure on BLM land. The study site is at an elevation of 6,650 feet with a southeast aspect. The wide draw drains to the south, although the bottom of the draw is relatively flat. The allotment is used by cattle each winter with a rotational deferred system of grazing from November 1 through April 30. Few deer and elk pellet groups were encountered in 1988 and no pellet groups were found in 1995. Pellet group transect data from 2000 indicate light use by wildlife with an estimated 3 deer days use/acre (8 ddu/ha) and 20 elk days use/acre (49 edu/ha). Cattle use is estimated at 19 cow days use/acre (47 cdu/ha).

The clay loam soil on the site is moderately deep and well-drained. Soil reaction is slightly alkaline (pH of 7.7). Effective rooting depth is estimated at almost 18 inches with an average temperature of 58°F at 18 inches. A stoniness profile estimated from penetrometer readings shows the majority of rock to occur 12 inches or deeper in the profile. With the dense vegetative cover on the study site, there is very little erosion, except along cattle trails. A gully in the middle of the draw was reported to be 10 feet deep in 1988 with steep banks. In 1995, it was only about 4 feet deep with vegetation growing in the bottom. Ground cover characteristics changed somewhat in 2000 with average cover from vegetation decreasing, while cover from litter and bare ground increased. The increase in litter was slight with bare ground increasing substantially.

Fourwing saltbush and sagebrush are large and vigorous on this site. In terms of numbers however, the incredible abundance of fringed sagebrush and winterfat appeared to dominate the understory in 1988. Yet, in 1995 this was not the case with the much larger sample size and better sampling design the estimates for shrub density are much more representative for discontinuous and/or clumped shrub distributions. In 2000, fringed sagebrush is estimated at 9,660 plants/acre and winterfat is estimated at 7,380 plants/acre. The populations of both species are composed mostly of mature plants that show mostly light use and good vigor. Winterfat displays excellent growth and seed production.

In 1988 and 1995, all sagebrush were classified as basin big sagebrush. In 1988, basin big sagebrush was estimated at 200 young plants/acre. With the larger sample used in 1995, estimated density was 2,700 plants/acre. In 2000, big sagebrush was split into basin big sagebrush which is estimated at 300 plants/acre, and Wyoming big sagebrush which is estimated at 1,480 plants/acre. The basin big sagebrush is more common near the bottom of the drainage where soils are deeper. Wyoming big sagebrush becomes more dense as you move out of the drainage bottom and up the slope. The population of basin big sagebrush is mostly mature, lightly utilized plants. One third of the population had poor vigor in 2000. Mature plants average nearly 4 feet in height with a 4 foot crown. The Wyoming big sagebrush population is comprised mostly of mature plants. Percent decadency is low at 3%. Use is mostly light with 12% of the population displaying poor vigor. Average leader growth in 2000 is estimated at 5 inches.

Fourwing saltbush had an estimated density of 1,333 plants/acre in 1988, increasing to 1,860 plants/acre in 1995, and 2,200 plants/acre in 2000. Currently, fourwing saltbush provides 27% of the total browse cover. Utilization was reported as mostly light in 1988 and 1995, with 47% of the population displaying poor vigor in 1995. The stand appeared to be moving to an increasingly decadent condition in 1995 with 80% of the population being classified as decadent and 59% of these being classified as dying. However in 2000, the condition of fourwing is improving as decadency decreased to 27%, no decadent plants were classified as dying, while no plants were classified as having poor vigor. The high amount of decadence in 1995 could be explained by the fact that fourwing saltbush is susceptible to winter injury and there was an extremely harsh winter during 1992-93. Also, this species is fairly short-lived (20-30 years) and many older plants may be reaching the end of their life span. With the mild winters in the past several years, condition seems to be improving. No seedlings

and few young have been encountered during any reading. Use increased to a mostly moderate level in 2000 (43%) with 5% of the population showing heavy use. Average leader growth was estimated at 3-4 inches in 2000.

The herbaceous understory was dominated by annual species in 1995 as cheatgrass and tansy mustard made up 88% of the herbaceous cover and 64% of the total vegetative cover. Due to the unusually wet spring of 1995, tansy mustard was 2 to 3 feet tall. Currently, annuals are minimal with cheatgrass decreasing to less than 1% cover, and tansy mustard not being sampled in 2000. This drastic decrease in annuals is due to the drought experienced in the fall, winter, and summer of 1999-2000. Thickspike wheatgrass was the only abundant perennial grass and scarlet globemallow was the only abundant perennial forb in 1995. Thickspike significantly increased in 2000 as did globemallow. Perennial grasses and forbs significantly increased in sum of nested frequency in 2000.

1988 APPARENT TREND ASSESSMENT

Basal vegetative cover is high for this type of site at 7%. Litter cover is also fairly high at 55% and found mostly under the shrubs. The site is dominated by annual species with percent bare ground moderately high at 28%. Rock fragments are exposed as pavement (9.5%), although they are not concentrated. Soil trend appears stable. The key browse, basin big sagebrush, fourwing saltbush, and winterfat have low decadency rates, light utilization, and good vigor. The herbaceous understory consists mostly of annuals but thickspike wheatgrass, blue grama, and Sandberg bluegrass are fairly abundant. Perennial forbs are lacking and consist primarily of one species, scarlet globemallow.

1995 TREND ASSESSMENT

Soil trend appears stable. Percent bare ground has declined from 28% to 21%. Litter cover also declined, but this has been the general trend with the extended drought. Due to the abundant herbaceous cover (mostly annuals), erosion is minimal. Overall, the browse trend is considered stable, but guarded. Fourwing saltbush has a high percentage of decadent plants (80%) and nearly half of the population displays poor vigor (47%). In the nearby Crow's Roost Enclosure, decadent fourwing were also noted in both the total and livestock enclosure. This increased decadency is not related to use, as only 13% of the mature plants have moderate to heavy use. Fourwing saltbush can be damaged by extended severe drought in association with a severe winter (cold with heavy snow) which took place in 1992-93. It should also be noted that even under ideal conditions fourwing saltbush has a fairly short life span of 20 to 30 years. The replacement of the older plants with younger ones is almost impossible when they are competing against a very dense population of winter annuals. Trend for winterfat appears stable, with only a small increase in moderate to heavy use than was reported in 1988 (0% vs 8%). Winterfat within the enclosure were larger and more vigorous than those sampled outside. Basin big sagebrush now provides 37% of the browse cover with good vigor, good reproductive potential, and a robust percentage of young plants. The great change in density for fringed sagebrush is most likely a reflection of the much larger, better distributed sample used in 1995. The herbaceous understory trend is down and in poor condition. The fairly numerous perennial grasses, thickspike wheatgrass and blue grama, have sum of nested frequency values that have declined significantly. The most numerous perennial forb, scarlet globemallow, has also decreased significantly. Sum of nested frequency of perennial grasses declined 59% while frequency of perennial forbs decreased 42%. Cheatgrass and annual forbs dominate the understory by providing 91% of the total herbaceous cover. Due to the wet spring, tansy mustard was very robust and abundant even within the enclosure.

TREND ASSESSMENT

soil - stable (3)

browse - stable, but guarded because of the high percent decadency for fourwing saltbush which provides 23% of the total browse cover (3)

herbaceous understory - down and dominated by annuals (1)

2000 TREND ASSESSMENT

Trend for soil is slightly down. Percent cover for bare ground increased from 21% to almost 36% in 2000. Percent cover of vegetation also decreased while litter cover remained nearly stable. Although the increase in bare ground and decrease in vegetative cover is due to the drastic decrease in annuals, cheatgrass is fairly good at holding soils and is better than having bare soil. Trend for browse is stable overall. Fourwing saltbush shows increased use, but greatly improved vigor. Percent decadency decreased from a high of 80% in 1995 to a moderate level in 2000 at 27%. Recruitment (# of young) remains low at 6%. Big sagebrush was split into basin big sagebrush and Wyoming big sagebrush in 2000. Use on both subspecies is mostly light with low decadency. However, poor vigor occurred in 33% of the basin big sagebrush population and 12% of the Wyoming big sagebrush population. Trend for the herbaceous understory is up. Annual species decreased in 2000 due to drought, with sum of nested frequency for perennial species increasing.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - up (5)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 10

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	b208	a119	b247	62	46	76	1.43	10.67
G	Agropyron spicatum	a-	b9	a-	-	4	-	.09	-
G	Bouteloua gracilis	c177	a22	b97	70	11	39	.18	1.68
G	Bromus tectorum (a)	-	b252	a82	-	80	33	10.79	.53
G	Poa fendleriana	a-	a-	b23	-	-	7	-	.21
G	Poa secunda	b20	ab16	a3	11	7	1	.10	.00
Total for Annual Grasses		0	252	82	0	80	33	10.79	0.53
Total for Perennial Grasses		405	166	370	143	68	123	1.81	12.57
Total for Grasses		405	418	452	143	148	156	12.61	13.10
F	Delphinium spp.	-	1	-	-	1	-	.00	-
F	Descurainia pinnata (a)	-	b302	a-	-	93	-	19.10	-
F	Erigeron eatonii	a1	b18	a-	1	6	-	.54	-
F	Lappula occidentalis (a)	-	b88	a44	-	33	18	.39	.16
F	Machaeranthera canescens	b9	a-	a-	6	-	-	-	-
F	Phlox longifolia	15	28	13	6	12	5	.11	.10

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
F	Ranunculus testiculatus (a)	-	_b 84	_a 21	-	28	6	.70	.10
F	Sphaeralcea coccinea	_c 202	_a 84	_b 142	76	37	53	.63	3.08
Total for Annual Forbs		0	474	65	0	154	24	20.20	0.27
Total for Perennial Forbs		227	131	155	89	56	58	1.28	3.18
Total for Forbs		227	605	220	89	210	82	21.48	3.45

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 10

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia frigida	44	79	1.78	3.60
B	Artemisia tridentata tridentata	47	9	4.55	.91
B	Artemisia tridentata wyomingensis	0	33	-	7.09
B	Atriplex canescens	55	53	2.83	5.23
B	Ceratoides lanata	55	61	3.23	2.85
Total for Browse		201	235	12.39	19.71

BASIC COVER --

Herd unit 10 , Study no: 10

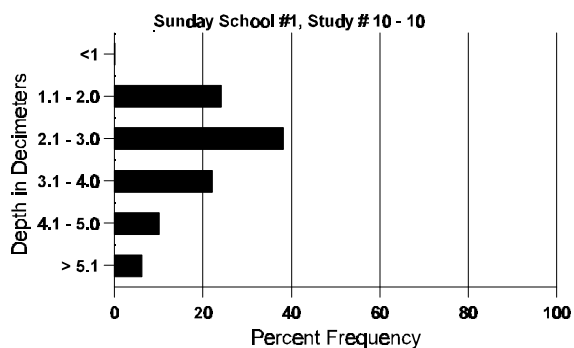
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'88	'95	'00
Vegetation	376	346	7.00	49.70	36.77
Rock	67	22	.25	.27	.06
Pavement	128	252	9.50	2.63	3.00
Litter	380	365	55.00	40.40	42.09
Cryptogams	20	30	.50	.03	.36
Bare Ground	304	317	27.75	21.33	35.75

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 10, Study Name: Sunday School #1

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.75	58.4 (18.11)	7.7	28.0	39.4	32.6	2.4	10.1	409.6	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 10

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	3	38	687	N/A
Elk	-	11	261	20 (50)
Deer	-	6	44	3 (9)
Cattle	3	6	226	19 (47)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 10

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total				
		1	2	3	4	5	6	7	8	9	1	2	3	4							
Artemisia frigida																					
S	88	1985	-	-	-	-	-	-	-	-	-	-	-	1985	-	-	-	132333		1985	
	95	442	-	-	-	-	-	-	-	-	-	-	-	444	-	-	-	8880		444	
	00	17	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
Y	88	940	-	-	-	-	-	-	-	-	-	-	-	940	-	-	-	62666		940	
	95	34	-	-	-	-	-	-	-	-	-	-	-	34	-	-	-	680		34	
	00	67	-	-	-	-	-	-	-	-	-	-	-	67	-	-	-	1340		67	
M	88	479	-	-	-	-	-	-	-	-	-	-	-	479	-	-	-	31933	7	5	479
	95	66	-	-	1	-	-	-	-	-	-	-	-	67	-	-	-	1340	7	5	67
	00	415	-	-	-	-	-	-	-	-	-	-	-	415	-	-	-	8300	5	8	415
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing			<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>								
	'88		00%			00%			00%				-98%								
	'95		00%			00%			.98%				+79%								
	'00		00%			00%			.20%												
Total Plants/Acre (excluding Dead & Seedlings)												'88	94599	Dec:	0%						
												'95	2040		1%						
												'00	9660		0%						

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4		1	2	
Artemisia tridentata tridentata									
S	88	26	-	-	-	-	-	-	26
	95	21	-	-	-	-	-	-	21
	00	-	-	-	-	-	-	-	0
Y	88	3	-	-	-	-	-	-	3
	95	57	1	-	-	-	-	-	58
	00	1	-	-	-	-	-	-	20
M	88	-	-	-	-	-	-	-	0
	95	57	13	4	-	-	-	-	74
	00	13	-	-	-	-	-	-	260
D	88	-	-	-	-	-	-	-	0
	95	-	1	1	1	-	-	-	60
	00	1	-	-	-	-	-	-	20
X	88	-	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	-	0
	00	-	-	-	-	-	-	-	40
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>	
'88		00%		00%		00%		+93%	
'95		11%		04%		.74%		-89%	
'00		00%		00%		33%			
Total Plants/Acre (excluding Dead & Seedlings)						'88	200	Dec:	0%
						'95	2700		2%
						'00	300		7%
Artemisia tridentata wyomingensis									
S	88	-	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	-	0
	00	3	-	-	-	-	-	-	60
Y	88	-	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	-	0
	00	7	-	-	-	-	-	-	140
M	88	-	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	-	0
	00	55	4	-	6	-	-	-	1300
D	88	-	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	-	0
	00	1	1	-	-	-	-	-	40
X	88	-	-	-	-	-	-	-	0
	95	-	-	-	-	-	-	-	0
	00	-	-	-	-	-	-	-	60
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>	
'88		00%		00%		00%			
'95		00%		00%		00%			
'00		07%		00%		12%			
Total Plants/Acre (excluding Dead & Seedlings)						'88	0	Dec:	0%
						'95	0		0%
						'00	1480		3%

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex canescens																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	5	2	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200	31 28	18	
	95	13	1	-	1	-	1	-	-	-	16	-	-	-	320	18 26	16	
	00	34	28	2	8	1	-	-	-	-	73	-	-	-	1460	18 24	73	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	39	2	5	19	2	1	6	-	-	30	-	-	44	1480		74	
	00	9	11	4	1	5	-	-	-	-	30	-	-	-	600		30	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%			+28%							
'95		05%			08%			47%			+15%							
'00		43%			05%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	1333	Dec:	0%				
											'95	1860		80%				
											'00	2200		27%				
Ceratoides lanata																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	88	43	-	-	-	-	-	-	-	-	43	-	-	-	2866		43	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
	00	19	-	2	-	-	-	-	-	-	21	-	-	-	420		21	
M	88	98	-	-	-	-	-	-	-	-	98	-	-	-	6533	9 3	98	
	95	325	12	15	5	-	-	-	-	-	357	-	-	-	7140	10 10	357	
	00	276	65	1	4	-	-	-	-	-	346	-	-	-	6920	7 8	346	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	30	-	-	-	-	-	-	-	-	30	-	-	-	600		30	
	00	-	-	2	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'88		00%			00%			00%			-11%							
'95		03%			04%			00%			-11%							
'00		18%			01%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	9399	Dec:	0%				
											'95	8320		7%				
											'00	7380		1%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	3	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
	'88	00%			00%			00%										
	'95	00%			00%			00%										
	'00	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	0		-			

Trend Study 10-11-00

Study site name: Park Ridge .

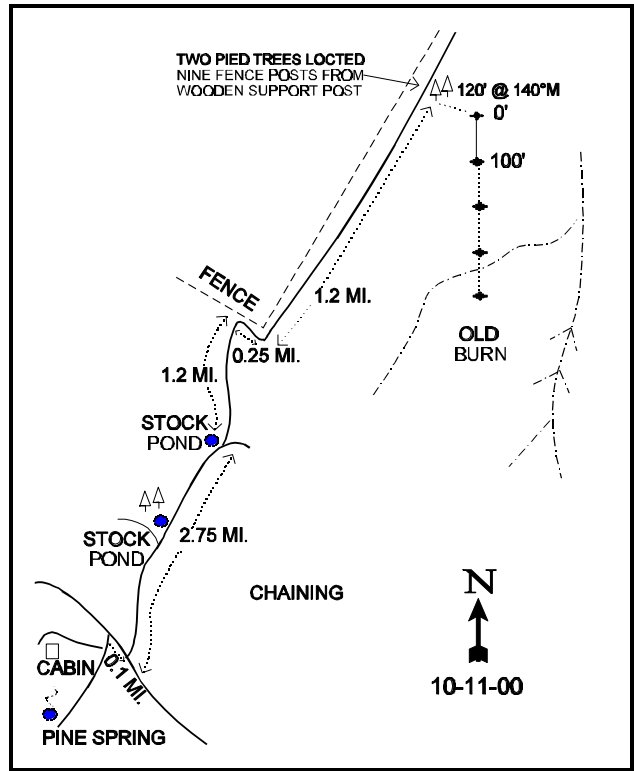
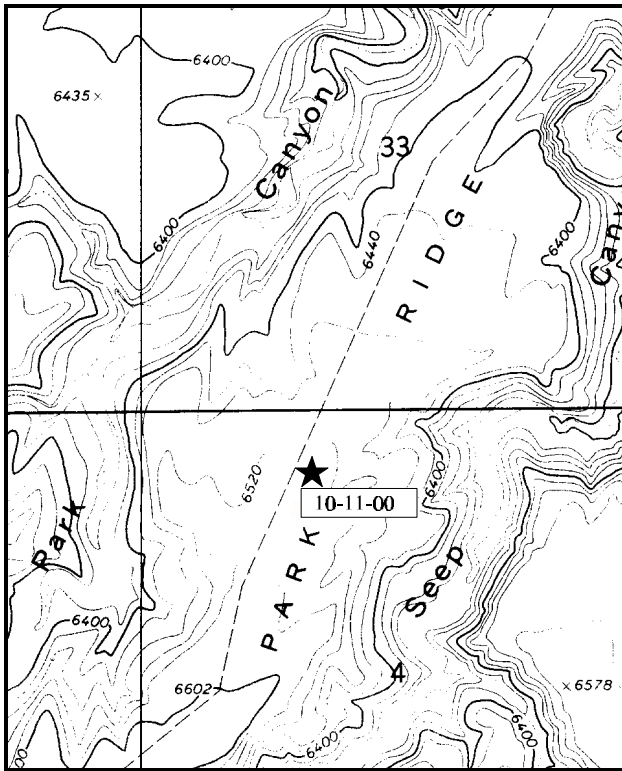
Range type: Fourwing Saltbush .

Compass bearing: frequency baseline 156°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Seep Ridge Road, 0.1 miles south of the Pine Spring turnoff, turn left onto a jeep trail. Go down this road 2.7 miles to a bend to the right by a stock pond. Continue straight past the stockpond on a faint road, and 1.2 miles down the ridge to a fence. Bear right and follow the road along the fence. Turn left through the gate and continue down the fence 1.2 miles. Stop by a small, isolated group of pinyon pine trees on the right side of the road. From here, walk SE into the flat approximately 120 feet at 140°M to the 0-foot baseline stake. The study is marked by short, green fenceposts.



Map Name: Cooper Canyon

Diagrammatic Sketch

Township 14S, Range 23E, Section 4

UTM. 4388221.704 N, 641557.198 E

DISCUSSION

Trend Study No. 10-11 (16A-11)

The Park Ridge trend study is located on what is thought to be critical mule deer winter range. The prevalent vegetation on the flats is fourwing saltbush and winterfat, with an increasing population of Wyoming big sagebrush. These flats are surrounded by mature pinyon-juniper woodland. When this site was established in 1988, little sign of deer was found in the large open parks, so the study was placed more closely to the edge where there was evidence of deer use. Elk pellet groups were also rare but were occurred more than deer. Pellet group transect data from 2000 estimate light use by wildlife with 6 deer days use/acre (15 ddu/ha) and 3 elk days use/acre (7 edu/ha). All cow pats sampled in 2000 were from the previous fall with use being estimated at 19 cow days use/acre (47 cdu/ha). Cattle graze this BLM land on a 3-year rest-rotation system during the spring or fall.

The terrain on top of the ridge is essentially flat, but it does gradually slope to the northeast. Slope at the study site is less than 1% with an elevation of 6,540 feet. A fire burned a portion of the site between 1988 and 1995. When the baseline was lengthened in 1995, part of belt 3 and all of belt 4 were within the burned area.

Soils on the site have a loam texture and are slightly alkaline (pH of 7.7). Effective rooting depth is estimated at just over 12 inches with average soil temperature being 63°F at 12 inches. A light-colored hardpan exists in the profile at approximately 10-12 inches. A profile stoniness index estimated from penetrometer readings shows this hardpan as the majority of readings are between 10 and 12 inches. Phosphorus (5.9 ppm) is lower than the 10 ppm thought necessary for normal plant growth and development. Organic matter is very low at only 0.1%. The risk of erosion is slight with the gentle slope, yet light to moderate soil pedestaling was noted around shrubs in 2000, especially the older fourwing plants. There was no sign of soil moisture down to about 14 inches. Bare ground cover increased in 2000, while protective ground cover from vegetation, litter, and cryptogams decreased.

The key browse species on the site consist of fourwing saltbush and winterfat, with an increasing population of Wyoming big sagebrush. The top end of the area where the last two belts are placed was burned leaving very little sagebrush in the burned portion. Winterfat is the most abundant preferred shrub with an estimated density of 17,000 plants/acre in 1988, declining to 8,440 plants/acre in 1995, and 6,600 plants/acre in 2000. The change in density between 1988 and 1995 is more related to the larger sample size used in 1995 and 2000. Twenty-seven percent of the winterfat sampled in 1988 were classified as heavily hedged. Use in 1995 was much lighter with only 1% heavily hedged, increasing to 34% in 2000. However, with minimal annual growth in 2000 due to drought it was difficult to determine use, thus utilization on winterfat could be overestimated. Percent decadency slightly increased from 3% in 1995 to 10% in 2000 as did the proportion of the population in poor vigor (2% to 7%). Recruitment from young plants is currently estimated at 1,120 plants/acre (17% of the population).

Fourwing saltbush was the dominant overstory shrub in 1988, but Wyoming big sagebrush is now more abundant. Density plot estimates from 1988 indicated 267 mature fourwing plants/acre with a canopy cover estimated at 5%. During the 1995 reading, fourwing numbered 380 plants/acre, decreasing to 320 plants/acre in 2000. Percent decadency has steadily increased over all sampling years and is currently ('00) very high at 69%. The proportion of the population in poor vigor has also increased. Although the mature plants produce a large quantity of seed, no seedling or young plants were found in 1988 or 1995. In 2000, seedlings are estimated at 40 per acre with young being approximately 20 plants/acre. Leader growth averaged about 6 inches in 2000.

With the lengthened baseline used in 1995, a number of Wyoming big sagebrush were picked up in the sample. There was an estimated 1,120 plants/acre in 1995, increasing to 1,740 plants/acre in 2000. Reproductive

potential (# of seedlings) and recruitment from young plants were extremely high in 1995 at 63% and 57% respectively. Both of these parameters decreased in 2000 (2% seedlings and 26% young). Utilization of the sagebrush was light in both 1988 and 1995 with a few preferred individuals displaying heavier use. Use increased in 2000 with 41% displaying moderate use and an additional 22% showing heavy use. Most of this use was in a concentrated area near the beginning of the transect where sagebrush was not burned. Vigor is good and decadency low at 6%. Leader growth on Wyoming big sagebrush is fair in 2000, averaging nearly 5 inches.

Other browse species include fringed sagebrush and broom snakeweed. Fringed sagebrush is currently ('00) estimated at 2,080 plants/acre with a high proportion of seedlings (52%) and moderate recruitment from young plants (19%). Fringed sagebrush is more common in the burned section of the site than outside of the burn. Broom snakeweed was present in the past, but in a fairly low density. However in 2000, this species rapidly increased in density to 20,100 plants/acre. Most of the broom snakeweed plants occur within the burned area. This population appears to be stable as 87% of the population is made up of mature plants. Snakeweed only contributed 9% of the browse cover in 1995, but currently provides 66% of the browse cover. The preferred species, winterfat, fourwing saltbush, and Wyoming big sagebrush contributed 77% of the browse cover in 1995, but only 29% in 2000 due to the very rapid increase in broom snakeweed.

Grasses provided 61% of the vegetative cover in 1995, decreasing to 38% in 2000. Forbs provided 18% of the vegetative cover in 1995, decreasing to 7% in 2000. These decreases in cover from herbaceous species is due to the decrease in annuals due to drought. Cheatgrass illustrates this well with this species decreasing from almost 13% average cover in 1995 to 3% in 2000. Cheatgrass is still abundant at this site as it has a quadrat frequency of 87% in 2000. Dominant perennial grasses include: thickspike wheatgrass, needle-and-thread, bottlebrush squirreltail, and blue grama. As a group, perennial grasses slightly increased in sum of nested frequency in 2000. Forbs decreased in 2000 with the loss of annuals due to drought. Scarlet globemallow is by far the most numerous forb, providing 80% of the total forb cover in 1995, and 88% in 2000. Annuals forbs decreased in sum of nested frequency from 178 in 1995 to 5 in 2000. Perennial forbs decreased somewhat.

1988 APPARENT TREND ASSESSMENT

Due to the rocky nature of the soil, there was a fairly high amount of pavement cover (13%). Overall, vegetative and litter cover is good, totaling 57%. Percent bare ground occupied almost 23% of the surface. Soil trend appears stable due to the vegetative and litter cover combined with the gentle terrain. The populations of the key species, fourwing saltbush and winterfat, appear stable. Lack of recruitment for fourwing is a concern, but plants are currently large and vigorous. Winterfat is abundant with abundant young plants, low decadency and good vigor. Without considering annuals, the herbaceous understory is not particularly abundant. The two most abundant grasses, thickspike wheatgrass and squirreltail, have quadrat frequencies of 46% and 50% respectively. Only five perennial forb species were encountered.

1995 TREND ASSESSMENT

Soil trend appears stable. Percent bare ground is similar to that of 1988. Litter declined with the extended drought, but erosion is not a problem due to the gentle terrain. Trend for browse is mixed. Fourwing has become increasingly decadent (0 to 47%) with no recruitment to replace decadent shrubs. This pattern was also noted on the previous site. The trend is most likely weather related with the combination of extended severe drought and the severe winter of 1992-93. In addition, height/crown measurements of mature shrubs are nearly twice as small as those observed in 1988. Another problem this species has is that it is a rather short-lived species, and under ideal conditions, it will only live about 20 to 30 years. Winterfat density has declined, but almost all of the difference would be due to the larger sample taken this year as there were no indications of heavy use and/or increased decadency to explain this large decline. Percent decadency is lower and moderate to

heavy use has decreased from 82% to 7% with no dead plants observed in 1995. Wyoming big sagebrush appears to have an increasing population with a majority of the population consisting of seedlings and young. Weighing all these factors, overall trend for browse is considered stable until more data on the trend of fourwing saltbush is available in the year 2000. The herbaceous understory is in poor condition and dominated by annuals, almost 50% of the herbaceous cover. Of the five perennial grasses observed in 1988, only one, needle-and-thread, increased in nested frequency. Sum of nested frequency of perennial forbs increased slightly, but scarlet globemallow is the only abundant perennial forb. Cheatgrass accounts for 55% of the grass cover, while annual forbs make up 11% of the forb cover. Trend for the herbaceous understory is considered slightly down.

TREND ASSESSMENT

soil - stable (3)

browse - stable overall, down for fourwing which makes up only 14% of the total browse cover (3)

herbaceous understory - slightly down and in poor condition with excessive numbers of annuals (2)

2000 TREND ASSESSMENT

Trend for soil is slightly down due to an increase in average cover of bare ground, with also decreases in protective cover from vegetation, litter, and cryptogams. Soil loss and pedestaling were noted as being light to moderate even with the gentle slope. Trend for browse is slightly down overall. Fourwing saltbush had increases in percent decadency (47% in '95 to 69% in '00) and poor vigor (11% in '95 to 19% in '00). Recruitment remains low at 6%. Winterfat is abundant, generally in good health but slightly increasing in percent decadency and poor vigor in 2000. Heavy use increased from 1% in 1995 to 34% in 2000. Young recruitment is moderate at 17%. Wyoming big sagebrush increased in density, but use increased. In 1995, use was light except for 2% of the population which displayed heavy use. In 2000, moderate use was sampled on 41% of the population and heavy use on 22% of the population. However, due to minimal annual growth on shrubs due to drought, utilization was difficult to determine and the increased use on winterfat and sagebrush may be overestimated. Recruitment in the sagebrush population remains good at 26%. A major negative factor at this site is the very rapid increase of broom snakeweed in 2000. This species currently is estimated at over 20,000 plants/acre while providing two-thirds of the browse cover. Trend for the herbaceous understory is stable. Annual grasses and forbs were greatly reduced in 2000 due to drought, with perennial grasses increasing slightly and perennial forbs slightly decreasing in sum of nested frequency.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 11

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	_b 144	_{ab} 98	_a 90	46	34	33	2.90	.82
G	Bouteloua gracilis	76	65	75	31	29	30	2.98	2.44
G	Bromus tectorum (a)	-	_b 307	_a 240	-	92	87	12.47	2.92
G	Oryzopsis hymenoides	_b 68	_b 58	_a 6	33	25	3	.52	.02
G	Poa fendleriana	-	6	4	-	2	2	.06	.01
G	Poa secunda	_a -	_a 6	_b 20	-	2	7	.30	.25
G	Sitanion hystrix	_b 107	_a 49	_a 75	50	23	30	.77	.69
G	Stipa comata	_a 62	_a 84	_b 124	27	34	49	2.67	2.39
Total for Annual Grasses		0	307	240	0	92	87	12.47	2.92
Total for Perennial Grasses		457	366	394	187	149	154	10.21	6.64
Total for Grasses		457	673	634	187	241	241	22.68	9.57
F	Astragalus spp.	_b 9	_a -	_a -	4	-	-	-	-
F	Calochortus nuttallii	-	3	-	-	1	-	.00	-
F	Cryptantha spp.	_a -	_b 14	_a -	-	6	-	.03	-
F	Descurainia pinnata (a)	-	_b 24	_a -	-	15	-	.17	-
F	Draba rectifruca (a)	_a 17	_b 67	_a 3	7	28	2	.14	.01
F	Erigeron pumilus	_c 63	_b 38	_a 12	32	19	7	.36	.09
F	Fritillaria pudica	_a -	_b 10	_a -	-	5	-	.05	-
F	Gilia pinnatifida (a)	_a 1	_b 34	_a -	1	19	-	.09	-
F	Lappula occidentalis (a)	-	_b 33	_a 2	-	16	1	.37	.00
F	Phlox longifolia	-	1	-	-	1	-	.00	-
F	Sphaeralcea coccinea	_a 144	_b 213	_a 168	59	78	68	5.44	1.54
F	Tragopogon dubius	_b 22	_a 12	_b 39	14	4	18	.02	.11
F	Unknown forb-annual (a)	-	_b 20	_a -	-	8	-	.06	-
Total for Annual Forbs		18	178	5	8	86	3	0.84	0.01
Total for Perennial Forbs		238	291	219	109	114	93	5.92	1.75
Total for Forbs		256	469	224	117	200	96	6.76	1.76

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 11

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia frigida	59	45	.89	.65
B	Artemisia tridentata wyomingensis	21	28	.66	2.02
B	Atriplex canescens	15	13	1.11	1.20
B	Ceratoides lanata	90	80	4.20	.91
B	Gutierrezia sarothrae	32	88	.70	9.23
B	Opuntia spp.	8	5	.16	-
Total for Browse		225	259	7.73	14.02

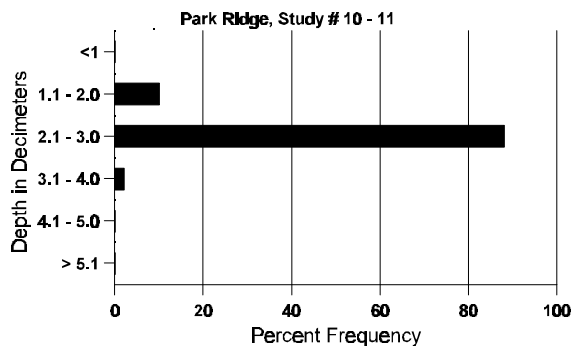
BASIC COVER --
Herd unit 10 , Study no: 11

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'88	'95	'00
Vegetation	363	326	8.50	41.96	34.06
Rock	216	79	2.25	1.23	.45
Pavement	321	306	12.75	4.54	5.51
Litter	385	351	48.75	35.29	26.56
Cryptogams	220	173	5.25	6.42	3.01
Bare Ground	336	344	22.50	25.77	39.20

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 11, Study Name: Park Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.33	63.2 (12.20)	7.7	38.0	36.4	25.6	0.1	5.9	339.2	.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 11

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'95	'00	00	00
Rabbit	4	6	183	N/A
Elk	5	6	35	3 (7)
Deer	3	5	78	6 (15)
Cattle	2	7	226	19 (47)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 11

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Artemisia frigida																		
S	88	38	-	-	1	-	-	-	-	-	39	-	-	-	2600			39
	95	47	-	-	-	-	-	-	-	-	47	-	-	-	940			47
	00	54	-	-	-	-	-	-	-	-	54	-	-	-	1080			54
Y	88	24	1	-	1	-	-	-	-	-	26	-	-	-	1733			26
	95	21	-	-	3	-	-	-	-	-	24	-	-	-	480			24
	00	20	-	-	-	-	-	-	-	-	20	-	-	-	400			20
M	88	13	1	-	1	-	-	-	-	-	15	-	-	-	1000	7	5	15
	95	146	-	-	-	-	-	-	-	-	146	-	-	-	2920	13	9	146
	00	51	-	-	13	-	-	-	-	-	63	-	1	-	1280	6	11	64
D	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	12	-	-	6	-	-	2	-	-	1	-	-	19	400			20
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		07%			00%			00%			+18%							
'95		00%			00%			00%			-39%							
'00		00%			00%			19%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	2799	Dec:	2%				
											'95	3400		0%				
											'00	2080		19%				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	30	-	-	5	-	-	-	-	-	35	-	-	-	700		35	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	32	-	-	-	-	-	-	-	-	32	-	-	-	640		32	
	00	20	-	3	-	-	-	-	-	-	23	-	-	-	460		23	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	23	-	1	-	-	-	-	-	-	24	-	-	-	480	20	36	
	00	11	18	6	-	15	9	-	-	-	59	-	-	-	1180	17	28	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	3	-	1	-	1	-	-	-	4	-	-	1	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			02%			00%			+36%							
'00		41%			22%			01%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'95	1120		0%				
											'00	1740		6%				
<i>Atriplex canescens</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	3	1	-	-	-	-	-	-	-	4	-	-	-	266	40	44	
	95	6	4	-	-	-	-	-	-	-	10	-	-	-	200	22	25	
	00	2	-	1	1	-	-	-	-	-	4	-	-	-	80	24	32	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	6	-	1	2	-	-	-	-	-	7	-	-	2	180		9	
	00	3	2	-	2	2	1	1	-	-	8	-	-	3	220		11	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		25%			00%			00%			+30%							
'95		21%			05%			11%			-16%							
'00		25%			13%			19%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	266	Dec:	0%				
											'95	380		47%				
											'00	320		69%				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total								
		1	2	3	4		1	2									
<i>Ceratoides lanata</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	7	-	-	-	-	-	-	-	7	-	-	-	140		7	
Y	88	24	39	2	1	-	-	-	-	66	-	-	-	4400		66	
	95	19	-	-	-	-	-	-	-	19	-	-	-	380		19	
	00	53	3	-	-	-	-	-	-	56	-	-	-	1120		56	
M	88	15	96	62	2	1	-	1	-	177	-	-	-	11800	10	9	177
	95	369	17	4	2	-	-	-	-	392	-	-	-	7840	8	9	392
	00	71	53	105	8	5	-	-	-	242	-	-	-	4840	4	5	242
D	88	2	5	5	-	-	-	-	-	12	-	-	-	800		12	
	95	3	7	1	-	-	-	-	-	2	-	-	9	220		11	
	00	17	6	8	-	-	-	1	-	9	-	-	23	640		32	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		55%			27%			00%			-50%						
'95		06%			01%			02%			-22%						
'00		20%			34%			07%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	17000	Dec:	5%				
										'95	8440		3%				
										'00	6600		10%				
<i>Echinocereus spp.</i>																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	1	2	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'95	0		-				
										'00	0		-				

A Y G R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
	1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																	
S	88	104	-	-	-	-	-	-	-	-	104	-	-	-	6933		104
	95	147	-	-	1	-	-	-	-	-	148	-	-	-	2960		148
	00	31	-	-	-	-	-	-	-	-	31	-	-	-	620		31
Y	88	26	-	-	-	-	-	-	-	-	26	-	-	-	1733		26
	95	25	-	-	1	-	-	-	-	-	26	-	-	-	520		26
	00	80	-	-	-	-	-	-	-	-	80	-	-	-	1600		80
M	88	42	-	-	-	-	-	-	-	-	42	-	-	-	2800	6 6	42
	95	57	-	-	-	-	-	-	-	-	57	-	-	-	1140	7 7	57
	00	876	-	-	-	-	-	-	-	-	733	15	128	-	17520	5 8	876
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	44	-	1	4	-	-	-	-	-	16	-	8	25	980		49
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'88		00%			01%			00%			-64%						
'95		00%			00%			00%			+92%						
'00		00%			.09%			16%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	4599	Dec:	1%		
												'95	1660		0%		
												'00	20100		5%		
<i>Opuntia spp.</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4 12	1
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	2 9	7
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	3 8	4
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'88		00%			00%			00%			+67%						
'95		00%			00%			20%			-50%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%		
												'95	200		20%		
												'00	100		0%		

Trend Study 10-12-00

Study site name: Wolf Den .

Range type: Big Sagebrush .

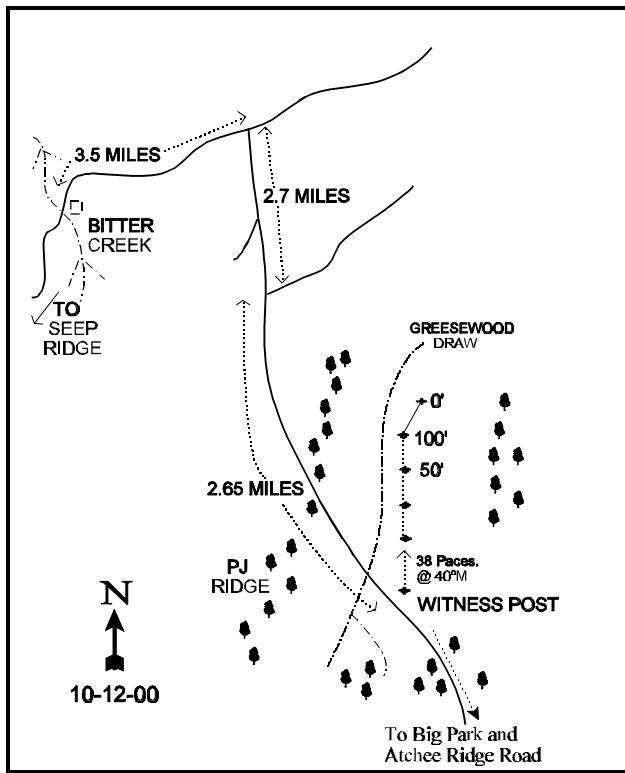
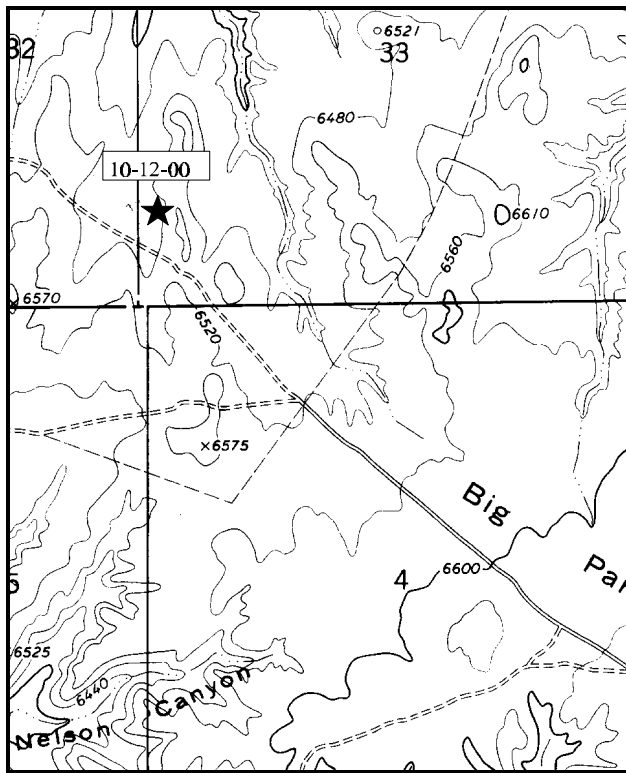
Compass bearing: frequency baseline 167°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Seep Ridge Road, about 10 miles north of Pine Spring, turn onto the Bitter Creek Road near McCoy Reservoir. Drive easterly on this road for 2.4 miles to a cattle guard. Continue 5.4 miles to a corral in the bottom of Bitter Creek. Drive up out of the Bitter Creek canyon 3.5 miles. Where the road tops out, turn right off the main road. Go 2.7 miles to a minor fork. Continue straight on the main road for 2.65 miles to the east edge of a sagebrush/greasewood draw. There is a witness post 15 feet off the north side of the road. From the witness post walk 38 paces bearing 40° to the 400 ft. baseline stake. The 0-foot baseline stake, tagged #9098, is 400 feet north.

Alternate route: From the intersection of Atchee Ridge Road and Big Park Road travel north toward Big Park 3.45 miles to a fork. Stay left and continue 0.15 to another fork. Go straight to Big Park for 5.7 miles to a cattle guard and a fork. Proceed right for 0.4 miles to the witness post.



Map Name: Burnt Timber Canyon .

Diagrammatic Sketch

Township 12S , Range 24E , Section 3

UTM. 4398779.273 N, 650483.663 E

DISCUSSION

Trend Study No. 10-12 (16A-12)

The Wolf Den trend study is located in a very dense stand of Wyoming big sagebrush along a wide swale between low ridges of pinyon and juniper. The area, near Big Park, is considered critical deer winter range, and also has some light use by elk. More pellet groups have been found on this study site than any other sampled on the herd unit in the past. Pellet group transect data in 2000 indicate heavy use by deer with an estimated 116 deer days use/acre (287 ddu/ha), and light use by elk with an estimated 3 elk days use/acre (7 edu/ha). No cattle pats were sampled in 2000, although cows were in the general area surrounding the Wolf Den transect when the site was read in June 2000. This area is used by cattle on a rotational deferment system anytime from November through April, depending on amounts of snow and other management considerations.

The study site slopes gently to the west at an elevation of 6,500 feet. The drainage basin is sufficiently small at the head that there are no gully patterns resulting from excessive runoff. Although the dense brush provides excellent canopy cover, the understory is very limited (makes up less than 5% of total vegetative cover) and the low amounts of litter are easily displaced. There was a moderate amount of bare ground in 2000 (19%). Cryptogamic crusts exist almost entirely underneath the sagebrush canopy. The soil is relatively deep with an estimated effective rooting depth of over 26 inches. Average soil temperature is 56°F at 18 inches. A stoniness index determined from penetrometer readings illustrates the deepness of the soil with nearly all measurements being over 20 inches in depth. However, very little rock was sampled in the profile and the index at this site is more a measure of a restrictive layers of soil than actual rockiness. The soil is a loam that is low in phosphorus (3.5 ppm), where 10 ppm has been shown necessary for normal plant growth and development. The soil reaction is moderately alkaline (pH of 8).

This study is located on a site dominated by Wyoming big sagebrush. Shadscale is found on the upper, more shallow portions of the swale, while greasewood grows along the lower reaches of the depression. The sagebrush on the site is so dense that it is difficult to travel through it, confirming the estimate of 32% sagebrush cover in both 1995 and 2000. Sagebrush currently ('00) provides 77% of the browse cover and 74% of the total vegetative cover at the Wolf Den site. Shrub density estimates for 1988 indicated a population of 18,133 plants/acre. Density of sagebrush was estimated at 7,580 plants/acre in 1995 and 7,260 plants/acre in 2000. The difference in population estimates is primarily the result of the increased sample size and better sampling distribution used after mid-1992. These modifications enlarge the sampling area and give much better estimates for shrubs with discontinuous and/or clumped distributions. This old sagebrush stand contained 78% mature and 19% decadent individuals in 1995. Decadency increased in 2000 to 42%. Thirty percent of the decadent individuals are classified as dying in 2000, which translates into about 920 plants/acre. Recruitment from the young age class is currently moderately low at 6%. Vigor improved in 1995 (10% vs 3% in poor vigor), but in 2000, poor vigor increased to 13% of the population. Use is currently moderate to heavy with 38% displaying moderate use and 18% of the population showing heavy use. These utilization estimates are lower than those in 1995 where 65% of the population showed moderate use and 20% displayed heavy use. The current condition of high decadency and reduced vigor is probably due to intraspecific competition combined with extended drought and use by wintering deer.

Greasewood is currently ('00) estimated at 800 plants/acre. It provides 12% of the total vegetative cover at the site. Thirty percent of the population is currently ('00) classified as decadent. Mature plants average 3 ½ feet in height with a 4 ½ foot crown.

The high sagebrush density and associated cover severely limits understory plants. Only four or five species of perennial grass were sampled in any year. Total grass cover was less than one half of one percent in 1995, slightly increasing to just over 2% in 2000. Grasses and forbs combined, including annuals, account for only

5% of the total vegetative cover in 2000. Bottlebrush squirreltail is the most abundant grass with mutton bluegrass being next. Perennial forbs are nearly non-existent with only one perennial forb being sampled in 1988 and 1995. No perennial forbs were sampled in 2000, and only one annual, tansy mustard, was encountered. Without some type of sagebrush thinning treatment, the herbaceous understory will continue to be extremely poor.

1988 APPARENT TREND ASSESSMENT

Under the shrubs, there is an almost complete cover of pavement-sized fragments, estimated at 32% of the ground cover. Litter cover from the shrubs is almost 50% and basal vegetative cover is low at 6%. The amount of bare soil exposed is also low at 7%, due to very high amounts of pavement. The sagebrush population appears stable with enough young and seedlings to replace dying individuals. The herbaceous understory is in extremely poor condition due to the dominance of sagebrush.

1995 TREND ASSESSMENT

The soil is adequately covered by sagebrush canopy to protect it from high intensity summer storm impacts, but there is little protection of the soil from erosion caused from the associated runoff. However, due to the gentle slope, erosion does not appear to be a major problem. Trend is considered stable, yet in poor condition. Browse trend is stable and fairly stagnant. There is a change in the proportion of individuals in the younger age classes which have declined, yet there are not an inordinately large number of dead plants in the population. Utilization is heavier with 20% of the sagebrush displaying heavy use. Percent decadency has declined and vigor is good on all but 3% of the population. There may be some fluctuations in population density in the future associated with prolonged drought, but the sagebrush will continue to dominate this site without some sort of mechanical or chemical manipulation. The herbaceous understory is severely suppressed and nearly non-existent at this time. This will remain the case until the sagebrush canopy is reduced. Trend for the herbaceous understory is stable, but in very poor condition.

TREND ASSESSMENT

soil - stable, but in poor condition (3)

browse - stable, stagnant, mature sagebrush stand (3)

herbaceous understory - stable, but nearly non-existent (3)

2000 TREND ASSESSMENT

Trend for soil is stable, but remains in poor condition with very little cover from herbaceous vegetation and an increase in bare ground. Trend for browse is stable. The Wyoming big sagebrush population increased in decadency from 19% to 42%, but due to the abundance of sagebrush at the site, this increase is not detrimental. It appears that the sagebrush population may enter a self-thinning period with the extended drought and high intraspecific competition for resources. Trend for the herbaceous understory is stable, but severely depleted due to high sagebrush density and cover.

TREND ASSESSMENT

soil - stable, but remains in poor condition (3)

browse - stable (3)

herbaceous understory - stable, but severely depleted due to high sagebrush density and cover (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 12

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'95	'00	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	c ₅₉	b ₃₅	a ₁	26	15	1	.22	.00
G	Bromus tectorum (a)	-	3	-	-	2	-	.01	-
G	Oryzopsis hymenoides	3	2	5	1	1	2	.03	.06
G	Poa fendleriana	a ₁	a ₃	b ₅₁	1	1	20	.00	.66
G	Sitanion hystrix	a ₂₄	ab ₅₂	b ₇₆	12	24	31	.18	1.35
Total for Annual Grasses		0	3	0	0	2	0	0.00	0
Total for Perennial Grasses		87	92	133	40	41	54	0.43	2.08
Total for Grasses		87	95	133	40	43	54	0.44	2.08
F	Chenopodium leptophyllum (a)	-	b ₈₄	a ₋	-	33	-	.34	-
F	Cryptantha spp.	1	2	-	1	1	-	.00	-
F	Descurainia pinnata (a)	-	b ₁₄₈	a ₃	-	66	1	1.46	.00
F	Lappula occidentalis (a)	-	b ₁₁	a ₋	-	4	-	.07	-
F	Unknown forb-annual (a)	-	4	-	-	3	-	.01	-
Total for Annual Forbs		0	247	3	0	106	1	1.88	0.00
Total for Perennial Forbs		1	2	0	1	1	0	0.00	0
Total for Forbs		1	249	3	1	107	1	1.89	0.00

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 12

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia frigida	36	46	1.85	3.03
B	Artemisia tridentata wyomingensis	97	98	32.26	32.55
B	Atriplex canescens	1	0	-	-
B	Atriplex confertifolia	16	18	1.69	.97
B	Chrysothamnus viscidiflorus	0	1	-	-
B	Gutierrezia sarothrae	2	13	.01	.07
B	Juniperus osteosperma	0	7	.15	.18
B	Opuntia spp.	4	3	-	.03
B	Sarcobatus vermiculatus	17	19	2.62	5.28
Total for Browse		173	205	38.59	42.13

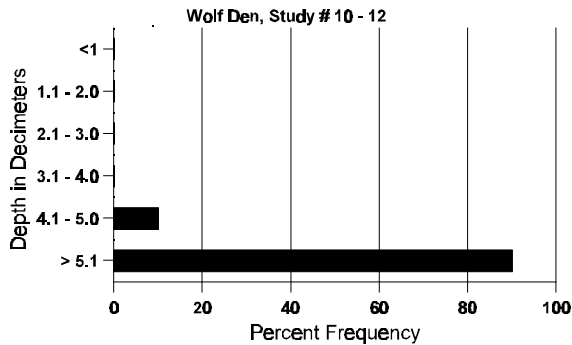
BASIC COVER --
Herd unit 10 , Study no: 12

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'88	'95	'00
Vegetation	284	244	5.75	43.86	41.80
Rock	80	8	.75	.74	.02
Pavement	267	265	32.25	19.73	15.25
Litter	385	366	49.50	43.14	45.29
Cryptogams	175	151	5.00	6.84	9.23
Bare Ground	207	262	6.75	8.53	19.11

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 12, Study Name: Wolf Den

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
26.05	56.0 (18.11)	8.0	46.0	33.4	20.6	1.8	3.5	115.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 12

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	7	6	26	N/A
Elk	3	4	44	3 (9)
Deer	52	47	151	116 (287)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 12

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia frigida</i>																		
S	88	2	-	-	3	-	6	2	-	-	13	-	-	-	866		13	
	95	24	-	-	6	-	-	-	-	-	30	-	-	-	600		30	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	7	-	-	1	-	2	-	-	-	10	-	-	-	666		10	
	95	15	-	-	5	-	-	-	-	-	20	-	-	-	400		20	
	00	24	-	-	3	-	-	-	-	-	27	-	-	-	540		27	
M	88	29	3	-	18	-	5	1	-	-	56	-	-	-	3733	7 5	56	
	95	61	-	-	21	-	-	-	-	-	82	-	-	-	1640	11 11	82	
	00	102	2	-	37	-	-	17	-	-	158	-	-	-	3160	5 9	158	
D	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		04%			10%			00%			-55%							
'95		00%			00%			00%			+45%							
'00		01%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	4532	Dec:	3%				
											'95	2040		0%				
											'00	3700		0%				
<i>Artemisia tridentata wyomingensis</i>																		
S	88	-	-	-	3	-	-	13	-	-	16	-	-	-	1066		16	
	95	10	-	-	2	-	-	-	-	-	12	-	-	-	240		12	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	88	9	1	-	10	-	-	3	-	-	21	-	2	-	1533		23	
	95	10	2	-	-	-	-	-	-	-	12	-	-	-	240		12	
	00	18	-	-	-	-	-	3	-	-	21	-	-	-	420		21	
M	88	104	47	11	13	-	-	2	-	-	171	4	2	-	11800	21 16	177	
	95	38	191	67	-	-	-	-	-	-	296	-	-	-	5920	27 32	296	
	00	72	64	20	21	9	5	-	-	-	190	-	-	1	3820	26 33	191	
D	88	43	19	4	5	-	-	1	-	-	49	-	13	10	4800		72	
	95	9	52	10	-	-	-	-	-	-	58	-	-	13	1420		71	
	00	21	60	36	17	6	5	6	-	-	105	-	-	46	3020		151	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1080		54	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1280		64	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		25%			06%			10%			-58%							
'95		65%			20%			03%			- 4%							
'00		38%			18%			13%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	18133	Dec:	26%				
											'95	7580		19%				
											'00	7260		42%				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total								
		1	2	3	4		1	2									
Atriplex canescens																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	43	22	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	1	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		00%		00%		00%											
'95		100%		00%		00%											
'00		00%		00%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	0%				
										'95	20		100%				
										'00	0		0%				
Atriplex confertifolia																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	8	-	-	-	-	-	-	-	8	-	-	-	160			8
	00	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	2	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	2	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	5	-	-	-	-	-	-	-	5	-	-	-	100			5
M	88	4	-	-	-	-	-	-	-	4	-	-	-	266	22	18	4
	95	14	-	-	-	-	-	-	-	14	-	-	-	280	20	23	14
	00	11	-	-	2	1	-	2	-	16	-	-	-	320	20	27	16
D	88	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	3	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	1	-	1	1	2	-	-	1	-	-	4	100			5
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		00%		00%		00%											
'95		00%		00%		00%											
'00		12%		08%		15%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	465	Dec:	14%				
										'95	380		16%				
										'00	520		19%				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	4	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
												'00	20		-			
Gutierrezia sarothrae																		
S	'88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	'95	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	'88	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	'88	4	-	-	5	-	-	-	-	-	9	-	-	-	600	7	6	9
	'95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	12	8	3
	'00	35	-	-	-	-	-	-	-	-	35	-	-	-	700	5	6	35
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-93%							
'95		00%			00%			00%			+93%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	866	Dec:	-			
												'95	60		-			
												'00	880		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	0		-				
											'00	140		-				
Opuntia spp.																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	3	4	
	00	2	-	-	1	-	-	-	-	-	3	-	-	-	60	5	9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+18%							
'95		00%			00%			00%			-25%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-				
											'95	80		-				
											'00	60		-				
Pinus edulis																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	0		-				
											'00	0		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Sarcobatus vermiculatus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	-	-	2	-	-	3	-	-	-	60		3	
M	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	33	26	4
	95	172	-	-	-	-	-	-	-	-	26	-	-	-	3440	37	50	172
	00	6	2	3	14	-	-	-	-	-	25	-	-	-	500	40	54	25
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	21	-	-	-	-	-	-	-	-	-	-	-	-	420		21	
	00	4	3	1	3	1	-	-	-	-	7	-	-	5	240		12	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+93%							
'95		00%			00%			00%			-79%							
'00		15%			10%			13%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	266	Dec:	0%				
											'95	3860		11%				
											'00	800		30%				

Trend Study 10-13-00

Study site name: Moon Ridge Burn .

Range type: Burned Black Greasewood .

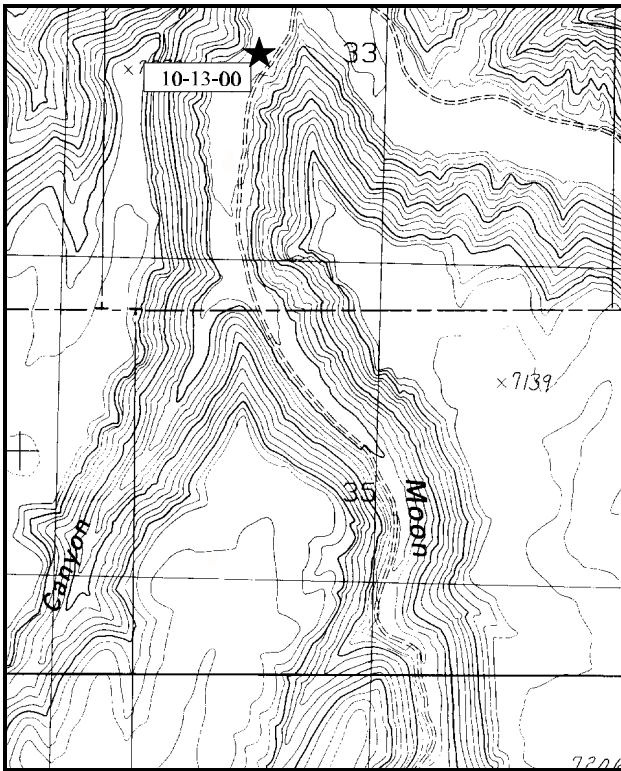
Compass bearing: frequency baseline 2°M degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

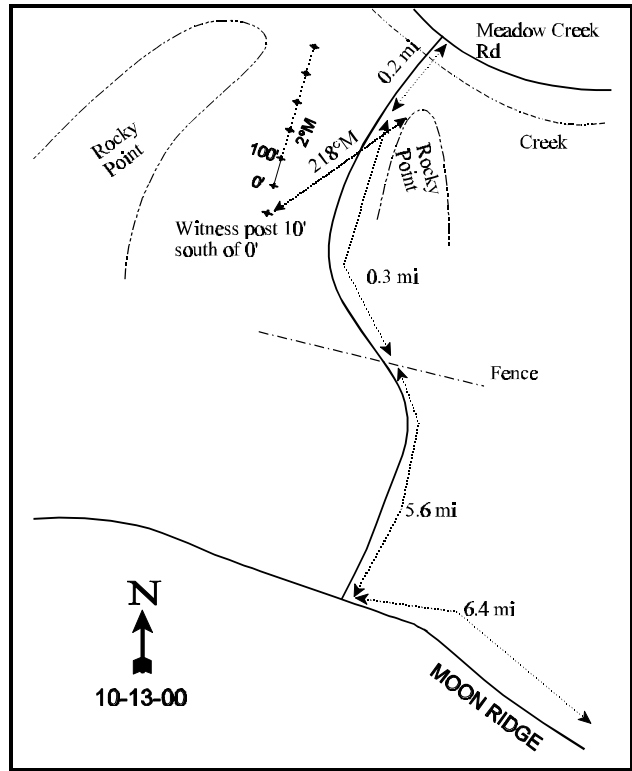
Travel 6.4 miles up Moon Ridge to Moon Ridge Canyon. Turn right and travel north down Moon Ridge canyon 5.6 miles to a gate. From the gate travel 0.3 miles and stop. From here walk towards the wash and into the burn to a full high witness post. The 0 ft. baseline stake is 10 feet to the north. The baseline runs north at 2/M.

When coming from Winter Ridge to the north travel to the intersection of Moon Canyon and Meadow Creek. Cross Meadow Creek and travel south 0.2 miles and stop. From here walk towards the wash and into the burn to a full high witness post. The 0 ft. baseline stake is 10 feet to the north.



Map Name: Tenmile Canyon North .

Township 15S , Range 21E , Section 33



Diagrammatic Sketch

UTM. 4369728.387 N, 622625.958 E

DISCUSSION

Trend Study No. 10-13 (16A-13)

The Moon Ridge Burn site was established in 1995 to monitor a burn and herbicide treatment of a greasewood dominated draw in Ten Mile Canyon. The area is administered by the Division of Wildlife Resources. It was burned in 1994, then later sprayed as the greasewood resprouted. This treatment was done to enhance habitat for wintering elk in the area. This site was re-read in 1997 as a special studies site to address perceived conflicts over elk and livestock use in the North Book Cliffs. In 1997, pellet group data estimated 59 elk days use/acre (146 edu/ha) and 19 cow days use/acre (47 cdu/ha). Pellet group transect data from 2000 estimate 1 deer day use/acre (2 ddu/ha), 22 elk days use/acre (54 edu/ha), and 13 cow days use/acre (32 cdu/ha). Due to several mild winters since 1997, it appears that winter elk use has decreased since the 1997 reading.

Terrain at the site is a nearly level canyon bottom. Soils are moderately deep and alluvially deposited. Texture analysis indicates a sandy loam soil with very little surface rock and pavement cover. Soils are slightly alkaline (pH of 7.8). The effective rooting depth was estimated to be 22 inches with an average temperature of 61°F. In the middle of the transect, the soil becomes more shallow with significantly more rock in the profile, but the soil on both ends is deeper with little rock encountered. There is abundant organic matter in the soil, mostly from old roots, presumably from the dense stand of black greasewood the once dominated this site. Since 1995, percent bare ground has considerably decreased from 49% to just over 22% in 1997, and to only 11% in 2000. Erosion still does not appear to be serious problem at this time, due to the level terrain, abundant herbaceous vegetation, and well dispersed litter cover.

Browse was not abundant on the site following the treatment, but has increased for some species since 1995. Fringed sagebrush had an estimated density of 1,200 plants/acre in 1997, increasing to 4,760 plants/acre in 2000. Most of the population was classified as mature in 1997. Age class distribution in 2000 shows a large influx of young plants where present, with young plants making up 80% of the population. Seedlings are also extremely abundant being estimated at 4,820 seedlings/acre in 2000. Basin big sagebrush density is slowly increasing from an estimated 140 plants/acre in 1997 to 200 plants/acre in 2000. These plants showed no utilization and were all classified as young in 1997. Many of these young plants have persisted and matured as 90% of the population is now classified as mature. Use is mostly light and vigor generally good except on 10% of the population.

Black greasewood is the dominant shrub on the site. Following the burn and spray treatment, greasewood has steadily increased from 640 plants/acre in 1995, to 960 plants/acre in 1997, and 1,740 plants/acre in 2000. Cover has doubled since 1997 from 7% to 15%. Currently, young recruitment is high at 36% indicating an increasing population in the future. A follow-up treatment is needed before greasewood becomes too dominant. Greasewood currently provides 94% of the browse cover and 21% of the total vegetative cover at this site.

Small numbers of rubber rabbitbrush, and seeded prostate kochia were encountered on the site in 1995. In 1997, rubber rabbitbrush density declined, but slightly increased in 2000 to 100 plant/acre. Prostrate kochia was not sampled in either 1997 or 2000.

Herbaceous vegetation is abundant, especially annual forbs. By far the dominant herbaceous species is summer cypress which currently has a cover value of 39%. It makes up 71% of the herbaceous cover and 55% of the total vegetative cover. Perennial grasses are composed almost entirely of seeded species including: crested wheatgrass, smooth brome, basin wildrye, and intermediate wheatgrass. Native perennial grasses are present in low numbers and include: thickspike wheatgrass and sand dropseed. Cheatgrass is present, but not particularly abundant. All grasses combined provide about 13% average cover.

1995 APPARENT TREND ASSESSMENT

The soil appears stable even though bare ground is abundant. The level terrain, well distributed litter cover (22%), and the abundant herbaceous vegetation cover (29%) prohibit serious erosion at this time. Browse is limited due to the treatment, yet a few seedlings and young fringed sagebrush, big sagebrush, and rubber rabbitbrush were encountered along with some seeded prostate kochia. The only negative aspect of the browse trend is the presence of resprouting greasewood. They are not currently abundant, however they will most likely increase in the future. The herbaceous understory is dominated by early successional forbs. The native and seeded grasses should increase and eventually dominate the site.

1997 TREND ASSESSMENT

Soil trend is improving with a decrease in bare ground cover and an increase in vegetation and litter cover. There is no erosion apparent on the site at this time. Soil trend is slightly upward. Black greasewood density has increased and the plants continue to become robust. Percent kill of greasewood on the north end of the transect was more complete than on the south end. Data collected in 1997 indicates that not only has the black greasewood density increased to 960 plants/acre, but these plants have become very robust averaging 41 inches in height with crown measurements of 58 inches. About 25% of the population are producing flowers 3 years after the burning and herbicide treatment. Black greasewood appears to be re-establishing on the site. Many of the black greasewood plants are sprouting from burned stumps. Fringed sagebrush has also increased in density, with a mostly mature age structure. Browse trend is stable at this time, but the black greasewood should have additional treatments to further reduce the density before the site is again dominated. Seeded grass cover and nested frequency have increased since 1995. Great Basin wildrye provides 7% of the herbaceous cover, while crested wheatgrass has increased to provide 13% of the herbaceous cover. Smooth brome, although encountered in 1995, was not sampled in 1997. Grasses now provide 22% of the total vegetative cover compared to 18% in 1995. Cheatgrass was encountered in 1997, although it has a cover value of less than 1%. All but two of the forbs are annual increasers. Dominant forb species are still early successional annuals and short lived perennials; summer cypress, Fremont goosefoot, tansymustard, coyote tobacco, and Russian thistle. Only one seeded forb, alfalfa, was sampled in 1997. Small burnet, sampled in 1995, but in low abundance, was not found in 1997. The herbaceous trend is stable.

TREND ASSESSMENT

soil - slightly upward (4)

browse - stable, black greasewood population should continue to be monitored for possible future treatment (3)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is up. Vegetation and litter cover continue to increase, while bare ground continues to decrease. Trend for browse is down as black greasewood dominates the shrub component. Greasewood currently makes up 94% of the browse cover and nearly doubled in density in 2000. Greasewood recruitment is high at 36% and average height and crown measurements have increased every year since the treatment. Trend for the herbaceous understory is down due to the dominance of annuals, primarily summer cypress which makes up 71% of the herbaceous cover, and 55% of the total cover. Sum of nested frequency for perennial species decreased in 2000 as well.

TREND ASSESSMENT

soil - up (5)

browse - down due to the dominance of greasewood (1)

herbaceous understory - down and dominated by annual species (1)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 13

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %		
		'95	'97	'00	'95	'97	'00	'95	'97	'00
G	<i>Agropyron cristatum</i>	_a 88	_b 221	_b 201	35	74	67	1.41	7.12	7.55
G	<i>Agropyron dasystachyum</i>	_a 1	_a -	_b 35	1	-	15	.03	-	1.41
G	<i>Agropyron intermedium</i>	-	-	8	-	-	2	-	-	.66
G	<i>Agropyron repens</i>	_b 32	_c 61	_a -	12	25	-	.91	.80	-
G	<i>Bromus inermis</i>	_c 39	_a -	_b 14	15	-	5	1.00	-	.15
G	<i>Bromus tectorum</i> (a)	_a -	_b 35	_b 57	-	13	20	-	.45	.94
G	<i>Elymus cinereus</i>	37	46	22	19	19	10	2.26	3.59	1.88
G	<i>Poa pratensis</i>	-	-	2	-	-	1	-	-	.15
G	<i>Sporobolus cryptandrus</i>	-	-	1	-	-	1	-	-	.00
Total for Annual Grasses		0	35	57	0	13	20	0	0.45	0.94
Total for Perennial Grasses		197	328	283	82	118	101	5.63	11.53	11.81
Total for Grasses		197	363	340	82	131	121	5.63	11.98	12.75
F	<i>Chenopodium fremontii</i> (a)	_c 339	_b 109	_a 8	95	34	4	18.03	3.01	.07
F	<i>Chorispora tenella</i> (a)	2	2	-	1	2	-	.03	.06	-
F	<i>Descurainia pinnata</i> (a)	_b 82	_c 256	_a 7	41	80	3	2.94	7.09	.01
F	<i>Kochia scoparia</i> (a)	_a 14	_b 374	_c 427	9	94	96	.52	18.73	38.93
F	<i>Lappula occidentalis</i> (a)	_a 17	_b 99	_b 75	8	33	29	.29	3.77	3.31
F	<i>Medicago sativa</i>	_b 33	_a 3	_a -	14	3	-	.24	.07	-
F	<i>Nicotiana attenuata</i> (a)	_b 14	_a -	_a -	5	-	-	.12	-	-
F	<i>Salsola iberica</i> (a)	5	-	-	3	-	-	.21	-	-
F	<i>Sanguisorba minor</i>	_b 17	_a -	_a -	7	-	-	.06	-	-
F	<i>Taraxacum officinale</i>	-	1	-	-	1	-	-	.00	-
F	Unknown forb-annual (a)	5	-	-	1	-	-	.15	-	-
F	<i>Wyethia amplexicaulis</i>	_b 20	_a -	_a -	9	-	-	.31	-	-
Total for Annual Forbs		478	840	517	163	243	132	22.31	32.68	42.33
Total for Perennial Forbs		70	4	0	30	4	0	0.62	0.07	0
Total for Forbs		548	844	517	193	247	132	22.93	32.75	42.33

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 13

Type	Species	Strip Frequency			Average Cover %		
		'95	'97	'00	'95	'97	'00
B	Artemisia frigida	10	27	26	.18	1.35	-
B	Artemisia tridentata tridentata	1	6	8	.00	.21	.91
B	Chrysothamnus nauseosus	3	1	4	.02	.06	.03
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	0	-	-	-
B	Kochia prostrata	5	0	0	.96	-	-
B	Sarcobatus vermiculatus	28	40	44	1.18	7.35	14.93
Total for Browse		47	75	82	2.35	8.98	15.87

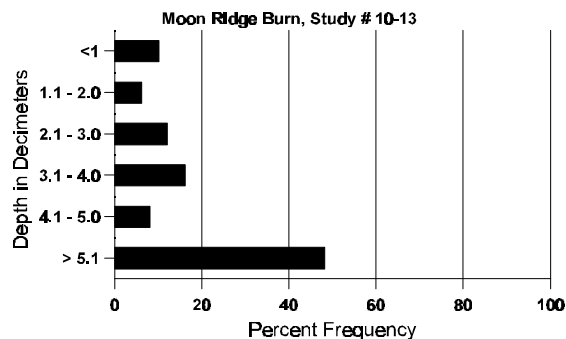
BASIC COVER --
Herd unit 10 , Study no: 13

Cover Type	Nested Frequency			Average Cover %		
	'95	'97	'00	'95	'97	'00
Vegetation	382	479	479	31.79	51.60	63.93
Rock	25	25	4	.72	.36	.15
Pavement	9	64	13	.06	.37	.12
Litter	465	492	492	22.21	36.65	68.13
Cryptogams	5	67	17	.00	.44	.21
Bare Ground	454	312	208	49.30	22.56	10.91

SOIL ANALYSIS DATA --
Herd Unit 10, Study no: 13

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
22.1	61.2 (19.7)	7.8	51.0	28.8	20.2	4.9	25.4	502.4	4.3

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 13

Type	Quadrant Frequency		
	'95	'97	'00
Rabbit	-	-	7
Elk	1	25	20
Deer	-	-	-
Cattle	-	5	11

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
-	35	-	N/A
766	287	59 (145)	22 (55)
-	9	-	1 (2)
226	157	19 (47)	13 (33)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 13

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia frigida																	
S	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	241	-	-	-	-	-	-	-	-	241	-	-	-	4820		241
Y	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10
	97	9	-	-	-	-	-	-	-	9	-	-	-	180		9	
	00	190	1	-	-	-	-	-	-	191	-	-	-	3820		191	
M	95	7	-	-	-	-	-	-	-	7	-	-	-	140	9 10	7	
	97	51	-	-	-	-	-	-	-	51	-	-	-	1020	12 14	51	
	00	42	-	-	-	-	-	3	-	45	-	-	-	900	5 7	45	
D	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'95		00%			00%			00%			+72%						
'97		00%			00%			00%			+75%						
'00		.42%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'95	340	Dec:	0%			
											'97	1200		0%			
											'00	4760		1%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata tridentata																		
Y	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	97	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	00	7	2	-	-	-	-	-	-	-	6	2	1	-	180	18	18	9
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'95		00%			00%			00%			+86%							
'97		00%			00%			00%			+30%							
'00		20%			00%			10%										
Total Plants/Acre (excluding Dead & Seedlings)												'95	20	Dec:	-			
												'97	140		-			
												'00	200		-			
Chrysothamnus nauseosus																		
Y	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	47	70	0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	15	19	4
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'95		00%			00%			00%			-75%							
'97		00%			00%			00%			+80%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'95	80	Dec:	-			
												'97	20		-			
												'00	100		-			
Chrysothamnus viscidiflorus viscidiflorus																		
M	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	13	15	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'95		00%			00%			00%										
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'95	0	Dec:	-			
												'97	20		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Kochia prostrata																		
M	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	11	9	5
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'95		00%			00%			00%										
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'95	100	Dec:	-			
												'97	0		-			
												'00	0		-			
Sarcobatus vermiculatus																		
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
Y	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	97	35	-	-	-	-	-	-	-	-	35	-	-	-	700			35
	00	31	-	-	-	-	-	-	-	-	31	-	-	-	620			31
M	95	22	-	-	2	-	-	-	-	-	24	-	-	-	480	14	15	24
	97	12	-	-	-	-	-	-	-	-	12	-	-	-	240	41	58	12
	00	43	-	-	11	-	-	1	-	-	55	-	-	-	1100	51	54	55
D	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	3960			198
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	2200			110
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'95		00%			00%			00%			+33%							
'97		00%			00%			00%			+45%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'95	640	Dec:	0%			
												'97	960		2%			
												'00	1740		1%			

Trend Study 10-14-00

Study site name: East Floy Bench .

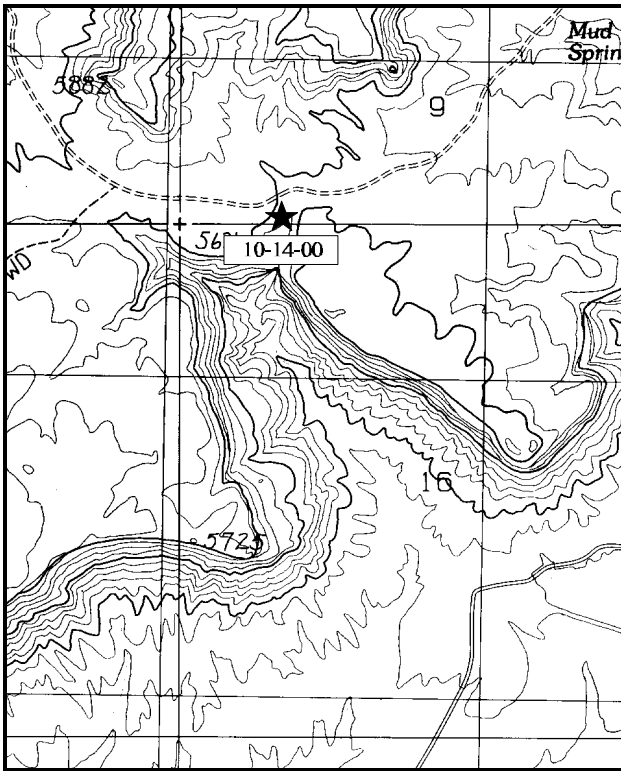
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 3 rebar at 15ft.

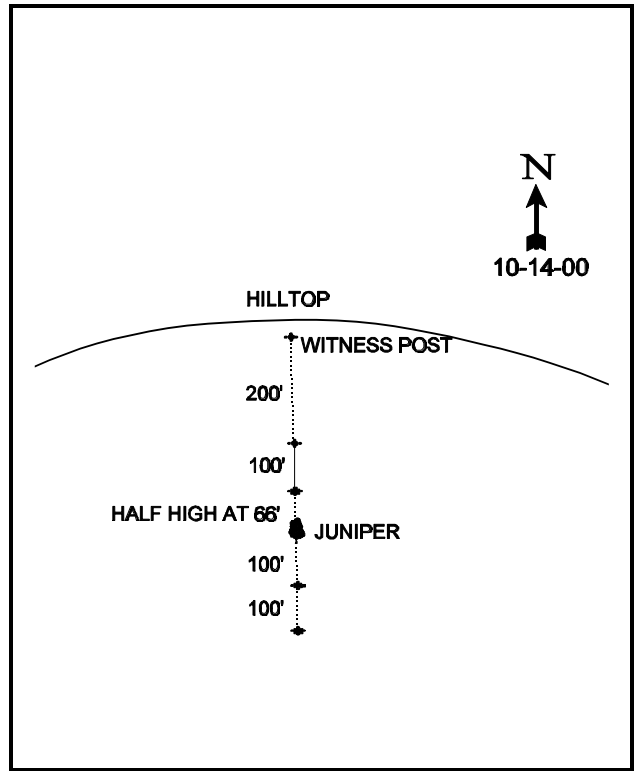
LOCATION DESCRIPTION

Go to Crescent Junction, off of I-70 east of Green River. From the dirt road 0.1 miles east of the gas station and SR 163 junction, cross the east-west running tracks and go north two miles on the main dirt road to a fork. Bear right and go 3.7 miles to a fork on top of a hill, stay left and climb out of the wash and up the west side of the canyon. Turn left. Continue 0.45 miles to the crest of a small hill. There is a rebar witness post 10 feet to the left. The 0-foot baseline stake, marked with a browse tag, is 200 feet south of the witness post.



Map Name: Crescent Junction

Township 21S , Range 19E , Section 9/16



Diagrammatic Sketch

UTM. 4317389.368 N, 602929.589 E

DISCUSSION

Trend Study No. 10-14 (16B-1)

The East Floy Bench transect is located on a low lying bench running along the south end of the Book Cliffs. The bench has a north aspect with a 3-5% slope and an elevation of 5,600 feet. This sagebrush-pinyon-juniper flat drops off abruptly at the southern edge to the salt desert below. This study is located on BLM administered land in the Floy Creek Allotment. In 1986, it was grazed by 1,208 sheep from mid-November to mid-April. This allotment was converted to cattle use after 1995. Grazing is currently permitted from November 1st through April 20 for cows at 958 AUM's on a 4 pasture deferred rotation system. Pellet group quadrat frequencies in 1995 and 2000 indicate light to moderate deer use, occasionally light use by elk, and high rabbit use. Pellet group transect data from 2000 estimated 27 deer days use/acre (67 ddu/ha), 7 elk days use/acre (17 edu/ha), and 18 cow days use/acre (44 cdu/ha).

The sandy loam soil is moderately deep, although, there are large areas of exposed and shallow covered sandstone bedrock. Chemical analysis indicates the soil is low in phosphorus at 4.3 ppm where 10 ppm has been shown to be necessary for normal plant growth and development. The soil is neutral in reactivity (pH of 7.0) and organic matter is low at less than 1%. A profile stoniness index estimated from penetrometer readings show the majority of the rockiness to occur between 8 and 12 inches in depth. Effective rooting depth is nearly 13 inches with average soil temperature being 62°F at 11 inches in depth. Bare ground is abundant on this site. In 1995, bare ground cover was estimated at 39%, increasing to over 57% in 2000. Average cover from vegetation and litter both decreased in 2000. Some soil movement is evident in plant interspaces, but due to the gentle slope, erosion is light. Rock and pavement cover combine for less than 2% of the ground cover.

Wyoming big sagebrush is the key browse species with an estimated density of 2,700 plants/acre in 1986, declining to 1,060 plants/acre in 1995, and 940 plant/acre in 2000. The decrease in density after 1986 is due mainly to the increased sample size used beginning in mid-1992, evidenced by the lack of dead plants in 1995. Mature plants comprise the majority of the population in both 1995 and 2000. Recruitment from young plants was moderately high in 1995 at 23%, but decreased to only 4% in 2000. Percent decadency has varied between sampling years. Decadency was estimated at 19% in 1986, down to 2% in 1995, and 28% in 2000. The proportion of the population displaying poor vigor has slightly increased in successive years where it is currently estimated at 19%. Utilization was moderate to heavy in the 1986 sample, but has since decreased to a more moderate level. Heavy use decreased to 4% in 1995 and then up to 11% in 2000. A sample of sagebrush annual leader growth were measured in 2000 which showed an average of about 7 inches. The population appeared to be naturally thinning itself in response to extended drought with one out of every five plants sampled classified as dead in 1995. The ratio of live to dead plants has since improved. Increased decadency, decreased recruitment, and reduced vigor since 1995 is likely partially due to the extended drought.

Due to the larger sample size and better sample distribution used in 1995, considerably more browse species were sampled in 1995 and 2000. These species include: fourwing saltbush, winterfat, spiny hopsage, green ephedra, shadscale, rubber rabbitbrush, low rabbitbrush, slenderbush eriogonum, broom snakeweed, and cactus. Many of these species are preferred by wildlife and livestock, but most occur in low densities. These shrubs show light to moderate utilization in 1995 and 2000. In 1995, most of these species had good vigor, with poor vigor increasing on fourwing and spiny hopsage in 2000. Broom snakeweed was the most abundant shrub in 1986 and 1995, but has since decreased to only 960 plants/acre in 2000. This species is vulnerable to drought conditions and is most likely decreasing due to the extended drought. Point center-quarter data estimates a low number of juniper trees in both 1995 and 2000 (16 trees/acre).

From 1986 to 1995, there was a significant decline in sum of nested frequency for perennial grasses. Galleta, bottlebrush squirreltail, and needle-and-thread all declined in 1995. In 2000, sum of nested frequency for perennial grasses slightly increased. Galleta and needle-and-thread remain stable, while bottlebrush squirreltail

significantly increased in nested frequency. Cheatgrass and sixweeks fescue, both annuals, significantly decreased in nested frequency in 2000. Forbs have been sparse in all sampling years, but especially so in 2000, where only two annual species were sampled.

1986 APPARENT TREND ASSESSMENT

Data and observations indicate an apparent slight downward trend under the current winter sheep grazing regime. The palatable shrubs are moderately to heavily hedged and generally declining in vigor and reproductive success. The Wyoming big sagebrush population has an encouraging amount of young plants, however, broom snakeweed and juniper appear to be increasing. Of particular concern is the fact that unless the new grazing plan includes a reduction in sheep AUM's, excessive shrub utilization will result in pastures that are not rested. This sagebrush range gradually gives way to the more traditional salt desert shrub sheep winter range at lower elevations. Management strategies should strive to minimize sheep use on critical big game winter range and limit winter use to the lower elevational areas. The soil is stable, but would benefit from less disturbance.

1995 TREND ASSESSMENT

Although this area had early spring precipitation, the rest of the summer was drier than usual. The early spring precipitation likely did not benefit the perennial grasses due to the abundance of cheatgrass. Perennial grass species compete poorly for soil moisture with cheatgrass when moisture only comes in the winter and spring, especially when cheatgrass is abundant. Although grasses provide 50% of the total vegetative cover on the site, the sum of nested frequency for perennial grass has declined by nearly 50% since 1986. For this reason, the herbaceous understory trend is downward with a notably poor forb component. The browse trend for this site appears to be stable. The Wyoming big sagebrush population has good biotic potential with nearly one-fourth of the population classified as young plants. Also, the intensity of hedging has shifted from heavy to moderate with a declining percent decadency. Some soil movement is evident, but due to the gentle slope, vegetative cover, and cryptogamic crust cover, the movement is slight. Therefore, soil trend is considered stable.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - downward and dominated by poor value annual forbs and annual grasses (1)

2000 TREND ASSESSMENT

Trend for soil is slightly down with a large increase in bare ground cover and decreases in cover from herbaceous vegetation and litter. The ratio of protective ground cover to bare soil is low at 2:1. Trend for browse is slightly down. Wyoming big sagebrush has increased decadency and poor vigor, as well as decreased recruitment from 23% in 1995 to 4% in 2000. Other less abundant palatable species such as fourwing saltbush, spiny hopsage, and shadscale have high decadency rates. Trend for the herbaceous understory is stable with a slight increase in sum of nested frequency for perennial grasses.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 14

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Aristida purpurea</i>	a-	ab1	b7	-	1	4	.03	.07
G	<i>Bromus tectorum</i> (a)	-	b318	a56	-	97	25	6.72	1.10
G	<i>Elymus salina</i>	a-	b15	b13	-	5	6	1.10	.18
G	<i>Hilaria jamesii</i>	b156	a65	a76	66	27	30	1.10	2.01
G	<i>Oryzopsis hymenoides</i>	b36	b37	a17	21	19	8	1.91	.30
G	<i>Sitanion hystrix</i>	b40	a7	a2	17	4	1	.07	.03
G	<i>Sporobolus cryptandrus</i>	a-	a5	b63	-	2	27	.03	1.58
G	<i>Stipa comata</i>	b92	a40	a39	42	19	15	.92	.93
G	<i>Vulpia octoflora</i> (a)	-	b75	a4	-	27	2	.21	.01
Total for Annual Grasses		0	393	60	0	124	27	6.93	1.11
Total for Perennial Grasses		324	170	217	146	77	91	5.18	5.12
Total for Grasses		324	563	277	146	201	118	12.11	6.23
F	<i>Chenopodium leptophyllum</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Descurainia pinnata</i> (a)	-	3	-	-	1	-	.00	-
F	<i>Draba</i> spp. (a)	-	b17	a-	-	5	-	.02	-
F	<i>Eriogonum cernuum</i> (a)	-	b10	a-	-	4	-	.02	-
F	<i>Erigeron pumilus</i>	-	5	-	-	3	-	.01	-
F	<i>Lappula occidentalis</i> (a)	-	b67	a-	-	24	-	.12	-
F	<i>Plantago patagonica</i> (a)	-	b42	a-	-	17	-	.09	-
F	<i>Ranunculus testiculatus</i> (a)	-	-	1	-	-	1	-	.00
F	<i>Salsola iberica</i> (a)	-	-	2	-	-	1	-	.00
F	<i>Tragopogon dubius</i>	3	-	-	1	-	-	-	-
Total for Annual Forbs		0	141	3	0	52	2	0.26	0.00
Total for Perennial Forbs		3	5	0	1	3	0	0.01	0
Total for Forbs		3	146	3	1	55	2	0.28	0.00

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 14

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia tridentata wyomingensis</i>	24	21	4.20	3.29
B	<i>Atriplex canescens</i>	7	7	.56	.15
B	<i>Atriplex confertifolia</i>	4	5	.03	.88
B	<i>Ceratoides lanata</i>	6	2	.45	.15
B	<i>Chrysothamnus nauseosus consimilis</i>	1	0	-	-
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	9	7	.15	.44
B	<i>Ephedra viridis</i>	1	4	-	1.50
B	<i>Eriogonum microthecum</i>	2	0	.00	-
B	<i>Grayia spinosa</i>	5	2	.33	.15
B	<i>Gutierrezia sarothrae</i>	80	27	3.82	.32
B	<i>Juniperus osteosperma</i>	0	0	2.25	3.11
B	<i>Opuntia spp.</i>	1	4	-	.03
Total for Browse		140	79	11.82	10.05

CANOPY COVER --
Herd unit 10 , Study no: 14

Species	Percent Cover '00
<i>Juniperus osteosperma</i>	4

BASIC COVER --
Herd unit 10 , Study no: 14

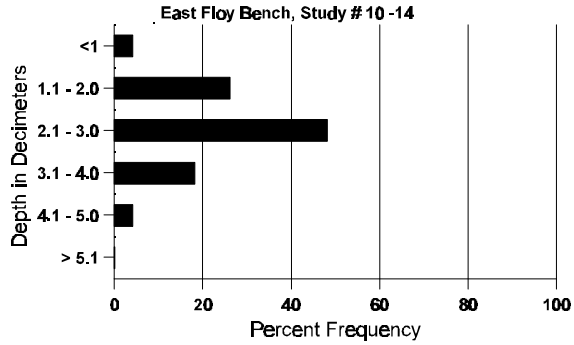
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	337	224	2.25	23.38	17.85
Rock	42	12	0	1.45	1.17
Pavement	66	44	0	.44	.42
Litter	387	351	35.75	31.51	24.85
Cryptogams	235	220	2.50	10.39	10.03
Bare Ground	335	364	59.50	39.23	57.54

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 14, Study Name: East Floy Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
12.76	62.0 (11.02)	7.0	60.0	23.4	16.6	0.6	4.3	185.6	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 14

Type	Quadrat Frequency	
	'95	'00
Sheep	7	4
Horse	-	-
Rabbit	58	42
Bighorn	-	-
Elk	5	3
Deer	20	15
Cattle	-	2

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
-	-
35	N/A
435	N/A
44	N/A
87	7 (17)
348	27 (67)
218	18 (44)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 14

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
<i>Artemisia tridentata wyomingensis</i>												
S	86	2	-	-	-	-	-	-	2	66		2
	95	7	-	-	-	-	-	-	7	140		7
	00	-	-	-	-	-	-	-	-	0		0
Y	86	21	5	4	-	-	-	-	29	1000		30
	95	3	9	-	-	-	-	-	9	240		12
	00	1	1	-	-	-	-	-	2	40		2
M	86	-	11	16	2	3	4	-	31	1200	15 14	36
	95	16	22	2	-	-	-	-	37	800	23 39	40
	00	1	14	3	2	11	1	-	32	640	24 41	32
D	86	-	6	7	-	-	2	-	15	500		15
	95	1	-	-	-	-	-	-	-	20		1
	00	6	4	-	-	2	1	-	4	260		13
X	86	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	220		11
	00	-	-	-	-	-	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		31%		41%		06%		-61%				
'95		58%		04%		13%		-11%				
'00		68%		11%		19%						
Total Plants/Acre (excluding Dead & Seedlings)									'86	2700	Dec:	19%
									'95	1060		2%
									'00	940		28%
<i>Atriplex canescens</i>												
S	86	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	1	20		1
Y	86	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	1	20		1
	00	-	-	-	-	-	-	-	-	0		0
M	86	-	-	-	-	-	-	-	-	0	- -	0
	95	6	-	-	-	-	-	-	6	120	27 37	6
	00	1	-	-	-	-	-	-	1	20	23 28	1
D	86	1	2	4	2	-	1	-	6	333		10
	95	-	-	-	-	-	-	-	-	0		0
	00	8	1	-	1	4	-	-	3	280		14
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		20%		50%		40%		-58%				
'95		00%		00%		00%		+53%				
'00		33%		00%		73%						
Total Plants/Acre (excluding Dead & Seedlings)									'86	333	Dec:	100%
									'95	140		0%
									'00	300		93%

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Atriplex confertifolia</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	3	1	-	-	-	-	-	-	5	-	-	-	100	22	32	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	21	44	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	5	-	-	-	-	6	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		60%			20%			00%			+38%							
'00		63%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	0%				
											'95	100		0%				
											'00	160		75%				
<i>Ceratoides lanata</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	2	-	2	7	-	-	-	-	12	-	-	-	240	15	17	
	00	6	3	-	-	-	-	-	-	-	9	-	-	-	180	13	22	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		77%			00%			00%			-31%							
'00		33%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	260		-				
											'00	180		-				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
Chrysothamnus nauseosus consimilis												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	0	21	20	0
	00	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)							'86	0	Dec:	0%		
							'95	20		100%		
							'00	0		0%		
Chrysothamnus viscidiflorus stenophyllus												
S	86	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	20		1	
Y	86	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	60		3	
	00	1	-	-	-	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	2	-	-	-	100	16	34	5
	00	7	-	1	-	-	-	-	160	13	28	8
D	86	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	40			2
	00	1	-	-	-	-	-	-	20			1
X	86	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	80			4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		10%		+ 0%				
'00		00%		10%		10%						
Total Plants/Acre (excluding Dead & Seedlings)							'86	0	Dec:	0%		
							'95	200		20%		
							'00	200		10%		

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	2	2	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	63	97	
	00	-	3	2	-	-	-	-	-	-	5	-	-	-	100	25	25	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+90%							
'00		60%			20%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	0%				
											'95	20		0%				
											'00	200		10%				
<i>Eriogonum microthecum</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	-	-	4	-	-	-	-	-	6	-	-	-	120	-	6	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	140		-				
											'00	0		-				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total						
		1	2	3	4		1	2							
Grayia spinosa															
M	86	-	-	-	-	-	-	-	0	-	-	0			
	95	2	-	-	1	-	-	-	3	-	-	60	25	44	3
	00	-	-	-	-	-	-	-	-	-	-	0	23	44	0
D	86	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	3	-	-	60			3
	00	-	-	-	2	-	-	-	-	-	2	40			2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>							
'86		00%		00%		00%									
'95		00%		00%		00%		-67%							
'00		100%		00%		100%									
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	0%						
						'95	120		50%						
						'00	40		100%						
Gutierrezia sarothrae															
S	86	10	-	-	-	-	-	-	10	-	-	333			10
	95	1	-	-	1	-	-	-	2	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	112	-	-	-	-	-	-	112	-	-	3733			112
	95	4	-	-	1	-	-	-	5	-	-	100			5
	00	-	-	-	-	-	-	-	-	-	-	0			0
M	86	129	-	-	-	-	-	-	129	-	-	4300	8	7	129
	95	295	-	-	7	-	-	-	302	-	-	6040	9	11	302
	00	28	-	-	5	-	-	-	33	-	-	660	6	8	33
D	86	5	-	-	-	-	-	-	5	-	-	166			5
	95	-	-	-	-	-	-	-	-	-	-	0			0
	00	14	-	-	-	1	-	-	7	-	1	300			15
X	86	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	1500			75
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>							
'86		00%		00%		00%		-25%							
'95		00%		00%		00%		-84%							
'00		02%		00%		17%									
Total Plants/Acre (excluding Dead & Seedlings)						'86	8199	Dec:	2%						
						'95	6140		0%						
						'00	960		31%						

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	71	71	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
												'00	0		-			
Opuntia spp.																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	7	1	1
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	21	1
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60	6	21	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			-39%							
'95		00%			00%			00%			+75%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	0%			
												'95	20		0%			
												'00	80		25%			

Trend Study 10-15-00

Study site name: East Thompson Bench

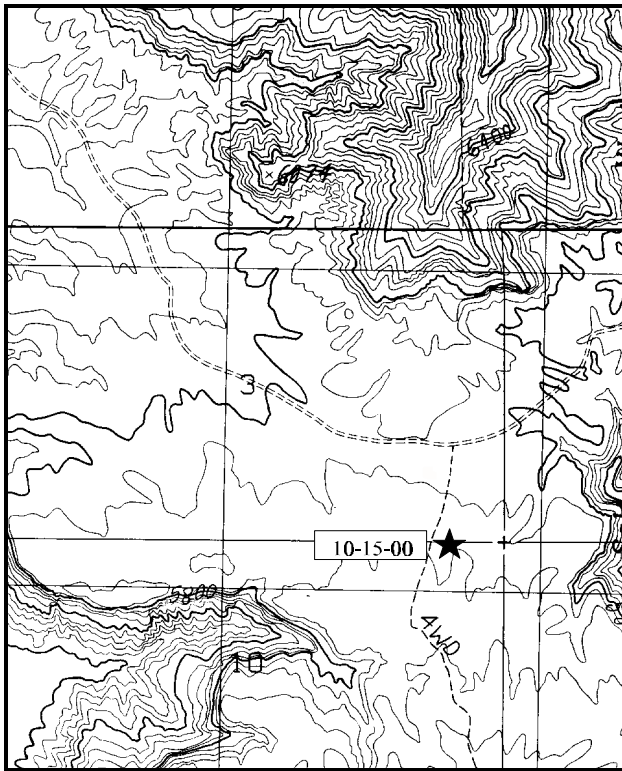
Range type: Pinyon-Juniper

Compass bearing: frequency baseline 170°M

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). No rebar marking belt placement on belts 1 and 4

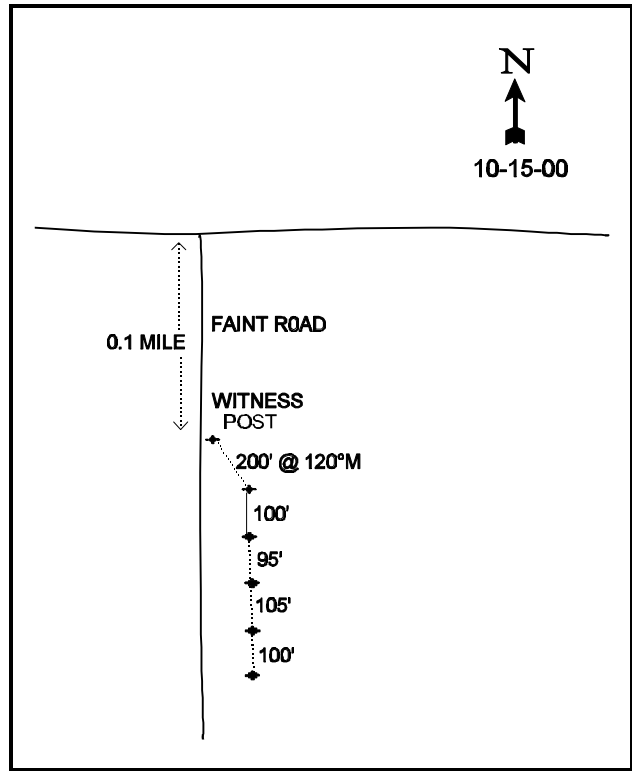
LOCATION DESCRIPTION

From the railroad crossing in the town of Thompson, travel 1.3 miles north up the main road to a fork. Stay left and go 2.2 miles to the Thompson Canyon pictographs. Continue 0.4 miles. Make a sharp right turn and go 0.2 miles past an old house and a railroad cut to a fork. Turn right across a deep gully and go 1.15 miles to a fork. Stay left and continue 0.55 miles to a very faint road on the right. Turn on this road and go 0.1 mile to a witness post (a steel rebar) on the left side of the road. The first baseline post is 200 feet away at a bearing of 120°M from the witness post.



Map Name: Sego Canyon

Township 21S, Range 20E, Section 3



Diagrammatic Sketch

UTM. 4318244.980 N, 613735.462 E

DISCUSSION

Trend Study No. 10-15 (16B-2)

The East Thompson Bench transect is located on a low lying bench east of Thompson Canyon at an elevation of 5,800 feet. It is a broad flat bench, dominated by junipers and intermixed with small openings of Wyoming big sagebrush. The bench has a gentle slope with a northern aspect. Water is limited in the area, but spring runoff flows through most of the intermittent washes in late winter or early spring. This site is located within the large Cisco Allotment which is grazed from November 1st to May 10th by 3 cattle permittees. Two sheep permittees also use the allotment from December through early May. In 1986, the BLM reported 61% use in the Thompson Bench area by sheep. In the past, the area was thought to be used heavily by deer, but data from 1995 and 2000 indicate this is not the case in recent years. In 2000, pellet group transect data estimate 35 deer days use/acre (86 ddu/ha) and 1 elk day use/acre (2 edu/ha). Two-thirds of the deer pellet groups were sampled on the first 200 feet of the transect where the area is in a sagebrush opening. Pellet groups decrease in frequency as you move into the pinyon-juniper further down the transect baseline.

Soil texture is a sandy clay loam and is reddish in color. The soil has moderate depth as indicated by the estimated effective rooting depth of over 17 inches. Average soil temperature is 61°F at 18 inches. The soil is slightly alkaline (pH of 7.5) with phosphorus (1.7 ppm) and potassium (48 ppm) being lower than the 10 ppm and 70 ppm shown necessary for normal plant growth and development. Organic matter is very low at less than 1%. There is little soil protection from vegetation and litter in the shrub interspaces. Several small active gullies are present, but due to the gentle terrain, erosion is not severe. Soil movement is most evident on trails or where the soil has been disturbed. Most of the litter and cryptogams are located directly beneath the canopy of the Wyoming big sagebrush. There is less than 1% cover contributed by rock and pavement combined.

Utah juniper is the predominant species, and it provided 67% of the browse cover in both 1995 and 2000, and over half of the total vegetative cover in both years. These are primarily large, mature trees that are estimated at 84 trees/acre from point-centered quarter data in 2000. Pinyon pine are present, but are much less abundant than juniper at an estimated 9 trees/acre.

The preferred key browse species is Wyoming big sagebrush with an estimated density of 1,680 plants/acre in 1995 and 1,960 plants/acre in 2000. In 1986, the small openings were not sampled very well and a lower plant density was estimated. With the increased sample size used beginning in mid-1992, a much better estimate was gathered in 1995 and 2000. Mature sagebrush currently averages nearly 1½ feet in height with a crown of 2 ½ feet. Leader growth was noted as being poor on most plants in 2000, with only a few plants having leaders up to 5 inches in length. Fifty-two percent of the population was decadent in 1986, decreasing to 42% in 1995 and then up slightly to 45% in 2000. The proportion of decadent plants classified as dying was 46% in 1995, increasing to 64% in 2000. Recruitment from young plants increased from 7% in 1995 to 34% in 2000. The number of young is currently adequate to replace the decadent, dying plants in the population. The proportion of the population in poor vigor has been high over all sampling years and is currently at 29%. Over grazing in the past, coupled with the extended drought and winter injury, has lead to much of the crown death and is likely the cause for increasingly poor vigor, high decadency, and the proportion of decadent plants classified as dying.

Other browse at this site include green ephedra and broom snakeweed. Ephedra density is currently estimated at 40 plants/acre with half being decadent. Snakeweed density was estimated at 1,160 plants/acre in 1995, decreasing to 860 plants/acre in 2000.

Cheatgrass and sixweeks fescue were the dominant grass species in 1995 as they combined to provide 34% of the herbaceous cover. However, cheatgrass significantly decreased in frequency and sixweeks fescue was not sampled in 2000 due to the drought. Galleta grass is the most abundant perennial grass followed by bottlebrush

squirreltail. Perennial grasses occur sporadically throughout the site and are in low abundance. Perennial grasses remained at stable frequencies in 2000.

Forbs are sparse and not significant on this site. The most abundant perennial forb, timber poisonvetch, showed signs of use by insects in 1986, but not in 1995 or 2000. Although considered palatable by all classes of livestock, this plant is in some instances toxic, and in others, a highly nutritious plant (high protein content). Other perennial forbs encountered include: longleaf phlox, low fleabane, and sego lily. Sum of nested frequency for perennial forbs increased in 1995, but again decreased by half in 2000. Annual species dominated the scant forb understory in 1995 due to the unusually wet spring. However, due the drought in 2000, annuals were greatly reduced.

1986 APPARENT TREND ASSESSMENT

Due to a declining Wyoming big sagebrush population and apparent invasion of junipers and broom snakeweed, the vegetative trend appears to be declining. A treatment for the juniper and/or rest from winter sheep use would be desirable, but neither is called for in the management plan. The soil appears stable.

1995 TREND ASSESSMENT

The Wyoming big sagebrush population is showing slight improvement. Seventy-four percent of the plants were heavily hedged in 1986, decreasing to 24% in 1995. There are nearly as many dead as there are living plants with 45% of the decadent plants classified as dying. Percent decadency slightly decreased in 1995 to 42%. Broom snakeweed was sampled and does not appear to be increasing in density or young age class. With the improvement in Wyoming big sagebrush and an apparently decreasing broom snakeweed population, the browse trend is slightly upward. Annual grasses do not dominate the understory of this site like they do on surrounding sites, but they do make up over 80% of the herbaceous cover. Sum of nested frequency for galleta and Indian ricegrass significantly decreased since 1986, while the increased sample size detected *Elymus* spp. and mutton bluegrass. The changes in composition of the grass species is likely due to a larger sample size and a better distribution of sampling over the entire site. Forbs add very little to the site and are found primarily beneath the sagebrush crowns. The herbaceous understory trend is stable for now and more of a trend will be evident the next time the site is evaluated. There is little soil movement or pedestaling evident on the site. Soil trend is stable with most of the erosion coming from disturbed areas. Previously, nested frequency was collected only in the sagebrush opening and not in the denser patches of trees. Also, a more accurate Utah juniper density is achieved by sampling throughout the entire vegetation type and not only in the more dense portions of the Utah juniper stand.

TREND ASSESSMENT

soil - stable (3)

browse - slightly upward for Wyoming big sagebrush (4)

herbaceous understory - stable, but poor with too many annuals (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down due to increased bare ground cover and a lower ratio of protective ground cover to bare soil. Several gullies are present underneath the juniper trees, although these are small, they are nonetheless active. Trend for browse is stable but in poor condition. Even though recruitment from the young age class increased to a high level (34%), percent decadency still remains high at 45% with 64% of these classified as dying. There are nearly as many dead plants as there are live in the population the last two sampling years. However, there appears to be currently enough young plants to replace the decadent/dying sagebrush. In addition, there is less heavy use than was reported in 1995. The site is still dominated by an

overstory of Utah juniper which has an overhead canopy cover value of 14%. Juniper cover will continue to increase and eventually begin to negatively effect the sagebrush to a greater degree. Trend for the herbaceous understory is stable, but depleted. Perennial grasses show a very slight decrease in sum of nested frequency from 163 to 156. Perennial forbs decreased to half of the sum of nested frequency value reported in 1995, however, they provide less than 1% average cover.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable but in poor condition (3)

herbaceous understory - stable, but depleted (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 15

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	b190	a33	-	73	14	1.41	.07
G	Elymus salina	a-	b29	b15	-	11	6	.63	.52
G	Hilaria jamesii	b129	a65	a83	54	25	30	.74	1.97
G	Oryzopsis hymenoides	b14	a1	ab4	6	1	3	.03	.17
G	Poa fendleriana	a-	b16	b5	-	6	4	.03	.02
G	Sitanion hystrix	49	52	49	23	25	23	.83	.36
G	Vulpia octoflora (a)	-	b186	a-	-	58	-	.44	-
Total for Annual Grasses		0	376	33	0	131	14	1.85	0.07
Total for Perennial Grasses		192	163	156	83	68	66	2.27	3.05
Total for Grasses		192	539	189	83	199	80	4.12	3.12
F	Alyssum alyssoides (a)	-	a-	b18	-	-	8	-	.04
F	Astragalus convallarius	13	21	20	7	9	8	.27	.26
F	Astragalus spp.	-	5	5	-	3	2	.01	.01
F	Castilleja linariaefolia	9	8	-	3	4	-	.04	-
F	Calochortus nuttallii	a-	b17	a1	-	8	1	.04	.00
F	Chenopodium fremontii (a)	-	1	-	-	1	-	.00	-
F	Cryptantha spp.	a-	b14	a-	-	7	-	.03	-
F	Descurainia spp. (a)	-	b26	a-	-	10	-	.05	-
F	Eriogonum cernuum (a)	-	3	-	-	2	-	.01	-
F	Erigeron pumilus	2	6	5	2	4	2	.04	.01
F	Euphorbia spp.	-	1	1	-	1	1	.00	.00
F	Gilia hutchinifolia (a)	-	b72	a3	-	31	2	.20	.01
F	Lappula occidentalis (a)	-	6	-	-	3	-	.01	-
F	Lepidium densiflorum (a)	-	b139	a-	-	47	-	.51	-
F	Phlox longifolia	13	10	8	5	3	3	.01	.01

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Ranunculus testiculatus (a)	-	-	1	-	-	1	-	.00
F	Schoenocrambe linifolia	-	2	-	-	1	-	.00	-
F	Sisymbrium altissimum (a)	-	5	-	-	2	-	.01	-
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	252	22	0	96	11	0.81	0.05
Total for Perennial Forbs		38	84	40	18	40	17	0.47	0.31
Total for Forbs		38	336	62	18	136	28	1.28	0.36

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 15

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata wyomingensis	39	38	5.23	6.04
B	Chrysothamnus viscidiflorus stenophyllus	0	1	-	-
B	Ephedra viridis	3	2	.00	.00
B	Gutierrezia sarothrae	22	20	.43	.43
B	Juniperus osteosperma	0	12	11.85	13.11
B	Opuntia spp.	2	2	.15	.00
Total for Browse		66	75	17.68	19.60

CANOPY COVER --

Herd unit 10 , Study no: 15

Species	Percent Cover
	'00
Juniperus osteosperma	14

BASIC COVER --

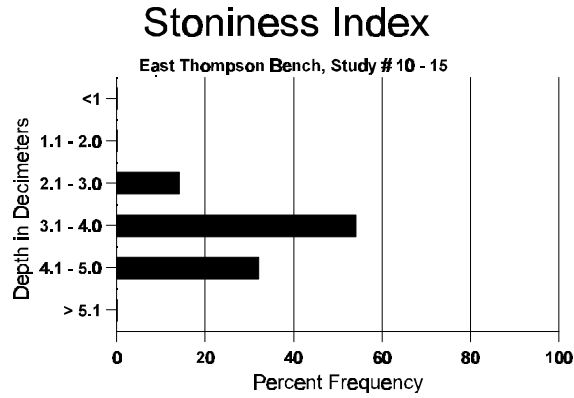
Herd unit 10 , Study no: 15

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	321	190	8.25	26.71	25.85
Rock	16	5	0	.68	.15
Pavement	28	19	0	.10	.75
Litter	382	339	40.25	34.96	34.76
Cryptogams	203	183	4.25	9.87	13.65
Bare Ground	255	317	47.25	30.85	47.48

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 15, Study Name: East Thompson Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
17.24	61.0 (18.03)	7.5	50.0	28.0	22.0	0.7	1.7	48.0	0.6



PELLET GROUP FREQUENCY --

Herd unit 10, Study no: 15

Type	Quadrat Frequency	
	'95	'00
Sheep	22	-
Rabbit	43	36
Elk	-	8
Deer	19	19

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
-	-
226	N/A
9	1 (2)
461	35 (88)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 15

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	26	-	-	1	-	-	-	-	-	27	-	-	-	540		27	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	86	-	4	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
	00	33	-	-	-	-	-	-	-	-	33	-	-	-	660		33	
M	86	-	2	5	-	-	2	-	-	-	7	2	-	-	300	18 20	9	
	95	9	17	17	-	-	-	-	-	-	43	-	-	-	860	20 31	43	
	00	4	4	4	-	8	1	-	-	-	21	-	-	-	420	21 29	21	
D	86	-	1	8	-	-	5	-	-	-	8	1	1	4	466		14	
	95	13	19	2	-	-	1	-	-	-	19	-	-	16	700		35	
	00	5	16	-	2	19	2	-	-	-	16	-	-	28	880		44	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1460		73	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1160		58	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		26%			74%			19%			+46%							
'95		43%			24%			19%			+14%							
'00		48%			07%			29%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	899	Dec:	52%			
												'95	1680		42%			
												'00	1960		45%			
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	20		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60	16	16	
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	9	9	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			-50%							
'00		00%			50%			50%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	80		0%			
												'00	40		50%			
<i>Gutierrezia sarothrae</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	11	-	-	-	-	-	-	-	-	11	-	-	-	366		11	
	95	13	-	-	2	-	-	-	-	-	15	-	-	-	300		15	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	86	93	-	-	-	-	-	-	-	-	93	-	-	-	3100	8	7	
	95	39	-	-	4	-	-	-	-	-	43	-	-	-	860	8	8	
	00	24	-	-	1	-	-	-	-	-	25	-	-	-	500	6	8	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	10	-	-	1	-	-	1	-	-	9	-	-	3	240		12	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			-67%							
'95		00%			00%			00%			-26%							
'00		00%			00%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	3466	Dec:	0%			
												'95	1160		0%			
												'00	860		28%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100	94	104	3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	7	-	-	2	-	-	3	-	-	12	-	-	-	240	-	-	12
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	200	Dec:	-				
											'95	0		-				
											'00	260		-				
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	7	7	1
	95	1	-	-	-	-	-	1	-	-	2	-	-	-	40	6	12	2
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	14	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			+18%							
'95		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	33	Dec:	-				
											'95	40		-				
											'00	40		-				

Trend Study 10-16-00

Study site name: West Horse Pasture .

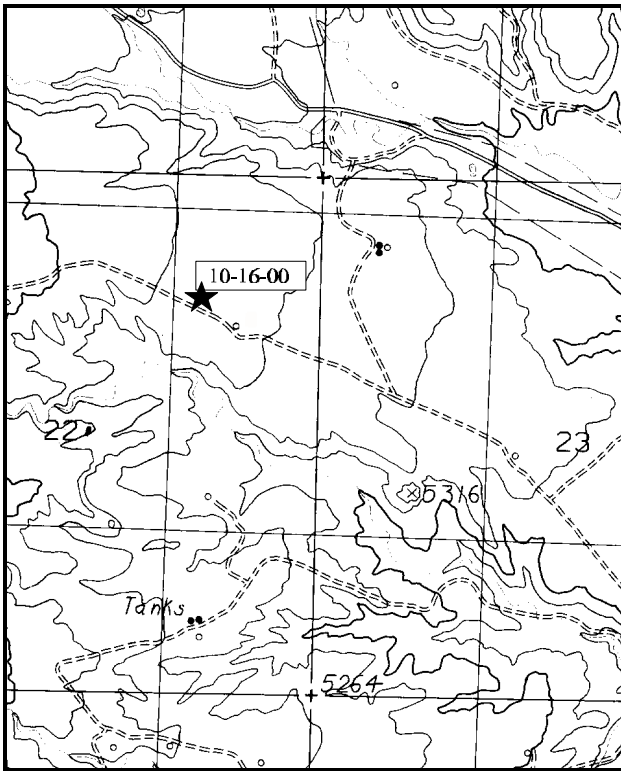
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (28ft).

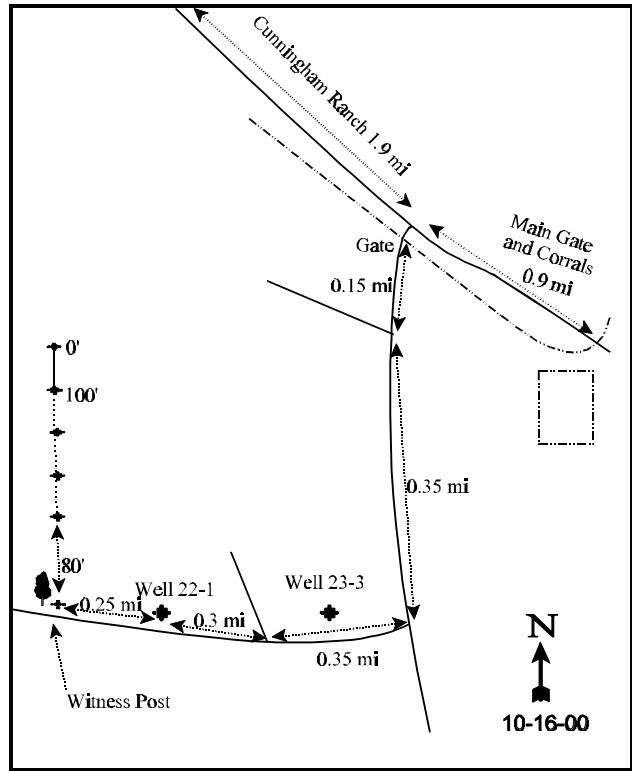
LOCATION DESCRIPTION

From the main gate at Cunningham Ranch travel south 1.9 miles to a fork and turn right. Go through a gate (100 yards) and proceed 0.15 miles to a fork at the top of a hill. Stay left and go 0.35 miles to a "T" intersection. Turn right and go 0.35 miles past a well [NP Energy #23-3] to a fork. Stay left and travel northwest 0.3 miles to another well [NP Energy #22-1]. Continue northwest for 0.25 miles to a rebar witness post on the right side of the road next to a small Juniper. The 400-foot stake is 80 feet due north from the witness post. The frequency baseline starts 400 feet north at a rebar tagged with browse tag #7807.



Map Name: Sego Canyon

Township 20S , Range 21E , Section 22



Diagrammatic Sketch

UTM. 4323817.811 N, 622881.679 E

DISCUSSION

Trend Study No. 10-16 (16B-3)

The West Horse Pasture transect is located south of Nash Wash and samples critical deer winter range. It is in a large, open Wyoming big sagebrush flat surrounded by junipers and eroded steep cliffs to the north and west. Elevation at the site is 5,300 feet. Not only is this a critical deer winter concentration area, it also supports many other uses including some cattle and sheep grazing, oil and gas exploration and production, mining, and associated human activity. Pellet group transects located in the Horse Pasture area showed an average use of 58 deer days use/acre (143 ddu/ha) between 1981 and 1986 (Jense et al. 1986). From 1986 through 1990, the last time this pellet transect was read, use averaged 39 deer days use/acre (95 ddu/ha) (Jense et al. 1991). A pellet transect read in 2000 along the trend study site baseline estimated 58 deer days use/acre (143 ddu/ha) and 5 elk days use/acre (12 edu/ha). In 1986, four antler drops were found. Cover for deer is provided by a nearby dense stand of mature Utah Juniper.

The transect site is basically flat, draining to the southeast by an ephemeral wash. There is some evidence of surface erosion and an active gully runs between the 300 and 400 foot stake making it necessary to sample line four at the 28 foot mark. Soil loss in the past is evident by a high degree of soil movement from interspaces and subsequent pedestaling around the base of the shrubs. Litter build-up is also evident on mounds underneath shrubs. Shrub interspaces are nearly all bare soil. Cryptogams are mossy-like and are present almost entirely underneath shrub crowns. Soil texture is a sandy clay loam with an average temperature of 64°F at just over 15 inches in depth. Effective rooting depth is estimated at a little beyond 15 inches. A profile stoniness index estimated from penetrometer readings shows a compact layer between 12-16 inches in depth. Very little rock is present in the profile, thus this index is a measure of the depth to a hardpan not actual rock. The soil is slightly alkaline (pH of 7.4) with phosphorus and potassium both lower than the 10 ppm and 70 ppm shown necessary for normal plant growth and development. Vegetative cover was estimated at 36% with a moderate amount of litter cover (46%) in 1995. Both of these categories decreased in value in 2000, while bare ground increased.

The key species is Wyoming big sagebrush which has been utilized heavily for many years on this site. Wyoming big sagebrush currently ('00) provides 98% of the browse cover and 62% of the total vegetative cover. Average height/crown measurements for mature plants currently are a little more than one foot in height with a little over a two foot crown. In 1986, forage availability was limited due to severe hedging. Heavy use was displayed on 93% of the population in 1986, decreasing to 50% in 1995, and 23% in 2000. Percent decadency has also decreased since 1986, when 55% of the sagebrush were classified as decadent. Currently, 26% of the sagebrush population are decadent. However, 73% of the decadent plants are classified as dying in 2000, an increase from 60% in 1995. This represents about 650 plant/acre that could be lost to die-off in the future. Recruitment from young plants is currently very low at 1%, so the decadent, dying plants should be watched closely. The proportion of the sagebrush population displaying poor vigor has remained nearly the same over all sampling years. The dead to live ratio was 1:6 in both 1995 and 2000. Leader growth ranged from 5-9 inches on sagebrush in 2000.

Broom snakeweed comprised 77% of the browse composition in 1995 having a population estimate of 15,140 plants/acre. This species has since drastically declined to 1,020 plants/acre in 2000. Snakeweed is vulnerable to dry conditions and is apparently decreasing due to the extended drought. Spiny hopsage, which was encountered in 1986, was not sampled in either 1995 or 2000 with the change in sampling design used beginning in mid-1992. Fourwing saltbush is estimated at 20 plants/acre in 2000. There are some scattered young pinyon and juniper trees throughout the flat, but they do not appear to be encroaching into the area. Point-quarter data in 2000 estimate 5 pinyon and 13 juniper trees/acre.

As reported in 1986, the grass composition has been dominated by annual cheatgrass in the past, with perennial grasses being relatively scarce. Cheatgrass was sampled in every quadrat in 1995, but due to the dry conditions in 2000, had a reduced quadrat frequency of 70%. It is still abundant enough to again dominate with normal precipitation patterns. Perennial grasses remain in low abundance in 2000 with the 4 species sampled having a combined nested frequency of only 121. The most numerous perennial grass is currently bottlebrush squirreltail with galleta being next in abundance. Both species have stable nested frequencies in 2000. Sum of nested frequency for all perennial grasses increased in 2000.

Forbs provide less cover than grasses (1.9% in 2000), but are slightly more diverse. Globemallow occurs throughout the area, along with several species of *Astragalus* and low fleabane. The most abundant forb in 1995 was wooly plantain, an annual, which is very low growing and of poor forage value or cover. However, as with virtually all other winter range sites, this species was nearly non-existent in 2000 due to drought. Perennial forbs slightly decreased in sum of nested frequency in 2000.

1986 APPARENT TREND ASSESSMENT

Wyoming big sagebrush on the site is sustaining severe heavy use and data indicates an apparent declining trend in vigor, age structure, and forage production. Ninety-eight percent of the sagebrush population is mature or decadent. The primary management objective should be to promote sagebrush seed production to enhance the opportunity for recruitment, but this is difficult with the high density of competing winter annuals in a very dry summer environment. Plant vigor needs to improve in order for seed production to occur. A combination of management practices could take place for this to happen. Grazing pressure on sagebrush must be greatly reduced. A thinning project designed to open up the stand could help reduce intraspecific competition and open up space for seedling establishment. Key browse species should be seeded in conjunction with the thinning treatment.

1995 TREND ASSESSMENT

Although the Wyoming big sagebrush is not as heavily hedged as in the past (93% vs 50%) and percent decadency in the population has decreased (55% vs 27%), 98% of the population still remains classified as mature or decadent. The broom snakeweed density, judging from its composition, appears to be relatively stable, although it is shifting to a more mature age structure. This leads to a stable browse trend. As mentioned in 1986, management objectives should be to promote sagebrush seed production. Concurrently, the herbaceous understory would benefit if the Wyoming big sagebrush population were thinned, but more importantly there should be fewer winter annuals for the herbaceous species and sagebrush seedlings to compete with. Wyoming big sagebrush now contributes over 12% of the vegetative cover. With this high of a cover value from Wyoming big sagebrush, the herbaceous understory production is reduced and anything more than an annual herbaceous understory should not be expected. The increase in sum of nested frequency for galleta and bottlebrush, which are good to fair forage in the spring, and the increase in sum of nested frequency for perennial forbs, indicates a slightly upward herbaceous understory trend. Although this trend is slightly upward, this is still a poor composition and is nonetheless dominated by annual species. An active gully is located in the center of the study site, but shows some signs of healing. Elsewhere on the site, there is not much evidence of erosion, mostly due to the dense cheatgrass and Wyoming big sagebrush cover. Soil trend for this site is stable for now and the gully should be monitored in the future for further activity.

TREND ASSESSMENT

soil - stable (3)

browse - stable, but over mature population of Wyoming big sagebrush (3)

herbaceous understory - slightly upward but poor composition (4)

2000 TREND ASSESSMENT

Trend for soil is slightly down due to a large increase in bare ground and decreases in vegetation and litter cover. As a result, the ratio of protective ground cover to bare soil decreased in 2000 and is low at just over 2:1. Interspaces between shrubs show past signs of soil loss and with the decrease in annual species, these are virtually bare making them susceptible to erosion. Trend for browse is stable, but the key species Wyoming big sagebrush, remains in a less than ideal condition. The population of Wyoming big sagebrush has remained at similar levels in percent decadency and the proportion of the population in poor vigor. One negative factor is that the decadent plants classified as dying increased from 60% in 1995 to 73% in 2000. Young recruitment remains low at 1% which could translate into a decreasing population in the future if the decadent, dying plants die-off. Heavy use has decreased again in 2000 to 23% of the population, down from 50% in 1995. Trend for the herbaceous understory is stable as sum of nested frequency for perennial species slightly increased in 2000.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 16

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	_b 374	_a 196	-	100	70	12.08	1.44
G	Hilaria jamesii	_a 2	_b 50	_b 51	2	19	19	1.25	3.73
G	Oryzopsis hymenoides	1	3	5	1	1	2	.15	.44
G	Sitanion hystrix	_a 3	_b 42	_b 63	2	23	27	.44	1.58
G	Sporobolus cryptandrus	_b 12	_a -	_{ab} 2	5	-	1	-	.03
G	Vulpia octoflora (a)	-	10	-	-	3	-	.01	-
Total for Annual Grasses		0	384	196	0	103	70	12.10	1.44
Total for Perennial Grasses		18	95	121	10	43	49	1.83	5.78
Total for Grasses		18	479	317	10	146	119	13.94	7.22
F	Astragalus convallarius	5	12	7	3	6	4	.17	.21
F	Astragalus moencopensis	1	-	-	1	-	-	-	-
F	Astragalus spp.	_a 3	_b 28	_a 3	2	11	1	.05	.00
F	Castilleja linariaefolia	-	6	3	-	3	1	.16	.00
F	Calochortus nuttallii	-	3	1	-	1	1	.00	.00
F	Descurainia spp. (a)	-	_b 11	_a -	-	4	-	.02	-
F	Draba spp. (a)	-	1	-	-	1	-	.00	-
F	Erigeron pumilus	1	-	5	1	-	3	-	.04
F	Gilia hutchinifolia (a)	-	_b 8	_a -	-	4	-	.02	-
F	Holosteum umbellatum (a)	-	_b 21	_a -	-	13	-	.06	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Lappula occidentalis (a)	-	_b 31	_a -	-	11	-	.05	-
F	Leucelene ericoides	-	1	3	-	1	1	.00	.03
F	Lepidium spp. (a)	-	_b 51	_a -	-	23	-	.11	-
F	Oenothera spp.	-	5	-	-	2	-	.01	-
F	Phlox longifolia	_a -	_b 19	_b 21	-	9	9	.04	.04
F	Plantago patagonica (a)	-	_b 129	_a 2	-	50	1	.30	.00
F	Schoenrambe linifolia	-	-	1	-	-	1	-	.00
F	Sphaeralcea coccinea	20	28	43	10	12	16	.16	1.57
F	Unknown forb-perennial	3	-	-	1	-	-	-	-
Total for Annual Forbs		0	252	2	0	106	1	0.58	0.00
Total for Perennial Forbs		33	102	87	18	45	37	0.61	1.92
Total for Forbs		33	354	89	18	151	38	1.19	1.93

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 16

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata wyomingensis	84	80	12.32	15.15
B	Atriplex canescens	0	1	-	-
B	Gutierrezia sarothrae	97	34	7.67	.23
B	Opuntia spp.	9	10	.00	.09
Total for Browse		190	125	20.01	15.48

BASIC COVER --

Herd unit 10 , Study no: 16

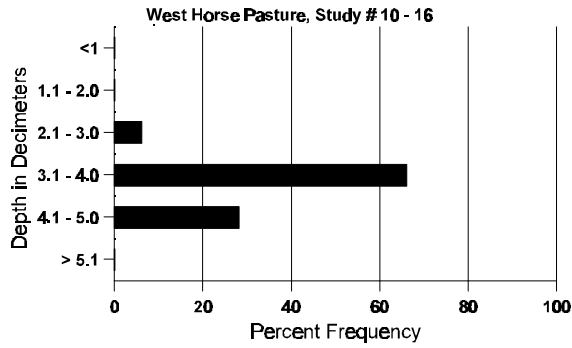
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	382	277	24.50	36.40	27.21
Rock	10	5	0	.07	.01
Pavement	-	21	0	0	.12
Litter	393	375	48.00	45.56	33.00
Cryptogams	139	93	0	1.89	2.98
Bare Ground	311	348	27.50	29.78	51.00

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 16, Study Name: West Horse Pasture

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
15.39	63.8 (15.51)	7.4	50.0	24.0	26.0	0.7	3.8	57.6	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10, Study no: 16

Type	Quadrat Frequency	
	'95	'00
Rabbit	49	30
Elk	-	3
Deer	44	66

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
235	N/A
70	5 (12)
757	58 (143)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 16

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
Y	86	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	3	-	-	-	-	-	-	-	4	-	1	-	100		5	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	11	1	-	6	-	-	-	17	-	1	-	1200	12	14	18
	95	12	59	65	-	4	13	-	-	-	153	-	-	-	3060	17	30	153
	00	12	58	23	8	26	2	-	-	-	126	3	-	-	2580	16	26	129
D	86	-	-	17	-	1	5	-	-	-	15	-	6	2	1533		23	
	95	1	26	20	-	1	9	-	-	-	23	-	-	34	1140		57	
	00	3	11	12	9	7	3	-	-	-	12	-	-	33	900		45	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	760		38	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	580		29	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		05%			93%			21%			+35%							
'95		43%			50%			16%			-19%							
'00		58%			23%			19%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	2799	Dec:	55%			
												'95	4300		27%			
												'00	3500		26%			
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	20		-			
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	1	-	-	-	1	-	-	-	66	13	17	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	20	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	-	-	-	3	-	-	-	2	-	1	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			100%			25%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	266	Dec:	75%			
												'95	0		0%			
												'00	0		0%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total					
		1	2	3	4		1	2						
Gutierrezia sarothrae														
S	86	11	-	-	-	-	-	-	11	-	-	733		11
	95	29	-	-	-	-	-	-	29	-	-	580		29
	00	2	-	-	-	-	-	-	2	-	-	40		2
Y	86	60	-	-	-	-	-	-	60	-	-	4000		60
	95	262	-	-	2	-	-	-	264	-	-	5280		264
	00	1	-	-	-	-	-	-	1	-	-	20		1
M	86	47	-	-	-	-	-	-	47	-	-	3133	10 7	47
	95	481	-	-	10	-	-	-	491	-	-	9820	12 13	491
	00	41	-	-	-	-	-	-	41	-	-	820	10 11	41
D	86	6	-	-	-	-	-	-	6	-	-	400		6
	95	2	-	-	-	-	-	-	1	-	-	40		2
	00	9	-	-	-	-	-	-	3	-	-	180		9
X	86	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	240		12
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>					<u>%Change</u>					
'86		00%	00%	00%					+50%					
'95		00%	00%	.13%					-93%					
'00		00%	00%	12%										
Total Plants/Acre (excluding Dead & Seedlings)										'86	7533	Dec:	5%	
										'95	15140		0%	
										'00	1020		18%	
Opuntia spp.														
S	86	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	1	-	-	20		1
M	86	-	-	-	-	-	-	-	-	-	-	0	- -	0
	95	10	-	-	-	-	-	-	10	-	-	200	6 18	10
	00	8	-	-	1	-	-	-	9	-	-	180	5 17	9
D	86	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	0		0
	00	3	-	-	-	-	-	-	1	-	-	60		3
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>					<u>%Change</u>					
'86		00%	00%	00%										
'95		00%	00%	00%					+17%					
'00		08%	00%	17%										
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	0%	
										'95	200		0%	
										'00	240		25%	

Trend Study 10-17-00

Study site name: East Calf Canyon .

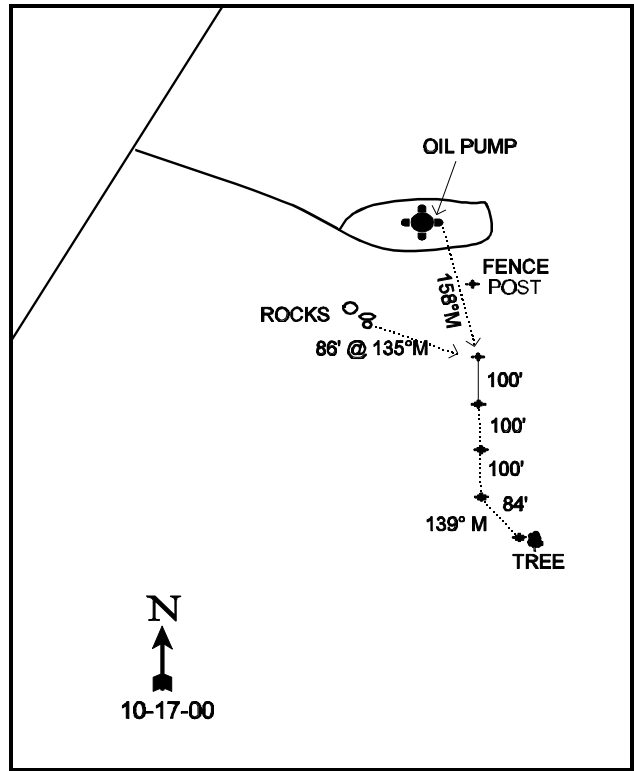
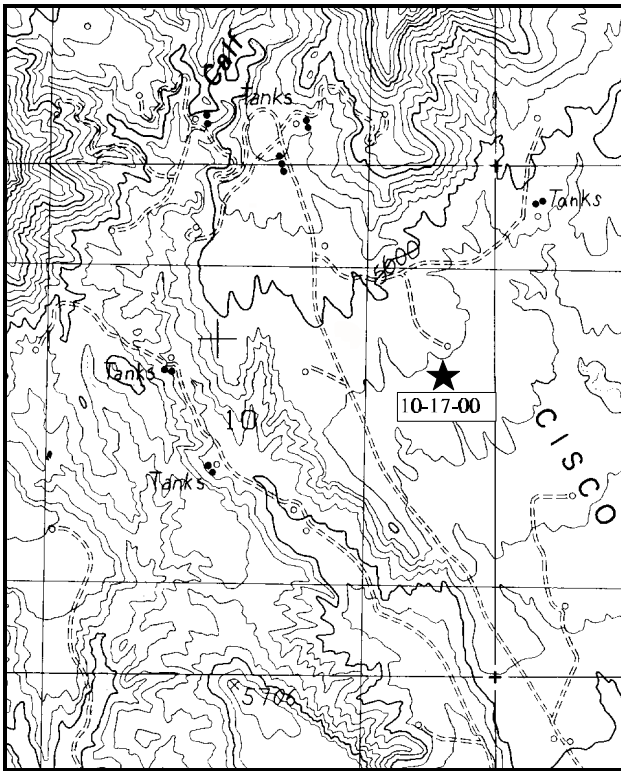
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the main gate at Cunningham Ranch go southeast on the main road for 1.55 miles to a fork and turn left (northeast). Proceed 0.4 miles to a fork. Turn right and proceed 0.85 to a fork. Stay left and go 1.05 miles to another fork. Turn right and go 0.2 miles to a well numbered Cisco Federal #1. The first baseline stake is approximately 100 feet southeast of the road in the sagebrush opening.



Map Name: Calf Canyon

Diagrammatic Sketch

Township 20S , Range 21E , Section 10

UTM. 4326704.855 N, 623276.606 E

DISCUSSION

Trend Study No. 10-17 (16B-4)

The East Calf Canyon transect is located in a sagebrush clearing on a mixed pinyon-juniper-sagebrush bench at the base of the Book Cliffs. The study is located north of Horse Pasture and Nash Wash at an elevation of 5,500 feet with a slight southeastern exposure. This Wyoming big sagebrush type has been an important wintering area for several hundred deer. This site is located within the large Cisco Allotment which is grazed from November 1 to May 10 by 3 cattle permittees. Two sheep permittees also use the allotment from December through early May. Prior to 1986, sheep use occurred in the winter months and cattle were present from mid-October to mid-June. A 330-acre chaining project was completed in the fall of 1987 on the area just east and northeast of the study site. The chaining and seeding was an Interagency project coordinated with State Lands, BLM, and DWR. This chaining was done with a light smooth chain to help protect an understory population of decadent cliffrose. Pellet group transect data from 2000 indicates deer use to be moderate with an estimated 29 deer days use/acre (72 ddu/ha). No elk pellets or cattle pats were sampled in the area of the transect. Besides its importance as big game and livestock winter range, there is active oil and gas exploration with associated developments and network of roads. At the north end of the clearing is an oil pump and storage tanks.

Soil on the site is a moderately deep, well-drained, loam to clay loam with an average temperature of 62°F at over 13 inches in depth. Effective rooting depth is estimated at nearly 16 inches. No hardpan, rock, or gravel exists in the profile, thus the profile stoniness index is more a reflection of increased compaction. Soils are neutral in reactivity (pH of 7.2). Phosphorus and potassium are lower than the 10 ppm and 70 ppm thought necessary for normal plant development. Shrub interspaces are mostly bare with small gullies and compacted animal trails showing the effects of some surface erosion. It was estimated in 2000 that the interspaces have between 4-6 inches of soil loss as indicated by the pedestaled shrubs. Litter is built up only under the sagebrush and had an estimated cover value of 39% in 1995, decreasing to 34% in 2000. Bare ground cover increased from 29% in 1995 to 47% in 2000.

The overall area supports a complex comprised mostly of juniper-pinyon woodland with scattered sagebrush openings. These sagebrush-grass openings provide the majority of the forage for deer, sheep, and cattle. Wyoming big sagebrush is the key browse species, and according to earlier BLM studies on the allotment in 1986, sagebrush utilization was heavy to severe. Sagebrush density was estimated at 3,999 plants/acre in 1986, increasing to 5,600 plants/acre in 1995, and 5,880 plants/acre in 2000. Data collected by the range crew in late June 1986 found a high percentage of decadent plants (55%) and many plants in the heavily hedged form class (57%). In 1995, percent decadency dropped to 18% and hedging was mostly moderate with very few heavily hedged plants. In 2000, percent decadency slightly increased to 25%, with 22% of the population displaying heavy use. Currently ('00), thirty-two percent of the decadent plants are classified as dying. However, young recruitment is high at 24%, and adequate to replace any individuals lost to die-off. The past heavily hedged appearance of the plants is also not as apparent. It now appears, with the apparent reduction in intensity of grazing, the sagebrush are responding positively. Seedlings, although not as numerous as in the past, can be found clustered around isolated productive individuals. Leader growth averaged about 4 inches in 2000 with few seed stalks on mature plants. Vegetative cover from Wyoming big sagebrush is estimated at 17-19%, and with this level of cover, the herbaceous understory is in a suppressed state and will continue to have a difficult time increasing without a decrease in sagebrush density in the future.

The two other browse species found on the transect are broom snakeweed and pricklypear cactus. The broom snakeweed population appeared to be slightly increasing and shifting to a more mature age structure in 1995. However, like other sites on the south end of the Book Cliffs, the density of snakeweed decreased in 2000 due to drought. Utah Juniper surrounds the sagebrush opening and does not appear to be invading. Mature trees,

especially on the edges and in the opening, have been highlined. Point-center quarter data from 2000 estimate 22 juniper trees/acre.

The sagebrush interspaces are basically devoid of vegetation except for annual cheatgrass. Even this invader species grows best under the protection of the sagebrush canopy. Forty-three percent of the total vegetative cover came from cheatgrass in 1995, making it present in nearly every quadrat (98%). However, due to drought in 2000, cheatgrass greatly decreased in abundance and was sampled in only 33% of the quadrats, while only making up only 5% of the total vegetative cover. Bottlebrush squirreltail significantly increased in sum of nested frequency between 1986 and 1995, but significantly decreased in 2000. It occurs sporadically throughout the site, but mostly under shrub crowns. There are a few scattered forbs, the most abundant being longleaf phlox and several *Astragalus* species that occur in low densities. The disturbed areas along the road and drill pad are a refuge for exotic annual weeds such as Russian thistle, but they have not yet invaded into the flat. Sum of nested frequency for all perennial herbaceous species decreased in 2000.

1986 APPARENT TREND ASSESSMENT

As long as current browsing pressure continues, especially by livestock, the long-term vegetative trend appears to be going down. The sagebrush cannot sustain current levels of use for many more years and there does not appear to be enough young plants to maintain stand density. A drought or severe winter could be deleterious. Soil trend appears downward because of the lack of ground cover, subsequent loss of the sandy soil through gully and surface erosion and lack of establishment of perennial plants in the bare areas. A combination of reduced grazing pressure and a sagebrush reduction treatment would be helpful in rejuvenating this area.

1995 TREND ASSESSMENT

Due to the recovery of the Wyoming sagebrush population from many years of excessive grazing, the browse trend is slightly upward. Although the Wyoming big sagebrush appears to be adequately recovering from heavy grazing pressure, the density of sagebrush coupled with the extended drought is causing the herbaceous understory to be stunted and to have poor diversity. The broom snakeweed population appears to be slightly increasing and the age class structure indicates a mature population with many young and seedlings present. This slight increase could be due to the much larger sample size and better distribution of the sample used throughout the sagebrush opening. The herbaceous understory is in poor condition with very few perennial species present. Sum of nested frequency for bottlebrush squirreltail and longleaf phlox significantly increased since 1986, but do not provide much forage or cover on this site. Therefore, the herbaceous understory trend is stable but with poor composition. The interspaces have little protection from erosion and some pedestaling is evident, but it does not appear to be any different than in 1986. Most litter and herbaceous vegetation is associated with the sagebrush plants, leaving the interspaces bare of cover. Trend for soil is stable for now. Thinning the sagebrush population on this site would benefit the herbaceous understory as well as provide needed soil protection.

TREND ASSESSMENT

soil - stable, but poor condition (3)

browse - slightly upward, although the Wyoming big sagebrush cover is dense and detrimental to the herbaceous understory establishment (4)

herbaceous understory - stable, but poor composition (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down to a large increase in bare soil, decreases in vegetation and litter cover, and a decrease in sum of nested frequency for perennial herbaceous species. The ratio of protective ground cover to

bare soil also largely decreased due to the these factors. Trend for browse is stable. Wyoming big sagebrush slightly increased in percent decadency and heavy use in 2000, but is still well below the 1986 levels of 55% and 57% respectively. Recruitment from young plants is currently high at 24% and adequate to replace the decadent, dying individuals that may be lost to die-off. The sagebrush is very dense at this site, and some thinning out of the population would be positive. Trend for the herbaceous understory is slightly down and in poor condition. Sum of nested frequency of the herbaceous perennial component decreased in 2000 from an already low level. The herbaceous understory will remain in this suppressed condition and poor composition unless the sagebrush is thinned out.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 10 , Study no: 17

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	_b 359	_a 95	-	98	33	16.90	1.02
G	Hilaria jamesii	3	-	-	1	-	-	-	-
G	Poa fendleriana	-	3	1	-	1	1	.00	.00
G	Sitanion hystrix	_a 31	_b 95	_a 58	14	40	26	.66	.41
G	Vulpia octoflora (a)	-	_b 37	_a 1	-	14	1	.07	.00
Total for Annual Grasses		0	396	96	0	112	34	16.97	1.02
Total for Perennial Grasses		34	98	59	15	41	27	0.66	0.41
Total for Grasses		34	494	155	15	153	61	17.63	1.44
F	Astragalus convallarius	_a -	_a -	_b 6	-	-	3	.00	.19
F	Astragalus spp.	1	8	1	1	4	1	.36	.00
F	Castilleja linariaefolia	-	6	3	-	2	1	.06	.03
F	Calochortus nuttallii	2	-	-	2	-	-	-	-
F	Chenopodium leptophyllum (a)	-	3	-	-	1	-	.00	-
F	Descurainia spp. (a)	-	8	-	-	3	-	.01	-
F	Draba spp. (a)	-	_b 18	_a 2	-	7	1	.03	.00
F	Eriogonum spp.	-	2	-	-	1	-	.00	-
F	Erigeron pumilus	-	-	1	-	-	1	-	.00
F	Erigeron utahensis	_{ab} 1	_b 8	_a -	1	5	-	.06	-
F	Gilia hutchinifolia (a)	-	_b 17	_a -	-	8	-	.04	-
F	Lappula occidentalis (a)	-	_b 8	_a -	-	4	-	.02	-
F	Phlox longifolia	39	60	41	16	25	21	.17	.13
F	Plantago patagonica (a)	-	_b 18	_a -	-	7	-	.03	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Salsola iberica (a)	-	a-	b29	-	-	12	-	.06
F	Schoenecrambe linifolia	-	4	6	-	2	3	.01	.04
Total for Annual Forbs		0	72	31	0	30	13	0.15	0.06
Total for Perennial Forbs		43	88	58	20	39	30	0.67	0.40
Total for Forbs		43	160	89	20	69	43	0.82	0.46

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 17

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia nova	-	-	-	.15
B	Artemisia tridentata wyomingensis	91	97	17.57	19.38
B	Atriplex canescens	-	-	-	.38
B	Gutierrezia sarothrae	60	23	1.05	.21
B	Juniperus osteosperma	0	2	1.85	.03
B	Opuntia spp.	5	9	.30	.18
Total for Browse		156	131	20.77	20.33

CANOPY COVER --

Herd unit 10 , Study no: 17

Species	Percent Cover '00
Juniperus osteosperma	3

BASIC COVER --

Herd unit 10 , Study no: 17

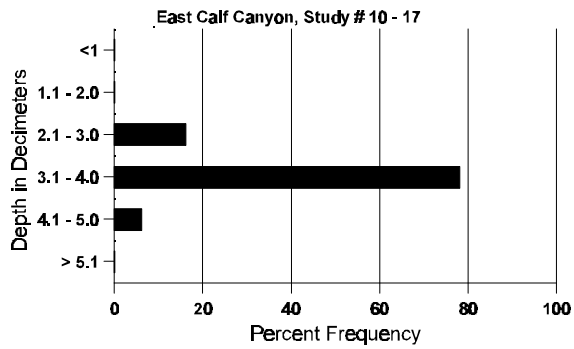
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	374	218	5.50	37.69	23.30
Rock	57	8	.25	.27	.69
Pavement	53	90	.25	.17	.43
Litter	389	362	47.00	38.50	33.78
Cryptogams	190	211	2.50	7.52	9.76
Bare Ground	284	333	44.50	29.38	47.86

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 17, Study Name: East Calf Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
15.70	62.0 (13.62)	7.2	44.0	29.4	26.6	0.8	6.6	67.2	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10, Study no: 17

Type	Quadrat Frequency	
	'95	'00
Sheep	9	-
Rabbit	16	19
Deer	21	30

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
-	-
35	N/A
374	29 (72)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 17

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total						
		1	2	3	4		1	2							
<i>Artemisia tridentata wyomingensis</i>															
S	86	19	-	-	-	-	-	-	19	-	19				
	95	35	-	-	-	-	-	-	35	-	35				
	00	7	-	-	-	-	-	-	7	-	7				
Y	86	7	-	-	-	-	-	-	7	-	7				
	95	54	3	-	-	-	-	-	57	-	57				
	00	54	10	-	3	2	-	2	71	-	71				
M	86	5	1	14	-	-	-	-	18	-	2	1333	12	18	20
	95	4	163	7	-	-	-	-	174	-	-	3480	20	33	174
	00	35	42	32	9	23	9	-	147	-	3	3000	18	30	150
D	86	13	-	20	-	-	-	-	29	-	4	2200			33
	95	5	41	3	-	-	-	-	38	-	-	980			49
	00	2	28	16	9	8	9	1	50	-	-	1460			73
X	86	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	300			15
	00	-	-	-	-	-	-	-	-	-	-	440			22
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>							
'86		02%		57%		10%		+29%							
'95		74%		04%		04%		+ 5%							
'00		38%		22%		09%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	3999	Dec:	55%		
										'95	5600		18%		
										'00	5880		25%		
<i>Gutierrezia sarothrae</i>															
S	86	8	-	-	-	-	-	-	8	-	-	533			8
	95	27	-	-	-	-	-	-	27	-	-	540			27
	00	3	-	-	-	-	-	-	3	-	-	60			3
Y	86	6	-	-	-	-	-	-	6	-	-	400			6
	95	99	-	-	-	-	-	-	99	-	-	1980			99
	00	1	-	-	-	-	-	-	1	-	-	20			1
M	86	19	-	-	-	-	-	-	19	-	-	1266	9	7	19
	95	139	2	-	7	-	-	-	148	-	-	2960	9	9	148
	00	45	-	-	-	-	-	-	45	-	-	900	5	6	45
D	86	4	-	-	-	-	-	-	4	-	-	266			4
	95	-	-	-	-	-	-	-	-	-	-	0			0
	00	4	-	-	-	-	-	-	2	-	-	80			4
X	86	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	-	-	-	220			11
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>							
'86		00%		00%		00%		+61%							
'95		.80%		00%		00%		-80%							
'00		00%		00%		04%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	1932	Dec:	14%		
										'95	4940		0%		
										'00	1000		8%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Juniperus osteosperma																	
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-		
												'95	0		-		
												'00	40		-		
Opuntia spp.																	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	6	5
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240	4	12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'95		00%			00%			00%			+58%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-		
												'95	100		-		
												'00	240		-		

Trend Study 10-18-00

Study site name: East Horse Pasture .

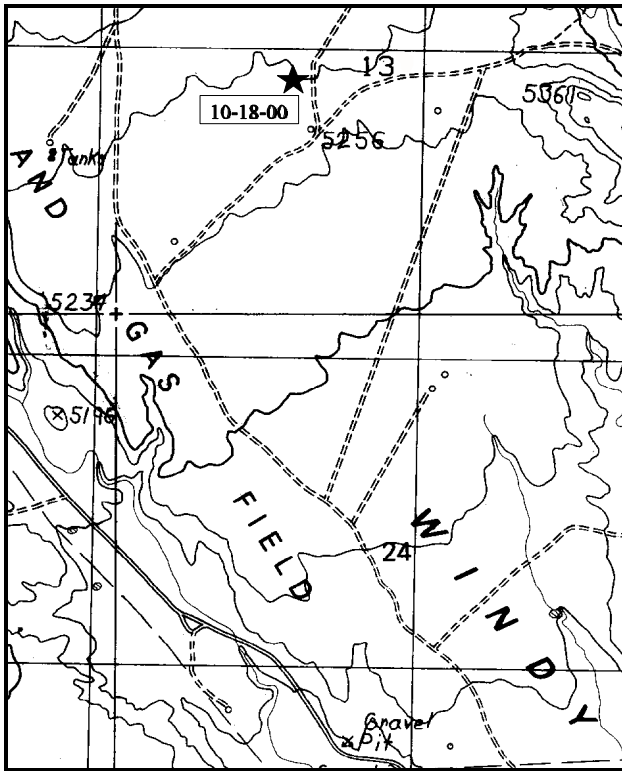
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

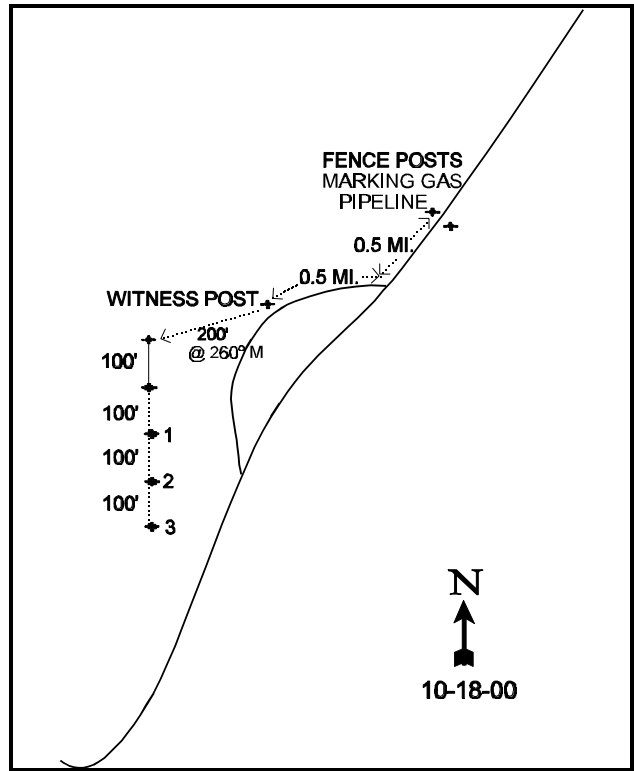
LOCATION DESCRIPTION

From Cunningham Ranch travel south 3.15 miles to a fork. Turn left and go 0.1 miles to a gate. Continue another 0.65 miles to a fork. Stay left (on main road) and continue 0.55 miles to another fork. Turn right and go 0.55 miles to a faint road turning back to the left. Go 0.05 miles on this faint road to a 2-foot tall rebar witness post on the right. The baseline begins 200 feet west of the witness post on a bearing of 245°M. From the first post, the transect runs south at 100 foot intervals.



Map Name: Calf Canyon

Township 20S , Range 21E , Section 13



Diagrammatic Sketch

UTM. 4324894.065 N, 625532.556 E

DISCUSSION

Trend Study No. 10-18 (16B-5)

The East Horse Pasture study lies in an area of mixed pinyon-juniper and sagebrush flats located to the east of Nash Wash and the Cunningham Ranch at an elevation of 5,300 feet. This whole general area is managed similarly, as the entire area has very comparable vegetative composition and condition to the other transects in the Nash Wash area. The sagebrush flat where the transect is located has a gentle slope with a south, southeast exposure. Use by wildlife is light at the present time. Pellet group transect data in 2000 estimated 27 deer days use/acre (67 ddu/ha) with no elk use.

The sandy clay loam soil is fine textured and moderately deep. In some areas there are large rocks near the surface, although there is little rock or pavement on the surface or in the profile. Thus the profile stoniness index is more a measure of compaction. Effective rooting depth is estimated at 17 inches with an average temperature of 63°F at 15 inches in depth. The soil is slightly alkaline (pH of 7.4), phosphorus levels are lower than the 10 ppm which have been shown necessary for normal plant growth and development. The soil has a dry crust formed on the surface which is easily broken and disturbed by animals. This crusting could impede seedling establishment. Since cover is poor, except for Wyoming big sagebrush and cheatgrass, any soil disturbance could leave the soil subject to wind and water erosion. There are rills and gullies present with evidence of soil loss, but due to the gentle terrain, erosion does not appear to be excessive. Bare ground is abundant in the shrub interspaces and had an estimated cover value of 28% in 1995, increasing to 44% in 2000. Vegetative cover was estimated at over 43% in 1995, with litter cover providing 48% cover. Both of these decreased in value in 2000, due primarily to the reduction in cheatgrass in association with the drought. Herbaceous vegetation and litter are generally found underneath Wyoming big sagebrush plants and occur only sporadically in the shrub interspaces.

Wyoming big sagebrush is the key species on this site. It visually dominates the site and provides 85% of the browse cover in 2000. Density was estimated at 3,833 plants/acre in 1986, declining to 2,660 plants/acre in 1995, and 2,940 plants/acre in 2000. The decrease between the 1986 reading and the latter two is primarily due to the greatly increased sample size used beginning in mid-1992. This modification more accurately estimates shrub populations with clumped and/or discontinuous distributions. Mature sagebrush plants average just under 2 feet in height with crown measurements averaging nearly 3 feet. In 1986, approximately 90% of the plants showed signs of heavy grazing. This percentage has declined significantly to only 14% and 18% in 1995 and 2000 respectively. The proportion of decadent plants decreased between 1986 and 1995 (60% to 18%), but slightly increased in 2000 to 25%. The proportion of decadent plants that are classified as dying has increased with each reading. In 2000, the decadent/dying plants represented 41% of the decadent plants or about 300 plants/acre. No seedlings and very few young plants have been encountered in any sampling year. Thus, with low recruitment and no biotic potential (# of seedlings), the current age structure for this particular sagebrush population is one of mostly mature plants with moderate decadency. Although grazing intensity has been reduced, it may not be enough for the Wyoming big sagebrush population to fully recover with the competition it receives from cheatgrass. Cheatgrass is the dominant understory plant that provides intense competition with sagebrush seedlings. This competition does not allow the development of seed or the germination and establishment of sagebrush seedlings. If there is little to no green-up of the cheatgrass in the spring or fall (this is currently the situation with extended drought), then the livestock would be forced to utilize the sagebrush. This has been the case most of the time since the late 1980's.

The most numerous shrub in the past was the undesirable broom snakeweed which had an estimated density of 8,860 plants/acre in 1995. Due to drought in 2000, this species decreased by 86% to only 1,220 plants/acre. In the past, snakeweed was vigorous and was the only plant producing seedlings in the shrub interspaces. No seedlings were sampled in 2000. Other shrubs sampled on the site include: fourwing saltbush, winterfat, spiny

hopsage, and a cactus, all of which are in low densities. Junipers appear to be encroaching from the north, but presently, there are none on the site. The nearby stand provides fair resting and thermal cover and the older trees are highlined with the younger ones appearing to be only lightly used.

With the exception of cheatgrass, grasses are scarce and selectively grazed. Cheatgrass was particularly abundant in 1995 due to high early spring precipitation. It produced over 27% average cover in 1995 which represented 94% of the grass cover and 90% of the total herbaceous cover. Due to drought in 2000, cheatgrass currently provides just over 6% average cover representing 56% of the grass cover and 39% of the herbaceous cover. Even with drought, cheatgrass is still the most abundant herbaceous species. Perennial grasses are sparse and include: galleta, bottlebrush squirreltail, and sand dropseed. Galleta and sand dropseed significantly increased in nested frequency in 2000, while squirreltail increased but not significantly. There are no really desirable forbs present. Scarlet globemallow is the most common perennial forb, but is not particularly abundant with a quadrat frequency of only 12% in 2000. Annual forbs as a group currently ('00) make up 81% of the forb cover, with Russian thistle being the most abundant. Because most of the forb composition comes from annual species, many of the forbs encountered on the site are not usually available for grazing animals. This type of range site is not known for its diversity and abundance of herbaceous vegetation, but this site has definitely suffered the effects of long-term overgrazing and drought.

1986 APPARENT TREND ASSESSMENT

The soil and vegetative trends indicated by current management practices appear to be downward. There is inadequate ground cover and soil movement is ongoing. The key species is severely hedged. It will likely become more decadent with no recruitment from young plants into the population for replacement. Besides these problems found in all three transects in the Nash Wash area, there is a continued loss of habitat due to oil and gas leasing and road building. As a very important deer wintering area, it seems necessary to protect and even improve range conditions. Possible solutions are more restrictive oil and gas leasing regulations, manipulation of livestock classes, their distribution and season of use, antlerless hunts to reduce the deer population and implementation of land treatments (chaining) to increase the carrying capacity for wildlife.

1995 TREND ASSESSMENT

Although the grazing pressure appears to be reduced, this Wyoming big sagebrush stand may be past the point of naturally reclaiming itself. The dense cheatgrass understory makes it difficult for sagebrush to produce seed, or for seedlings to become established if they germinate. This has resulted in the creation of a primarily mature or decadent stand. Sagebrush density has declined but the remaining population is healthier. Percent decadency has declined from 60% to 18%. Utilization is also lighter declining from 90% heavy use in 1986 to 14% in 1995. These factors lead to a slightly upward browse trend for Wyoming big sagebrush. The herbaceous understory is comprised primarily of cheatgrass and very few forbs. Although cheatgrass is still very abundant, the total sum of nested frequency for the perennial grass and forbs has increased, leading to a slightly upward herbaceous understory trend. It still is in poor condition. Soil erosion is limited to the disturbed interspaces between the sagebrush. Erosion is not extensive and apparently has not increased since 1986, leading to a stable, yet only fair soil trend.

TREND ASSESSMENT

soil - stable, but only fair condition (3)

browse - slightly upward for Wyoming big sagebrush (4)

herbaceous understory - slightly upward, but poor condition because of high proportion of annuals (4)

2000 TREND ASSESSMENT

Trend for soil is slightly down. Bare ground cover moderately increased in 2000, while vegetation and litter cover decreased. As a result, the ratio of protective ground cover to bare soil decreased also. Trend for the key browse species, Wyoming big sagebrush, is stable but only in fair condition. Percent decadency slightly increased from 18% to 25% with 41% of these classified as dying. Recruitment remains low at 1%. Trend could go down in the future if recruitment remains low and the proportion of decadent dying individuals continues to increase. Heavy use is about the same as in 1995, with moderate use decreasing somewhat. Trend for the herbaceous understory is stable. Sum of nested frequency of perennials slightly increased while the abundance of cheatgrass decreased. However, cheatgrass remains the most abundant herbaceous species even with drought.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 18

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	_b 352	_a 172	-	97	62	27.40	6.38
G	Festuca ovina	-	-	4	-	-	1	-	.63
G	Hilaria jamesii	_a 6	_b 56	_c 84	2	23	31	1.25	3.27
G	Oryzopsis hymenoides	-	2	-	-	1	-	.00	.01
G	Sitanion hystrix	_a 4	_b 19	_b 28	2	10	13	.27	.47
G	Sporobolus cryptandrus	_a -	_b 14	_c 32	-	5	13	.05	.55
G	Stipa comata	-	3	3	-	2	1	.03	.00
G	Vulpia octoflora (a)	-	_b 28	_a -	-	13	-	.06	-
Total for Annual Grasses		0	380	172	0	110	62	27.47	6.38
Total for Perennial Grasses		10	94	151	4	41	59	1.61	4.95
Total for Grasses		10	474	323	4	151	121	29.09	11.33
F	Astragalus spp.	-	-	1	-	-	1	-	.00
F	Descurainia pinnata (a)	-	7	3	-	4	1	.02	.00
F	Draba spp. (a)	-	-	1	-	-	1	-	.00
F	Erodium cicutarium (a)	-	_a -	_b 11	-	-	5	-	.21
F	Erigeron utahensis	7	4	-	3	1	-	.00	-
F	Lappula occidentalis (a)	-	_b 30	_a -	-	11	-	.08	-
F	Lactuca serriola	-	3	-	-	1	-	.00	-
F	Leucelene ericoides	_a -	_b 9	_b 15	-	3	6	.06	.15
F	Lepidium perfoliatum	_a -	_b 31	_a 3	-	12	1	.06	.03

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	<i>Machaeranthera grindelioides</i>	-	2	-	-	1	-	.00	-
F	<i>Orobanche corymbosa</i>	3	-	-	3	-	-	-	-
F	<i>Phlox longifolia</i>	6	4	3	3	2	2	.01	.01
F	<i>Plantago patagonica</i> (a)	-	_b 145	_a -	-	52	-	.28	-
F	<i>Salsola iberica</i> (a)	-	_a -	_b 106	-	-	42	-	1.35
F	<i>Schoenocrambe linifolia</i>	-	2	-	-	1	-	.00	-
F	<i>Sisymbrium altissimum</i> (a)	-	_a 30	_b 51	-	16	18	.18	2.49
F	<i>Sphaeralcea coccinea</i>	15	27	31	7	11	12	.68	.76
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	212	172	0	83	67	0.57	4.07
Total for Perennial Forbs		32	82	53	17	32	22	0.84	0.96
Total for Forbs		32	294	225	17	115	89	1.41	5.03

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 18

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia tridentata wyomingensis</i>	65	67	8.57	11.68
B	<i>Atriplex canescens</i>	0	1	-	.00
B	<i>Ceratoides lanata</i>	1	0	-	-
B	<i>Grayia spinosa</i>	1	1	.00	1.01
B	<i>Gutierrezia sarothrae</i>	68	29	2.53	.97
B	<i>Opuntia</i> spp.	5	4	.00	.01
Total for Browse		140	102	11.12	13.68

BASIC COVER --

Herd unit 10 , Study no: 18

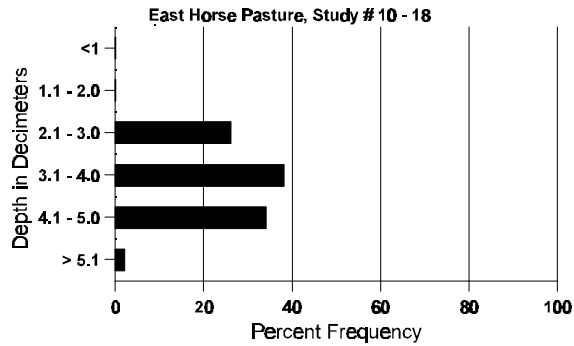
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	374	312	8.25	43.52	32.86
Rock	41	5	0	.15	.04
Pavement	53	79	.25	.12	.88
Litter	397	361	56.50	48.29	36.91
Cryptogams	104	80	1.75	2.11	1.41
Bare Ground	268	322	33.25	28.83	44.73

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 18, Study Name: East Horse Pasture

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
17.02	63.4 (15.20)	7.4	48.0	24.0	28.0	1.1	4.5	108.8	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10 , Study no: 18

Type	Quadrat Frequency	
	'95	'00
Rabbit	22	23
Elk	1	-
Deer	17	41
Cattle	1	-

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
148	N/A
-	-
357	27 (67)
-	-

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 18

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
Y	86	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	86	-	-	-	-	4	38	-	-	-	42	-	-	-	1400	21	23	42
	95	35	54	19	-	1	-	-	-	108	-	-	1	2180	22	34	109	
	00	49	21	26	8	4	-	-	-	108	-	-	-	2160	20	32	108	
D	86	-	-	-	-	4	64	-	-	1	58	-	-	11	2300		69	
	95	12	12	-	-	-	-	-	-	-	15	-	-	9	480		24	
	00	12	19	1	1	4	-	-	-	-	19	-	3	15	740		37	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	520		26	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	640		32	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		07%			90%			10%			-31%							
'95		50%			14%			08%			+10%							
'00		33%			18%			12%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	3833	Dec:	60%				
											'95	2660		18%				
											'00	2940		25%				
<i>Atriplex canescens</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	43	65	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	32	65	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	0		-				
											'00	20		-				
<i>Ceratoides lanata</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	6	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	20		-				
											'00	0		-				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Grayia spinosa																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	7	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	35	75	
D	86	-	-	-	-	-	1	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	1	-	-	-	-	-	1	20		1	
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			100%			00%			-39%							
'95		00%			00%			100%			+ 0%							
'00		00%			00%			100%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	100%			
												'95	20		100%			
												'00	20		100%			
Gutierrezia sarothrae																		
S	86	10	-	-	-	-	-	-	-	-	10	-	-	-	333		10	
	95	32	-	-	-	-	-	-	-	-	32	-	-	-	640		32	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	52	-	-	-	-	-	-	-	-	52	-	-	-	1733		52	
	95	167	-	-	4	-	-	-	-	-	171	-	-	-	3420		171	
	00	28	-	-	-	-	-	-	-	-	28	-	-	-	560		28	
M	86	95	-	-	-	-	-	-	-	-	95	-	-	-	3166	9	6	95
	95	272	-	-	-	-	-	-	-	-	272	-	-	-	5440	12	12	272
	00	33	-	-	-	-	-	-	-	-	33	-	-	-	660	8	9	33
D	86	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%			+43%							
'95		00%			00%			00%			-86%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	5065	Dec:	3%			
												'95	8860		0%			
												'00	1220		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	5	4	2
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	14	4
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	14	4
D	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%			-50%							
'95		00%			00%			00%			-20%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	199	Dec:	50%			
												'95	100		0%			
												'00	80		0%			

Trend Study 10-19-00

Study site name: Lower Cottonwood .

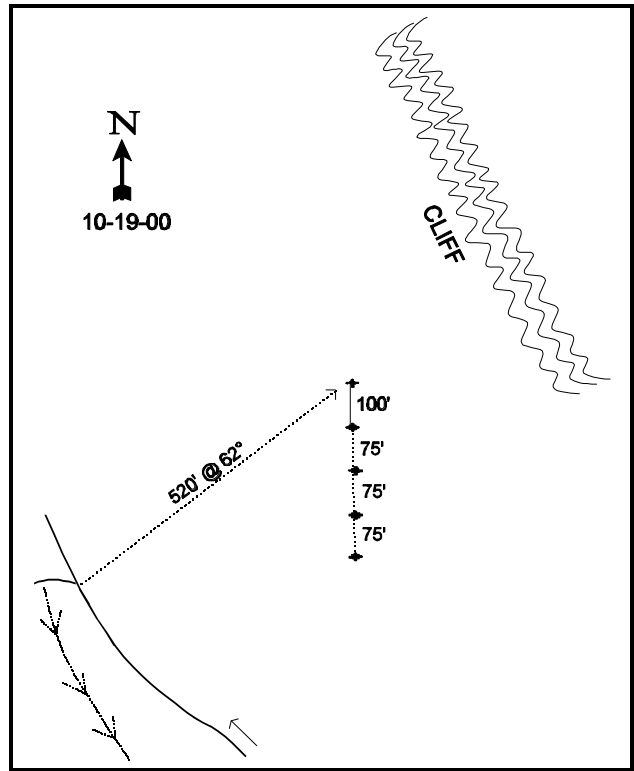
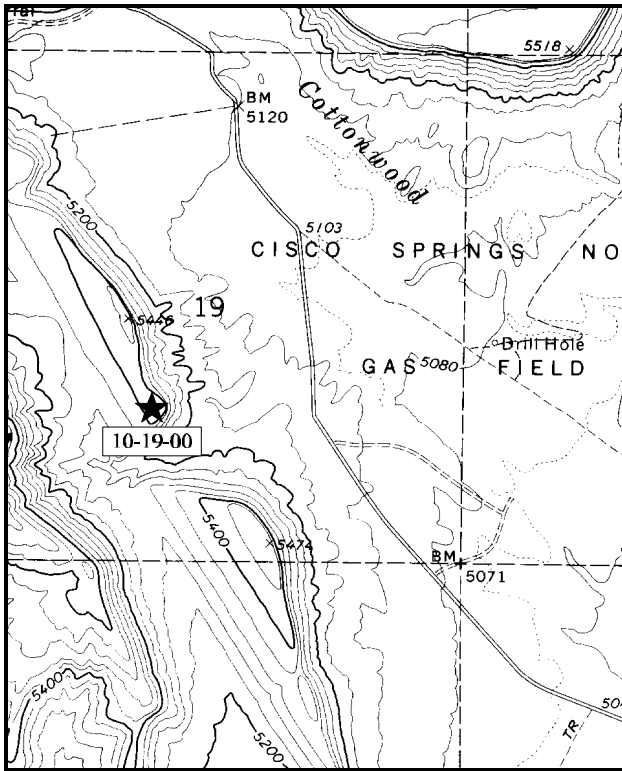
Range type: Pinyon-Juniper .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From I-70, take the east Cisco exit, then go 10.55 miles north towards Cottonwood Canyon to a road going into a small canyon to the west. Turn left here and immediately pass between two "Buried Gas Line" warning signs. From the turn, go 0.3 miles and turn right. Go another 5.75 miles to a faint fork in the road. Park here. Walk approximately half way up the hill to the east (520 feet bearing 62 degrees) to the 0-foot baseline stake.



Map Name: Flume Canyon

Diagrammatic Sketch

Township 19S , Range 23E , Section 19

DISCUSSION

Trend Study No. 10-19 (16B-6)

*** This trend study was not read in 2000 and is being discontinued. Only text from the 1995 Utah Big Game Range Trend Studies report is included. Consult the 1995 report for maps and data tables.

Located midway up the west facing slope of a small ridge, the Lower Cottonwood transect samples a juniper-cheatgrass slope above a greasewood valley bottom. The dry wash in the valley below drains to the east. Elevation on the moderately sloping hill is 5,400 feet. The transect is located in the Cisco Mesa Allotment which is grazed by sheep (2,628 AUM'S) from late-November to mid-May. Horses are permitted from the first of December through mid-May for 94 AUM's. The average use by sheep from 1981 through 1986 was 1,884 sheep. No land treatments have been conducted and none are planned. Although there is concurrent sheep and deer use, it appears the amount of deer use is minimal. The scattered junipers provide marginal thermal and escape cover for deer. Human pressure is low, except when sheep are in the immediate area, especially since there is no active oil and gas drilling currently in this area. There are some old drill holes located in the lower country to the east.

The soil on the slope is moderately shallow and the ridge ends in a steep broken cliff of exposed rock. The whole slope appears to be underlain by a continuous sheet of sandstone. The surface is fairly rocky along the transect with a cover value of various sized flat rocks and pavement estimated at almost 25%. The cover value for bare soil is almost 6%, which is made of a grayish-tan, fine sand. Litter cover (39%) is composed mostly of dry cheatgrass. Though few definite erosion channels are evident, sheet erosion occurs all over the hillside. Sedimentation mostly occurs on the study site from runoff of high intensity storms on the higher rocky slopes.

Utah junipers are scattered throughout the site with an estimated density of 33 trees/acre. The junipers are vigorous and show little use. As in 1986, few young or seedling of any browse species, with the exception of broom snakeweed, were encountered on the transect. Broom snakeweed density appears to be increasing with a generally mature population and many seedlings. Broom snakeweed was reported to actually show some signs of being used for forage in 1986, but in 1995 this is not the case as none of the plants show any hedging. Shadscale and Wyoming big sagebrush are the key browse species for both sheep and deer. The shadscale, with an estimated density of 500 plants/acre, is lightly hedged and without the insect damage that was reported in 1986. The sparse Wyoming big sagebrush population still has some heavily hedged individuals, but most are only lightly used. Also present are a few green ephedra, yucca, and cactus in lower densities.

Perennial herbaceous vegetation is sparse. Grasses sampled include sand dropseed, bottlebrush squirreltail, needle-and-thread grass, and Indian ricegrass. Wildrye is found in large bunches near the ridge top. As on most sites in this area, cheatgrass is the most abundant herbaceous understory species providing nearly 70% of the total vegetative cover. Only one perennial forb, an *Astragalus spp.*, was sampled in 1995. Storksbill is the most abundant annual followed by prairie pepperweed, both of which provide little forage or soil protection.

1986 APPARENT TREND ASSESSMENT

Production potential on this site is limited by the shallow rocky soil and low rainfall. Although the area is in poor condition, site potential will greatly limit the ability of the area to respond favorably to changes in management. Overgrazing and extended drought has caused the decadence of the desirable browse species, as well as the replacement of perennial grasses by cheatgrass. The vegetative trend will continue to decline with winter and spring sheep grazing. Erosion and sedimentation is a continuous and unavoidable natural process on this slope. The best that can be done for soil stability is to increase perennial vegetative cover.

1995 TREND ASSESSMENT

The most abundant browse on the site is broom snakeweed, which is used only sparingly as forage. The remaining shrubs are not as heavily hedged as reported in 1986 with shadscale showing improved vigor. The densities are low and will stay this way due to the highly competitive cheatgrass understory and continued drought. At this time, the browse trend for the key species is declining with broom snakeweed likely continuing to increase while the more palatable shrubs decrease. Even though grazing intensity is lower, competition with the annual herbaceous understory will prevent the more palatable shrubs from becoming re-established from seed. The herbaceous understory has not changed much since 1986. Sand dropseed has significantly increased in sum of nested frequency, but cheatgrass is still the dominant grass. Cheatgrass occurs throughout the entire site and although it provides soil protection, it also provides abundant fine fuels for a possible destructive fire. Because the sum of nested frequency for perennial grasses and forbs increased, the herbaceous understory trend is slightly up, but still in very poor condition. There will likely always be some soil movement on this site and at this time there are no large gullies. There is adequate vegetative and litter cover to protect the soil and slow down most runoff coming from the slope above. The soil trend on this site appears stable at this time.

TREND ASSESSMENT

soil - stable, but fair condition (3)

browse - declining, key species at low densities (1)

herbaceous understory - slightly up, but with poor composition of mostly annual species (4)

Trend Study 10-20-00

Study site name: Upper Cottonwood.

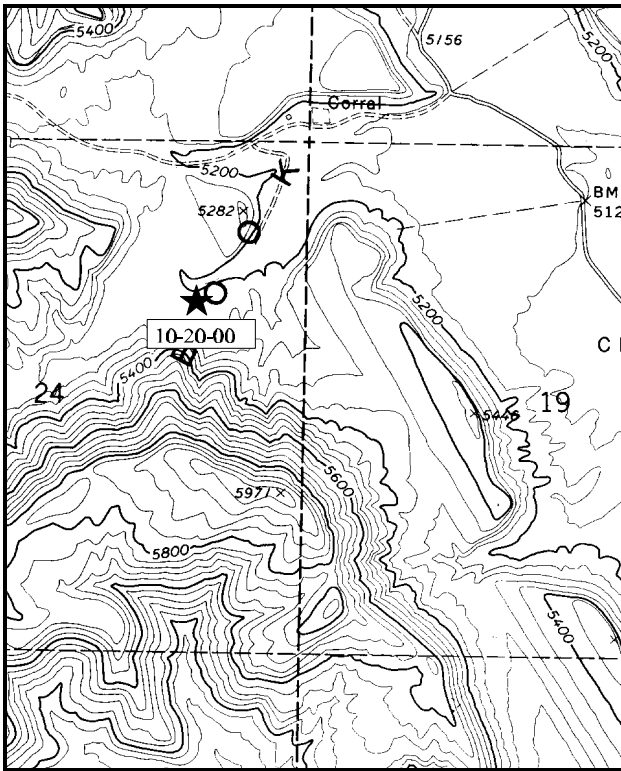
Range type: Black Greasewood and Juniper.

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

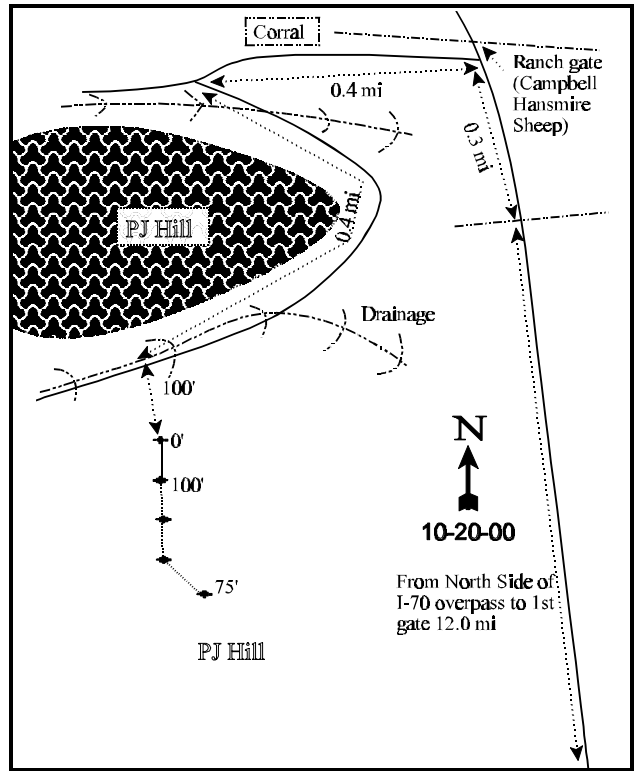
LOCATION DESCRIPTION

From I-70, take the east Cisco exit (Exit #212). From the north side of the overpass travel 12.0 miles to a gate. Go through the gate and proceed 0.3 miles to a sheep ranch gate with an archway. Turn left just before the gate. Go 0.4 miles passing the corrals. Turn left again to go to the next canyon to the south and continue 0.4 miles up the canyon to just past a large rocky cliff on your right. Park in the wash (road is in the wash at this point) near a small draw that comes in from the north. Walk up the hill to the left (south) to an open greasewood-cheatgrass bench. The frequency baseline 0-foot stake is 70 feet south of the wash.



Map Name: Flume Canyon

Township 19S, Range 22E, Section 24



Diagrammatic Sketch

UTM. 4333576.332 N, 635851.100 E

DISCUSSION

Trend Study No. 10-20 (16B-7)

The Upper Cottonwood transect is the only study on the South Book Cliffs to sample the common black greasewood habitat type. It samples a mixed vegetation type located at the foot of the Book Cliffs at the mouth of Coal Canyon. Elevation at the study site is 5,300 feet with a mainly northern exposure and a slight slope down to a deep intermittent wash. When this study was established, the lower part of the transect was located in more of an alkali flat dominated by black greasewood and cheatgrass. The density plots were located on a slope with rockier soil where juniper and sagebrush were more prevalent. For a better sample size and to get a better distribution within the same type (more homogeneous sample), the last three belts were moved from the hillside and now sample the lower flat.

This area currently receives sheep use from November 15th through mid-May as part of the Cisco Mesa Allotment plan for 2,628 AUM's. Due to a temporary sheep shearing camp located nearby, the area may receive concentrated use at certain times. Currently, deer use is light in this area. Pellet group transect data from 2000 estimate 15 deer days use/acre (37 ddu/ha) and 6 elk days use/acre (15 edu/ha).

This alkaline-saline flat receives sedimentation from the eroding hillsides. Overall, the soil is loamy in texture with an estimated effective rooting depth of over 13 inches. Average soil temperature is 67°F at 13 inches. The soil reaction is slightly alkaline (pH of 7.5). In certain places the soil appears quite deep, but in others there are large rocks near the surface. Rock and pavement combine for a cover value over 7% in 2000. A profile stoniness index estimated from penetrometer readings shows a moderate amount of rock in the first few inches of the profile. Phosphorus is very low at 1.5 ppm, well below the 10 ppm thought necessary for normal plant growth and development. Vegetation and litter accounted for 44% and 45% of the ground cover in 1995, both decreasing in 2000. Vegetation cover decreased by half and litter cover by nearly a third due to the drastic decrease in cover from cheatgrass associated with the drought in 2000. As a result, bare ground cover nearly doubled in 2000.

Wyoming big sagebrush is the key species on this winter range, although it is not very abundant. Sagebrush density was estimated at 520 plants/acre in 1995 and 620 plants/acre in 2000. Fifty-six percent of the population was reported as decadent in 1986, decreasing to 4% in 1995. Decadency increased to 19% in 2000 with 6% of the population displaying poor vigor. Use on sagebrush increased to 45% heavy use in 2000, up from 4% in 1995. Recruitment is currently moderate at 10%, but no seedlings were sampled in 2000. Sagebrush annual leaders were on average up to 5 inches in length in 2000.

Shadscale is found scattered over the area at an estimated density of 280 plants/acre in 1995, decreasing to 80 plants/acre in 2000. The decrease in density is due to an increase in the number of dead plants and a decrease in the young age class. Percent decadency, poor vigor, and the ratio of dead to live plants all increased in 2000. There is currently no recruitment from young plants. Winterfat is currently ('00) estimated at 240 plant/acre with 25% of the population showing heavy use. Decadency is low at 8%, with vigor being generally good. Winterfat had excellent annual leader growth in 2000 ranging from 12 to 20 inches. The most numerous plant sampled in 1995 was broom snakeweed at an estimated density of 880 plants/acre. This population decreased in 2000 to an estimated 300 plants/acre. The black greasewood density is low, but increased from 260 plants/acre in 1995 to 760 plants/acre in 2000. This increase is due to high young recruitment which make up 55% of the population in 2000. Mature plants average 4 feet in height with 4 ½ feet crowns. Juniper is prevalent on the surrounding hillsides and can also be found along the washes below the site. The juniper on the slope are not utilized but provide some thermal and escape cover. Also scattered throughout the site in low densities are spiny hopsage, rubber rabbitbrush, sticky leaf rabbitbrush, and fourwing saltbush.

Perennial grasses on the site include Salina wildrye, bottlebrush squirreltail, sand dropseed, Indian ricegrass, and mutton bluegrass. These are found scattered throughout the area with most occurring under the protective cover of shrubs. Salina wildrye was the most abundant perennial grass in 1995, and second most abundant in 2000. Sand dropseed is currently the most abundant perennial grass, significantly increasing in nested frequency in 2000 with all other perennial grasses remaining at fairly stable frequencies. As a group, perennial grasses increased in sum of nested frequency and nearly doubled in average cover. A very dense stand of cheatgrass occurs throughout the flat under the shrubs, as well as in the interspaces. Cheatgrass was overwhelmingly thick in 1995 due to the very wet spring providing over 32% average cover. In 2000, cheatgrass was almost as abundant in quadrat frequency as in 1995, but greatly decreased in average cover to just over 5% as plants were small statured due to drought. Cheatgrass still remains the most abundant grass and it provides 48% of the grass cover. Perennial forbs provide little forage value. Scarlet globemallow, which was thought to be increasing in 1986, has since significantly decreased. Sego lily, longleaf phlox, and *Astragalus* were also sampled and are in low densities. Nested frequency for perennial forbs stayed the same as the 1995 reading. Annual forbs greatly increased in abundance in 2000 which is surprising with the drought. Most of this increase comes from the increase in two species, bur buttercup and blue mustard, which together account for 87% of the forb cover and 36% of the total herbaceous cover.

1986 APPARENT TREND ASSESSMENT

This site appears to receive lighter grazing pressure than other study sites in management unit 10 on the South Book Cliffs. The browse species are in better condition, there is more diversity in both the browse and herbaceous components and generally more ground cover. Although the browse looks better, the vegetative trend appears stable to possibly down due to the composition and age class distribution of the key species. Harvester ant hills are common. The soil trend appears stable with no recent gullies or detectable soil movement over most of the area. There will always be some erosion and sedimentation from the hillside.

1995 TREND ASSESSMENT

Although the more preferable species Wyoming big sagebrush and shadscale show improving trends individually, both broom snakeweed and black greasewood have increased in total percent browse composition. Very few seedlings were encountered for any species. This is likely due to the intense competition for soil moisture with the dense annual understory and the extended drought. Lighter utilization may be helping the plants individually, but only the removal of the very competitive cheatgrass with competition with perennial grasses will increase the biotic potential for the shrub populations. With such a high fine fuel load provided by the cheatgrass, if a fire does occur, all that would be left is cheatgrass and the root sprouting black greasewood. The browse trend is stable to slightly downward since 1986 and is in fair to poor condition with several non-preferred species. Total sum of nested frequency for perennial grass species has increased since 1986 with most of the increase coming from Salina wildrye. At this time, any increase in perennial grass species, to compete with the dense cheatgrass understory, is good. Although scarlet globemallow significantly decreased in sum of nested frequency value, several other perennial species were encountered keeping the total perennial forb sum of nested frequency nearly the same. For these reasons, herbaceous understory trend is slightly upward. Soil stabilization is not a problem at this time due to the high cover of cheatgrass and litter. With no signs of active erosion, except for the gully that drains the canyon below the site, the soil trend is stable.

TREND ASSESSMENT

soil - stable (3)

browse - stable to slightly downward (3)

herbaceous understory - slightly upward but with poor composition of mostly annuals (4)

2000 TREND ASSESSMENT

Trend for soil is slightly down. Bare ground cover nearly doubled while vegetation cover decreased by half and litter cover decreased by a third. These drastic changes in ground cover characteristics are due to the decrease in cheatgrass cover due to drought in 2000. The unusually wet spring of 1995 resulted in 32% average cover from cheatgrass, but the drought in 2000 caused cheatgrass to decrease in average cover to just over 5%. Soil trend is only slightly down as perennial grasses nearly doubled in cover, but more importantly, increased in sum of nested frequency. Trend for browse is slightly down overall. Wyoming big sagebrush shows increases in decadency, use, and poor vigor. Recruitment slightly decreased in 2000, but is still moderate at 10%. Other palatable browse such as shadscale and winterfat occur in low densities and do not appear to be increasing with low recruitment. The main negative factor for browse on this sight is the increase in black greasewood. Estimated at 260 plants/acre in 1995, greasewood increased to 760 plants/acre in 2000 with an influx of young plants into the population. Greasewood is now the most abundant browse species in cover, stature, and density. Trend for the herbaceous understory is slightly up as perennial grasses doubled in cover and increased in sum of nested frequency.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 20

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Aristida purpurea	-	-	6	-	-	3	-	.01
G	Bromus tectorum (a)	-	_b 376	_a 288	-	97	94	32.71	5.55
G	Elymus cinereus	7	-	-	2	-	-	-	-
G	Elymus salina	-	53	47	-	21	19	2.45	1.95
G	Oryzopsis hymenoides	22	18	34	16	11	17	.26	1.70
G	Poa fendleriana	1	6	7	1	2	4	.01	.04
G	Sitanion hystrix	12	9	6	5	3	3	.19	.01
G	Sporobolus cryptandrus	_a 48	_a 31	_b 82	21	14	33	.22	2.19
G	Stipa comata	-	4	9	-	2	3	.15	.07
Total for Annual Grasses		0	376	288	0	97	94	32.71	5.55
Total for Perennial Grasses		90	121	191	45	53	82	3.28	5.99
Total for Grasses		90	497	479	45	150	176	36.00	11.55
F	Ambrosia psilostachya	_a -	_a -	_b 21	-	-	8	-	.19
F	Astragalus spp.	-	4	-	-	2	-	.03	-
F	Calochortus nuttallii	2	2	-	1	2	-	.01	-
F	Chenopodium spp. (a)	-	-	6	-	-	2	-	.01
F	Chorispora tenella (a)	-	_a -	_b 125	-	-	45	-	2.29

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	<i>Collinsia parviflora</i> (a)	-	-	2	-	-	1	-	.00
F	<i>Draba</i> spp. (a)	-	-	1	-	-	1	-	.00
F	<i>Erodium cicutarium</i> (a)	-	3	-	-	1	-	.00	-
F	<i>Erigeron</i> spp.	-	5	-	-	3	-	.04	-
F	<i>Lepidium perfoliatum</i>	-	2	-	-	1	-	.00	-
F	<i>Phlox longifolia</i>	a-	b11	ab3	-	5	1	.02	.00
F	<i>Plantago patagonica</i> (a)	-	b81	a5	-	33	3	.19	.01
F	<i>Ranunculus testiculatus</i> (a)	-	a5	b236	-	2	78	.01	4.80
F	<i>Salsola iberica</i> (a)	-	a-	b100	-	-	41	-	.63
F	<i>Sisymbrium altissimum</i> (a)	-	b14	a2	-	6	1	.03	.03
F	<i>Sphaeralcea coccinea</i>	b23	a5	a5	10	3	3	.04	.16
F	<i>Tragopogon dubius</i>	1	-	-	1	-	-	-	-
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	103	477	0	42	172	0.23	7.80
Total for Perennial Forbs		27	29	29	13	16	12	0.15	0.35
Total for Forbs		27	132	506	13	58	184	0.38	8.15

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 20

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia tridentata</i> <i>wyomingensis</i>	16	13	.80	1.21
B	<i>Atriplex canescens</i>	1	1	.03	.00
B	<i>Atriplex confertifolia</i>	13	4	.74	.31
B	<i>Ceratoides lanata</i>	7	10	.57	.31
B	<i>Chrysothamnus viscidiflorus</i> <i>stenophyllus</i>	2	3	-	.38
B	<i>Grayia spinosa</i>	1	4	.63	.67
B	<i>Gutierrezia sarothrae</i>	13	5	.45	.18
B	<i>Juniperus osteosperma</i>	0	0	.03	-
B	<i>Opuntia</i> spp.	0	1	-	-
B	<i>Sarcobatus vermiculatus</i>	11	19	4.07	4.17
Total for Browse		64	60	7.34	7.25

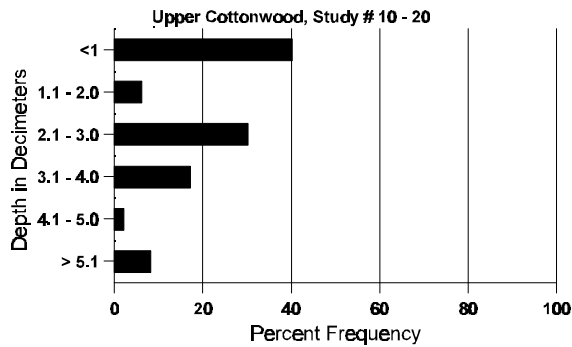
BASIC COVER --
Herd unit 10 , Study no: 20

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	386	279	32.25	44.45	22.42
Rock	119	78	0	4.74	4.63
Pavement	21	127	0	1.55	3.00
Litter	393	369	46.50	45.71	33.49
Cryptogams	34	34	0	.25	1.37
Bare Ground	251	330	21.25	21.18	40.65

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 20, Study Name: Upper cottonwood

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.46	67.2 (13.23)	7.5	42.4	31.1	26.6	1.6	1.5	166.4	0.6

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 20

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Sheep	31	2	52	N/A
Rabbit	5	46	392	N/A
Horse	-	1	61	N/A
Elk	-	2	78	6 (15)
Deer	4	11	200	15 (38)
Cattle	-	1	-	-

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 20

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total				
		1	2	3	4		1	2					
<i>Artemisia tridentata wyomingensis</i>													
S	86	4	-	-	-	-	-	-	4	-	133		4
	95	1	-	-	-	-	-	-	1	-	20		1
	00	-	-	-	-	-	-	-	-	-	0		0
Y	86	3	-	-	-	-	-	-	3	-	100		3
	95	1	3	-	-	-	-	-	4	-	80		4
	00	3	-	-	-	-	-	-	3	-	60		3
M	86	3	5	1	-	-	-	-	8	-	300	16 15	9
	95	4	13	1	2	1	-	-	21	-	420	34 38	21
	00	2	10	9	-	1	-	-	22	-	440	24 27	22
D	86	5	7	2	1	-	-	-	14	-	500		15
	95	-	1	-	-	-	-	-	1	-	20		1
	00	-	1	5	-	-	-	-	4	-	120		6
X	86	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	80		4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'86		44%		11%		07%		-42%					
'95		69%		04%		00%		+16%					
'00		39%		45%		06%							
Total Plants/Acre (excluding Dead & Seedlings)										'86	900	Dec:	56%
										'95	520		4%
										'00	620		19%
<i>Atriplex canescens</i>													
Y	86	-	-	-	-	-	-	-	-	-	0		0
	95	1	-	-	-	-	-	-	1	-	20		1
	00	-	-	-	-	-	-	-	-	-	0		0
M	86	-	-	-	-	-	-	-	-	-	0	- -	0
	95	-	-	-	-	-	-	-	-	-	0	17 19	0
	00	2	-	-	-	-	-	-	2	-	40	18 17	2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'86		00%		00%		00%							
'95		00%		00%		00%		+50%					
'00		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-
										'95	20		-
										'00	40		-

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Atriplex confertifolia</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	1	-	-	3	-	-	-	-	-	4	-	-	-	80		4	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	5	-	-	-	-	-	-	-	-	5	-	-	-	166	14 18	5	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160	15 30	8	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60	12 21	3	
D	86	3	1	1	-	-	-	-	-	-	4	-	1	-	166		5	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	1	-	-	-	-	-	-	-	-	-	-	1	20		1		
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		08%			08%			08%			-35%							
'95		00%			00%			00%			-71%							
'00		00%			00%			25%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	432	Dec:	38%				
											'95	280		14%				
											'00	80		25%				
<i>Ceratoides lanata</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	17 22	6	
	00	4	-	2	-	1	-	-	-	-	7	-	-	-	140	16 13	7	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	1	-	-	-	-	-	-	-	-	1	20		1		
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			+76%							
'95		00%			00%			00%			+42%							
'00		08%			25%			08%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	33	Dec:	0%				
											'95	140		0%				
											'00	240		8%				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus nauseosus																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	34	77	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	0		-			
Chrysothamnus viscidiflorus stenophyllus																		
M	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	15	11	1
	'95	1	2	-	-	-	-	-	-	-	3	-	-	-	60	18	26	3
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15	17	0
D	'86	4	1	-	-	-	-	-	-	-	5	-	-	-	166			5
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	2	-	-	1	-	-	-	-	-	2	-	-	1	60			3
X	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		17%			00%			00%			-70%							
'95		67%			00%			00%			+ 0%							
'00		00%			00%			33%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	199	Dec:	83%			
												'95	60		0%			
												'00	60		100%			
Eriogonum microthecum																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	11	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	0		-			

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	21	51	0
	00	3	-	1	-	-	-	-	-	-	4	-	-	-	80	16	28	4
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		100%			00%			00%			+75%							
'00		00%			25%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	20		100%			
												'00	80		0%			
<i>Gutierrezia sarothrae</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100	8	3	3
	95	38	-	-	-	-	-	-	-	-	38	-	-	-	760	14	18	38
	00	14	-	-	-	-	-	-	-	-	14	-	-	-	280	7	9	14
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			+85%							
'95		00%			00%			00%			-66%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	0%			
												'95	880		0%			
												'00	300		7%			
<i>Juniperus osteosperma</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	67	79	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	99	Dec:	-			
												'95	0		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	19	0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	22	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	20		-			
Sarcobatus vermiculatus																		
S	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	'00	18	-	-	3	-	-	-	-	-	21	-	-	-	420			21
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	11	-	-	1	-	-	-	-	-	12	-	-	-	240	55	60	12
	'00	7	-	-	2	1	-	-	-	-	10	-	-	-	200	49	55	10
D	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	5	2	-	-	-	-	1	-	-	6	140			7
X	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			+87%							
'95		00%			00%			00%			+66%							
'00		08%			00%			16%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	0%			
												'95	260		0%			
												'00	760		18%			

Trend Study 10-21-00

Study site name: East Sulphur Bench .

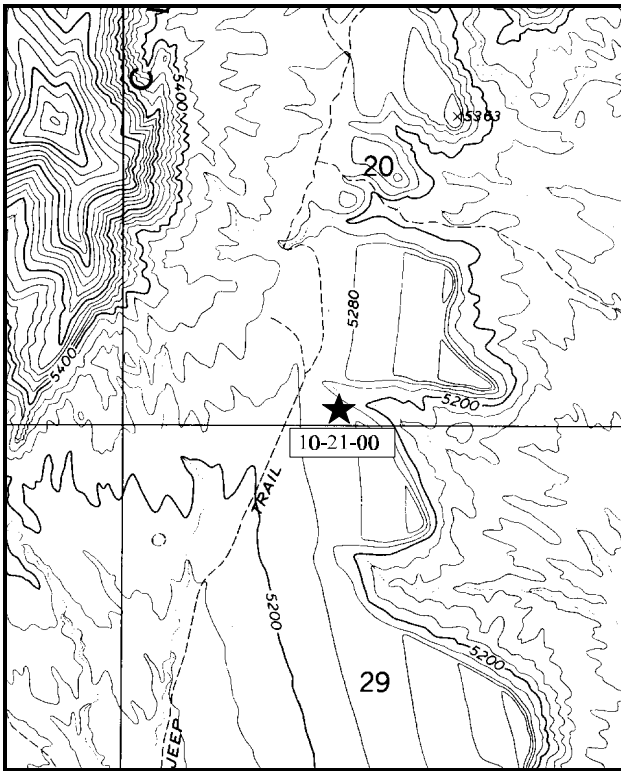
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

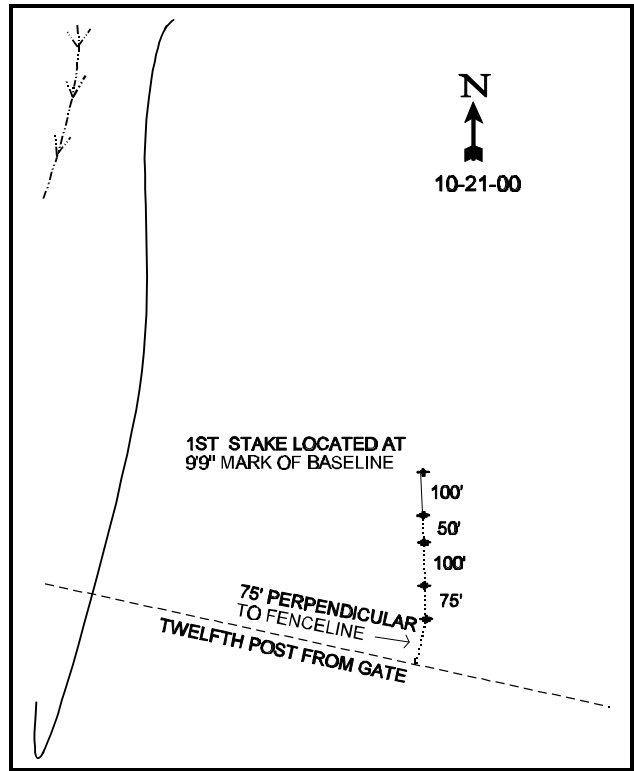
LOCATION DESCRIPTION

Take exit #220 east of Cisco on I-70. Beyond the freeway fence turn left at a fork and go northwest toward the Book Cliffs for 2.15 miles to a fork. Turn right. Go 6.5 miles and turn left at another fork. Go 1.85 miles to the ranch in Sulphur Creek. Make a sharp right turn just before the ranch gate and proceed up the hill 0.25 miles to a gate. Pass through this gate and go 0.9 miles to another gate. Stop here. Walk east along the fence to the twelfth wooden post. The fourth baseline stake is 75 feet to the north. The 0-foot end of the baseline is 325 feet north of the fourth baseline stake, but is not marked by a visible stake. There is a 3-foot tall rebar and rock cairn 9 feet 9 inches south of the actual starting place of the frequency baseline. All plots are marked with rebar stakes and a rebar spike at ground level.



Map Name: Antone Canyon

Township 18S , Range 24E , Section 20



Diagrammatic Sketch

UTM. 4342606 N, 647807 E

DISCUSSION

Trend Study No. 10-21 (16B-8)

*** This trend study was not read in 2000 and is being discontinued. Only text from the 1995 Utah Big Game Range Trend Studies report is included. Consult the 1995 report for maps and data tables.

The East Sulfur Bench transect is located on a bench north and east of Sulfur Canyon at an elevation of 5,200 feet. The study site is a sagebrush-juniper bench sloping to the west and towards the Book Cliffs. On the east side it drops off into sheer rocky cliffs. Numerous small drainages head off the cliffs or drain south into Sulphur Creek. Because runoff is seasonal, the closest permanent water source is in widely dispersed stock ponds. Water is probably not a limiting factor in the winter to domestic livestock or deer. However, year-round antelope use could increase especially if water was available. At this time it is used infrequently by antelope. In 1986, the Sulphur Canyon Allotment allowed grazing by 1,961 sheep from mid-November through mid-April and had a 5 year average (1985-1980) use of 897 sheep. Currently, sheep graze from late- December through late-April for 1,973 AUM's. Judging from pellet group quadrat frequency and hedging, there is only light use by deer.

Soil at the site is classified as sandy and moderately shallow. Rock and pavement cover combine to provide nearly 7% ground cover with much of the rock cover occurring as moderately large rocks which are widely scattered on the soil surface. Estimated vegetative cover is 32% with just over half coming from cheatgrass. Cryptogamic cover was reported high in 1986 (15%), but is now estimated at below 1% with extended drought. There are well defined trails and bare spots, but water erosion is only slight. Percent bare ground cover is estimated at 28% with a few small, active gullies. Litter cover has also declined to 36%, due again mostly to extended drought.

The dominant and key browse species is Wyoming big sagebrush. In 1986, there was an obvious gradient of use and vigor from heavily hedged decadent plants along the road, to lightly used healthy mature plants that were reported further up slope. This gradient may have been due to concentrations of sheep trailing along the road or bunching up at the gate, but this gradient is not as apparent in 1995. There is a fence just south of the transect that separates BLM administered land from private land. Sagebrush across the fence on private land appeared even more heavily utilized and displayed a severely clubbed appearance in 1986 and still appears in the same condition in 1995. The Wyoming big sagebrush density is estimated at 3,100 plants/acre and exhibits a moderate to heavily hedged condition on mature and decadent plants. Over half of the mature plants sampled in 1986 showed insect damage and poor vigor, but now only 7% of the mature plants exhibit these problems. Fourteen percent of the plants were classified as young and 70% were classified as mature in 1995. This is a shift from 1986 when 63% were classified as young and 32% were classified as mature. The proportion of heavily hedged individuals and the rate of decadency has increased. The vigor of the population has decreased overall, with over half of the decadent plants classified as chlorotic or dying.

Mature stands of juniper to the north, east, and west give way to scattered young trees near the transect. Point-center quarter method estimated only 13 trees/acre on the site. Shadscale density is estimated at 340 plants/acre with only mature plants sampled. Fourwing saltbush has a lower density with one out of every five plants sampled classified as dead. Less common shrubs that provide some variety, but limited forage are winterfat, spiny hopsage, and low rabbitbrush. The shrub with the highest density is broom snakeweed with an estimated density of 7,480 plants/acre. The population had an incredible number of seedlings (4,160 plants/acre) counted in 1995. Snakeweed had the highest density, yet it only contributes 12% of the browse cover. This undesirable increaser has an unutilized dynamic population that is taking up resources that ideally could be used by perennial herbaceous species.

As in 1986, there are very few desirable grasses on the site. The sum of nested frequency for perennial grasses has increased with most of the increase coming from bottlebrush squirreltail. All of the perennial grasses by themselves provide only 11% of the total grass cover. A few individual Indian ricegrass and muttongrass plants can be found, but it is the annual cheatgrass that dominates the understory. Cheatgrass accounts for 51% of the total vegetative cover and 89% of the total grass cover. Fall green-up of cheatgrass and its subsequent availability in winter and spring constitutes the bulk of the herbaceous forage utilized by deer. Three perennial forb species were encountered including: scarlet globemallow, longleaf phlox, and *Astragalus*. Perennial forb species have also increased in total sum of nested frequency since 1986. Plantain and prairie pepperweed are the most abundant annual forb species accompanied by several other species that add little to ground cover or forage.

1986 APPARENT TREND ASSESSMENT

The soil trend is basically stable. The vegetative trend is harder to determine. Although the mature sagebrush display heavy hedging and generally poor vigor, there are many vigorous young plants. With a reduction in livestock grazing pressure, the sagebrush, and other shrubs, show the potential to regain vigor and reproduce. The amount of available forage has been reduced by the heavily hedged appearance of the shrubs. The increasing snakeweed is another factor that contributes to the preliminary assessment of a downward trend. Of course, the trend could change with a reduction in browsing pressure and favorable weather patterns. The planned change in season of use by sheep should also favor the perennial grasses.

1995 TREND ASSESSMENT

The Wyoming big sagebrush population appears to be declining at this time. The decadency rate and proportion of heavily hedged plants have increased significantly and at the same time there is a decline in vigor. There are fewer young plants now than reported in 1986 with most of population being classified as mature. Shadscale and fourwing saltbush are in low densities, but could be used as forage. Broom snakeweed is the most abundant browse with great biotic potential this year. Many of the seedlings may not survive, but if they do, this just adds competition for the more preferred species. These factors lead to a downward browse trend. Sum of nested frequency for perennial grasses and forbs has increased since 1986, but cheatgrass dominates the site and was present in every quadrat. This causes great competition for soil moisture along with the prolonged drought for perennial species attempting to become established. The herbaceous understory trend is slightly upward, but still with a very poor composition. Erosion does not appear to be a problem on the site with adequate vegetative and litter cover. There is only a slight slope which does not allow much soil movement and leads to a more stable soil trend.

TREND ASSESSMENT

soil - stable, but only fair condition (3)

browse - downward (1)

herbaceous understory - slightly upward, but poor condition because of the high amount of annuals in the composition (4)

Trend Study 10-22-00

Study site name: Bryson Draw .

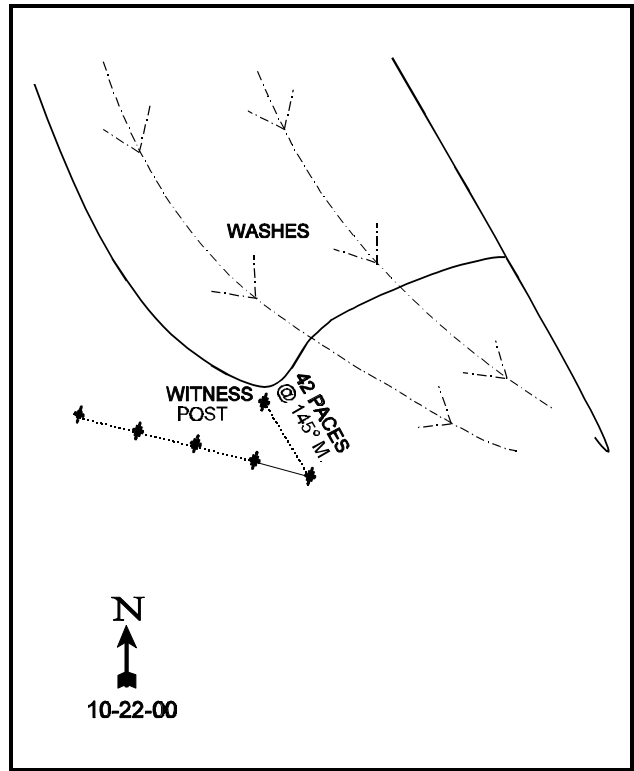
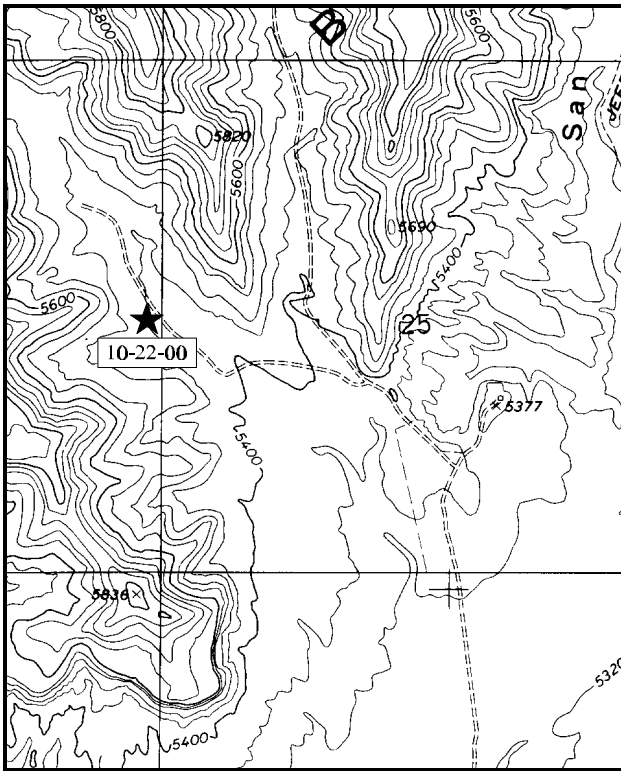
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Take I-70 to the Westwater exit near mile marker 225. Go north 0.2 miles to a "T" intersection and Book Cliff Ridge sign. Turn right and follow an old paved road parallel to the freeway for 2.1 miles to a left turn at a sign to Hay Canyon, East Canyon, PR Springs. Turn left. After 1.85 miles, there is a minor fork to the right, stay on main road. Continue 3.75 miles to a major fork. Turn right and go 2.65 miles to a fork. Stay to the left and go 1.55 miles to another fork. Stay to the left. Go 0.2 miles to the point of a hill past a fence line. Just beyond the old fence line, turn left on a faint old road. Go 0.25 miles. The transect is just past the second wash, where there is a witness post in the sage flat on the left. The 0-foot baseline stake, a rebar tagged #7892, is 42 paces at 145/M from the witness post.



Map Name: Bryson Canyon

Diagrammatic Sketch

Township 17S , Range 24E , Section 26

UTM. 4351243 N, 653757 E

DISCUSSION

Trend Study No. 10-22 (16B-9)

*** This trend study was not read in 2000 and is being discontinued. Only text from the 1995 Utah Big Game Range Trend Studies report is included. Consult the 1995 report for maps and data tables.

The Bryson Canyon transect is located at the mouth of a wide canyon just west of Bryson Canyon. Elevation at the site is 5,400 feet on a gently sloping big sagebrush covered flat with an easterly aspect. Just below the site is a wash that drains south-southeast out of the canyon. This land is administered by the BLM and is part of the Winter Camp Allotment. Prior to 1986, the BLM estimated that overall browse utilization on the allotment as usually less than 20%. The 5-year average (1980-1985) stocking rate was 620 sheep for two months from mid-December to mid-February (248 AUMs). An increase in AUMs allocated for sheep is anticipated upon completion of a proposed land treatment involving 640 acres of sagebrush (not near the Interagency study). Sheep are now permitted to graze from late-December through the last of February at 347 AUM's. Quadrat frequency of pellet groups show moderately high sign for both sheep and rabbits.

The soil is moderately deep and well-drained. It is a fine sandy loam formed in residuum and alluvium from sandstone and conglomerate. There is less bare soil exposed (30%) than reported in 1986 when it was 39%. Litter cover is the same as sampled in 1986 with an estimated cover value of 38%. The litter is found mostly under sagebrush and patches of perennial grass. Vegetative cover is estimated at 36% with 52% of the cover coming from one species, cheatgrass. There is a low level of sheet erosion with some evidence of slight wind erosion.

Like most of the other winter range study sites on the South Book Cliffs, this site samples a sagebrush flat adjacent to a juniper woodland. There is an estimated 5,680 Wyoming big sagebrush plants/acre with 71% of the sampled plants classified as mature. There were no seedlings encountered which is not unusual with the abundant cheatgrass cover on the site. Hedging is reported as mostly light to moderate with 15% of the population being heavily hedged. A higher percentage of plants are classified as chlorotic or dying than reported in 1986, although the decadency rate declined from 39% to 9%. As in 1986, some of the mature sagebrush is parasitized by white fuzzy galls, but these do not appear to be causing a reduction in vigor.

The spiny hopsage has an estimated density of 160 plants/acre with heavy hedging on 63% of the population and a decadency rate of 37%. Broom snakeweed has shifted to a mostly mature age structure with good biotic potential. The estimated density of broom snakeweed is 2,240 plants/acre with no apparent utilization. Juniper do not appear to be invading down the slope. It presently provides good escape and thermal cover. Both pricklypear cactus and fourwing saltbush are present in low densities and do not appear to be increasing at this time. Winterfat was reported in 1986 as being present but none were sampled in 1995.

A moderate amount of perennial grasses are present with the most abundant being the low-growing, warm season galleta grass. Galleta occurs in scattered bunches and also dominates grassy openings in the sagebrush. It has decreased significantly in sum of nested frequency value since 1986 along with Indian ricegrass and needle-and-thread grass. Muttongrass significantly increased in sum of nested frequency and is now the second most abundant grass. Although cheatgrass is not as robust as on other sites, it still has a quadrat frequency of 100% and provides 52% of the total vegetative cover. The cheatgrass is mostly associated with the Wyoming big sagebrush canopy, but also occurs scattered throughout the interspaces. The total sum of nested frequency for perennial forbs is nearly the same as in 1986 with several new species sampled. The most common is longleaf phlox and others include Astragalus, Onobrychis, and scarlet globemallow. The most abundant annual forb is woolly Indianwheat which contributes 58% of the total forb cover. Total forb cover (<1%) is low with most of the species not providing much cover or forage.

1986 APPARENT TREND ASSESSMENT

The soil trend appears stable. Overall, the vegetative trend also appears stable. The sagebrush, although parasitized, is moderately hedged and vigorous and there appears to be sufficient recruitment of new plants into the population. The site appears capable of sustaining the current level of use by livestock and deer with normal precipitation.

1995 TREND ASSESSMENT

The Wyoming big sagebrush population shows a mostly mature age structure with no seedlings sampled. Hedging is mostly light to moderate with a decrease in decadency. It is unlikely there will be much seedling establishment of Wyoming big sagebrush in the future due to the competition for soil moisture with cheatgrass and other annual forbs. The broom snakeweed population does not appear to be increasing at this time and has also shifted to a more mature age structure. These factors lead to a slightly upward browse trend with a need to reduce annual herbaceous understory competition so seedling sagebrush can become established. The herbaceous understory has remained nearly the same in total sum of nested frequency value. Overall, the herbaceous understory trend is stable with a very high frequency of cheatgrass. Some slight erosion was noted as well as slight pedestaling in the interspaces. Erosion does not appear to be any worse now than in 1986, so the soil trend is considered stable.

TREND ASSESSMENT

soil - stable but fair condition (3)

browse - slightly upward (4)

herbaceous understory - stable but with a very high proportion of annuals (3)

Trend Study 10-23-00

Study site name: Bogart-She .

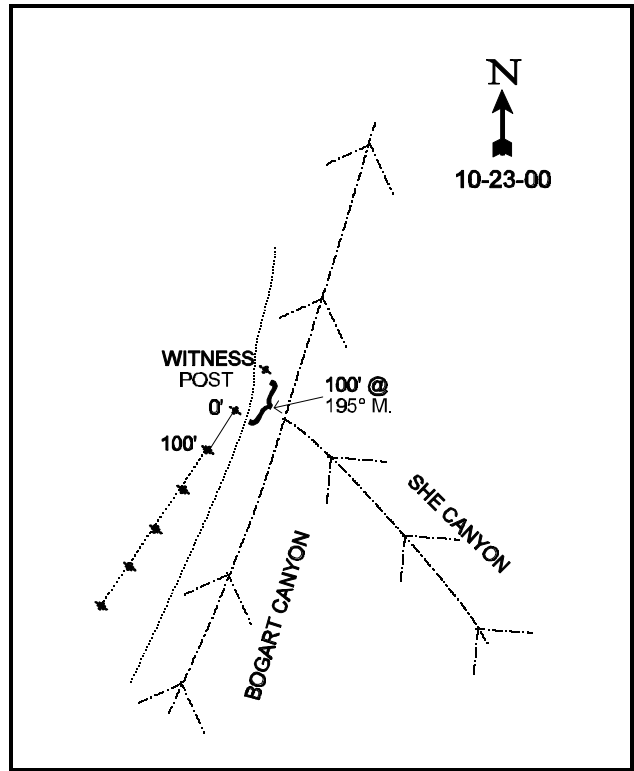
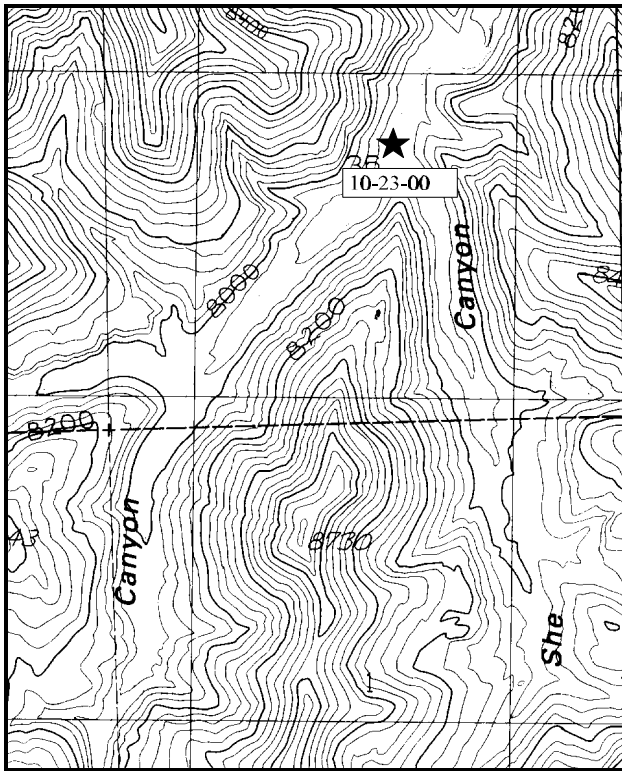
Range type: Meadow .

Compass bearing: frequency baseline 195/M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From the Bogart Canyon Cabin travel northeast through the drainage to the confluence of She Canyon and Bogart Canyon. There is a witness post located just off the trail. The 0 foot baseline stake is located 100 ft. from the witness post at 195/ M. The baseline runs 195/ M.



Map Name: Bogart Canyon .

Diagrammatic Sketch

Township 18S , Range 20E , Section 36

UTM. 4339744 N, 615485 E

DISCUSSION

Trend Study No. 10-23 (16B-10)

***This site was not read in 2000. Text from the 1995 Utah Big Game Range Trend Studies report is included. Consult the 1995 report for maps and data tables.

This is a new site which samples a grassy meadow at the confluence of Bogart and She Canyons in the roadless area of the Book Cliffs. The canyon is narrow, 400-500 feet wide, with conifers on the north slopes to the bottom and ponderosa pine and mixed browse on the south slopes. Elevation at the site is approximately 7,800 feet with an east aspect. Slope averages between 8-10% and drains into a small stream that runs down the canyon bottom on the lower side of the site. The area around the stream is more of a wet meadow while the transect samples the drier portion of the meadow. There has been no grazing by livestock since 1990.

Ground cover for vegetation is excellent at nearly 69% with a majority of the cover coming from grass. Litter is the other major contributor to ground cover with a cover value estimated at 57%. The loamy, light brown soil is moderately deep. At this time, there is no erosion on the site due to the abundant vegetation and litter cover. There is obvious evidence that there has been severe erosion down the stream channel in the past, but the steep sides of the stream channel have now become covered with grasses. Most of the bare ground encountered on the site is due to gopher activity and accounts for only 8% of the ground cover. Rock and pavement combined cover values contribute to just over 1%.

The dominant species on the site is Kentucky bluegrass. This grass comprises 77% of the grass cover and 54% of the total vegetative cover. Although this species is good for erosion control and forage, it is an aggressive competitor often replacing other native grasses and forbs with its sod forming growth and propensity to increase with moderate to heavy grazing. The next most abundant grass sampled is thickspike wheatgrass. This grass is considered good forage early in the season and is also good for erosion control. Carex is present on the site and also provides good forage and watershed protection. Other grasses encountered, but in low densities include: blue grama, wiregrass, and needle-and-thread grass.

A variety of forbs are scattered throughout the site with the most abundant being horsetail. The next most abundant forb is Aster followed by the invasive dandelion. Annual forb species contribute only a small percent (4%) to the total vegetative cover with most being relatively small statured species such as stickseed and knotweed.

1995 APPARENT TREND ASSESSMENT

Historically, this site was subject to heavy use by livestock, mostly cattle. There has been no grazing in the area for several years and the canyon bottom is showing good recovery. There is excellent vegetative cover for both erosion control and forage. The composition could be better with a higher density of preferred native species, although Kentucky bluegrass provides needed cover to protect the soil from erosion. Forbs are scattered throughout the site and could provide some forage but not much because of their small size. The herbaceous understory trend at this time is stable while providing abundant soil protection. The soil trend is stable as well for the same reasons. There is no erosion on the site and there will likely not be any as long as the vegetative and litter cover values stay this high. There were no browse species sampled at this time on the site.

Trend Study 10-24-00

Study site name: Turner Canyon .

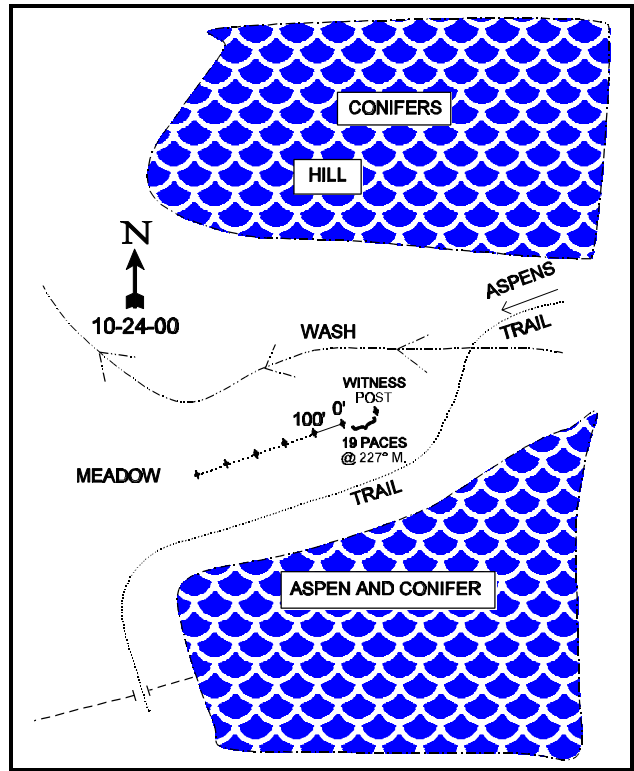
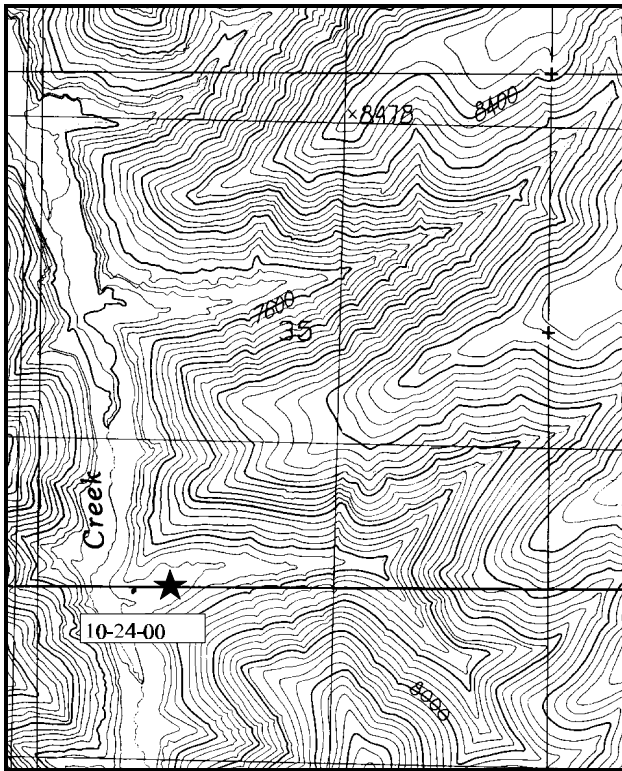
Range type: Basin Wild Rye .

Compass bearing: frequency baseline 225/M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From the road closed sign walk for about 30-40 minutes south along Diamond Ridge until you reach a definite fork in the trail and a rock cairn. The fork to the right is the Turner Canyon Trail. It is well worn and used by horses. Follow the Turner Canyon Trail to the bottom of the canyon where you will go through a gate. Continue down the trail until you break out of the aspen into the wider part of the canyon mouth. The transect will be on the south side of the wash in a basin wildrye and grass type. A witness post will be there marking the transect. From the witness post walk 19 paces at 227/M to the 0 foot baseline stake. The baseline runs 225/M.



Map Name: Tenmile Canyon South .

Diagrammatic Sketch

Township 18S , Range 21E , Section 2

UTM. 4348535.088 N, 623523.418 E

DISCUSSION

Trend Study No. 10-24 (16B-11)

The Turner Canyon transect samples a canyon bottom at the mouth of Turner Canyon where it joins East Willow Canyon. Elevation at the site is 7,500 feet with a west-southwest aspect. There is only a slight slope of 1-3% which drains into East Willow Canyon. The slopes of the canyon surrounding the meadow are covered with conifers and aspen. On the north side of the transect is a gully about 15 feet deep. In 1990, it was reported as having little vegetation on the sides with signs of active cutting. In 1995 and 2000, the gully was healing with vegetation covering the sides and no apparent erosion problems. Supposedly, there has been no livestock grazing since 1990, although light use by cattle was noted in 2000. Pellet group data estimate 2 cow days use/acre (5 cdu/ha) in 2000. Use by wildlife is currently light. Pellet group transect data from 2000 estimate 9 elk days use/acre (22 edu/ha).

The soil is a deep sandy loam with very few rocks showing. Estimated effective rooting depth is over 35 inches with average soil temperature being 48°F at 18 inches in depth. No rock was sampled with penetrometer readings so the stoniness index is a measure of soil compaction. Vegetation and litter cover are high at 56% and 71% in 1995, increasing to 67% and 80% in 2000. These provide excellent protection to the soil, allowing negligible erosion to occur. Less rock and pavement have been encountered with each successive reading and currently combine for less than 2% average cover. Percent bare ground also declined from 15% in 1990 to 5% in 1995, and only 4% in 2000.

Basically, the only shrub sampled on the site is fringed sagebrush. It had an estimated density of 5,866 plants/acre in 1990, increasing to 21,940 plants/acre in 1995, and 5,620 plants/acre in 2000. The large difference between 1995 and 2000 is most likely due to the unusually wet spring of 1995 causing a large increase in density, then with drought in 2000, this species returned to more normal levels. Currently, most of the population is mature plants (81%) with moderate recruitment from the young age class (19%). These plants do not appear to be utilized and exhibit good vigor. The population may be slightly increasing, but the age structure of mature and young plants are fairly stable. Mountain big sagebrush was also sampled in 1995 and 2000 and estimated at 20 plants/acre. Mountain big sagebrush can be found on the other side of the canyon and appears to be slowly moving into the flat.

The dominant grass on the site is Kentucky bluegrass. This grass contributes nearly 30% of the total vegetative cover in 1995 and 2000. This species is considered good for forage and erosion control. However, Kentucky bluegrass is an aggressive increaser with moderate to heavy grazing. It is a rhizomatous sod former and is able to out-compete many species of grasses and forbs. Thickspike wheatgrass, Great Basin wildrye, and needle-and-thread grass are also present. In 2000, it was difficult to identify grasses because of very few seed heads. This may partly account for large decrease in thickspike and subsequent increase in needle-and-thread in 2000. Great Basin wildrye occurs in large clumps and is the most conspicuous species on the site. Other grasses that occur infrequently include: blue grama, cheatgrass, prairie junegrass, and alkali muhly. In 1995, sum of nested frequency for perennial grasses increased with several additional species being sampled. However, sum of nested frequency decreased for perennial grasses in 2000, most likely due to the dry conditions.

The most abundant forb sampled in 1995 and 2000 was cinquefoil which accounts for 32% of the total forb cover in both years. This is considered an increaser and grows relatively low to the ground. Other low growing, increaser forbs encountered on the site include: western yarrow, Rose pussytoes, Pacific aster, and dandelion. Dandelion was the most abundant forb in 1990 when the site was established. The abundance of these forbs would indicate a long history of overgrazing. Sum of nested frequency for perennial forbs also decreased in 2000, again mostly due to the dry conditions.

1995 TREND ASSESSMENT

Fringed sagebrush would not be available as forage in the winter, while in the summer, grasses would be preferred before the fringed sagebrush would be utilized. The abundance of fringed sagebrush is an indication of past overgrazing and misuse of the area. The drastic increase in density is likely due to the unusually wet spring in 1995. Browse trend at this time is stable, although, a different shrub component is likely preferred. Herbaceous understory trend is also stable, but most of the forbs are increasers. These, along with the abundant Kentucky bluegrass, all indicate past misuse of the area. The gully located on the north side of the transect appears to be healing and there is no apparent erosion taking place at this time. Percent bare ground has declined from 15% in 1990 to only 5%. Vegetative and litter cover are abundant and contribute to an upward soil trend.

TREND ASSESSMENT

soil - upward (5)

browse - stable (3)

herbaceous understory - stable, but better grass and forb composition is desired; this will change through time (3)

2000 TREND ASSESSMENT

Trend for soil is stable. Vegetation and litter cover are dense and bare ground remains low. Trend for browse is stable but unimportant on this summer range site. Fringed sagebrush had a large decrease in density, but this species provides less than 1% cover and is not an important forage plant. Trend for the herbaceous understory is slightly down due to decreases in sum of nested frequency for perennial grasses and forbs.

TREND ASSESSMENT

soil - stable (3)

browse - stable, but unimportant (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 24

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'90	'95	'00	'90	'95	'00	'95	'00
G	Agropyron dasystachyum	_b 251	_b 245	_a 91	84	81	36	7.64	2.07
G	Bouteloua gracilis	_b 7	_{ab} 4	_a -	4	2	-	.01	-
G	Bromus tectorum (a)	-	2	-	-	1	-	.03	-
G	Elymus cinereus	52	56	54	26	22	18	8.48	8.01
G	Koeleria cristata	_a -	_b 6	_a -	-	3	-	.18	-
G	Muhlenbergia asperifolia	_a -	_b 11	_a -	-	5	-	.05	-
G	Poa pratensis	318	324	281	89	92	83	16.29	18.61
G	Stipa comata	_a 116	_a 121	_b 201	42	40	60	6.26	20.46
Total for Annual Grasses		0	2	0	0	1	0	0.03	0
Total for Perennial Grasses		744	767	627	245	245	197	38.93	49.17
Total for Grasses		744	769	627	245	246	197	38.96	49.17

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'90	'95	'00	'90	'95	'00	'95	'00
F	<i>Achillea millefolium</i>	_a 22	_b 73	_b 59	11	29	24	1.66	1.48
F	<i>Agoseris glauca</i>	-	-	5	-	-	2	-	.15
F	<i>Antennaria rosea</i>	_a 9	_{ab} 20	_b 30	3	7	10	1.03	2.08
F	<i>Androsace septentrionalis</i> (a)	-	_b 25	_a 9	-	9	3	.04	.06
F	<i>Arabis</i> spp.	_a -	_b 20	_a -	-	8	-	.23	-
F	<i>Artemisia dracunculus</i>	_a -	_b 49	_b 61	-	20	25	1.80	2.29
F	<i>Aster chilensis</i>	32	32	34	10	11	13	1.00	.86
F	<i>Chenopodium leptophyllum</i> (a)	-	_b 30	_a -	-	14	-	.49	-
F	<i>Crepis acuminata</i>	_b 17	_a -	_a -	6	-	-	-	-
F	<i>Cryptantha</i> spp.	_b 67	_a -	_a -	32	-	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	_b 9	_a -	-	4	-	.02	-
F	<i>Erigeron flagellaris</i>	21	11	9	8	5	3	.22	.09
F	<i>Erigeron pumilus</i>	_a -	_a -	_b 11	-	-	5	-	.07
F	<i>Lappula occidentalis</i> (a)	-	11	3	-	5	1	.05	.00
F	<i>Lithospermum ruderales</i>	_b 17	_a -	_a -	10	-	-	-	-
F	<i>Microsteris gracilis</i> (a)	-	4	-	-	3	-	.21	-
F	<i>Oenothera pallida</i>	_c 115	_b 86	_a 12	52	37	6	1.37	.06
F	<i>Penstemon</i> spp.	_b 28	_a -	_a -	13	-	-	-	-
F	<i>Phlox longifolia</i>	_b 27	_a -	_a 2	12	-	2	-	.01
F	<i>Potentilla anersina</i>	_b 12	_a -	_a -	4	-	-	-	-
F	<i>Polygonum douglasii</i> (a)	-	_b 25	_a -	-	12	-	.11	-
F	<i>Potentilla gracilis</i>	_b 145	_a 158	_a 163	64	67	71	4.29	3.99
F	<i>Taraxacum officinale</i>	176	100	74	71	47	35	.58	.85
F	<i>Tragopogon dubius</i>	_a 4	_{ab} 9	_b 17	3	5	11	.10	.29
F	<i>Vicia americana</i>	_a -	_b 8	_{ab} 4	-	3	2	.04	.03
Total for Annual Forbs		0	104	12	0	47	4	0.93	0.07
Total for Perennial Forbs		692	566	481	299	239	209	12.35	12.29
Total for Forbs		692	670	493	299	286	213	13.28	12.36

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 10 , Study no: 24

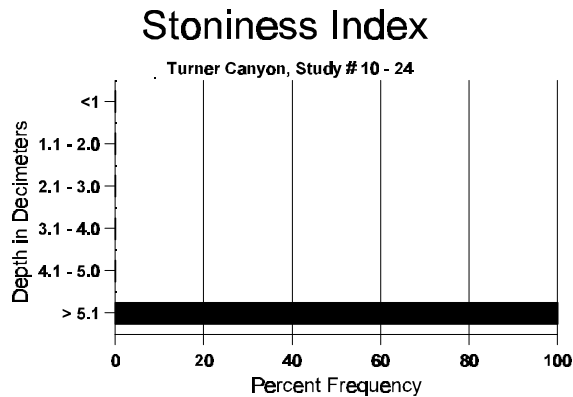
Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia frigida</i>	96	73	6.01	.37
B	<i>Artemisia tridentata vaseyana</i>	1	1	-	-
Total for Browse		97	74	6.01	0.37

BASIC COVER --
Herd unit 10 , Study no: 24

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'90	'95	'00
Vegetation	390	395	32.50	56.31	67.81
Rock	91	13	.25	.32	.21
Pavement	196	98	11.25	2.94	1.22
Litter	399	396	41.00	71.51	80.30
Cryptogams	22	7	0	.50	.18
Bare Ground	181	118	15.00	5.01	3.94

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 24, Study Name: Turner Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
35.07	48.4 (18.11)	7.9	57.3	24.2	18.6	2.9	17.4	416.0	0.7



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 24

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	3	2	17	N/A
Horse	1	-	-	-
Elk	17	4	122	9 (24)
Deer	3	-	-	-
Cattle	1	-	26	2 (5)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 24

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia frigida</i>																		
S	90	76	-	-	-	-	-	-	-	-	76	-	-	-	5066		76	
	95	46	-	-	5	-	-	-	-	-	51	-	-	-	1020		51	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	90	40	7	2	-	-	-	-	-	-	47	-	2	-	3266		49	
	95	155	-	-	48	-	-	-	-	-	203	-	-	-	4060		203	
	00	53	-	-	-	-	-	-	-	-	53	-	-	-	1060		53	
M	90	18	16	5	-	-	-	-	-	-	37	-	1	1	2600	0	1	39
	95	823	-	-	69	-	-	-	-	-	892	-	-	-	17840	15	8	892
	00	224	-	-	4	-	-	-	-	-	228	-	-	-	4560	5	6	228
D	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'90		26%			08%			05%			+73%							
'95		00%			00%			00%			-74%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'90	5866	Dec:	0%			
												'95	21940		0%			
												'00	5620		0%			
<i>Artemisia tridentata vaseyana</i>																		
M	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	18	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	1	-	-	-	-	-	1	-	20		1	
X	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'90		00%			00%			00%										
'95		00%			00%			00%			+ 0%							
'00		00%			100%			100%										
Total Plants/Acre (excluding Dead & Seedlings)												'90	0	Dec:	0%			
												'95	20		0%			
												'00	20		100%			

Trend Study 10-25-00

Study site name: Little Ridge .

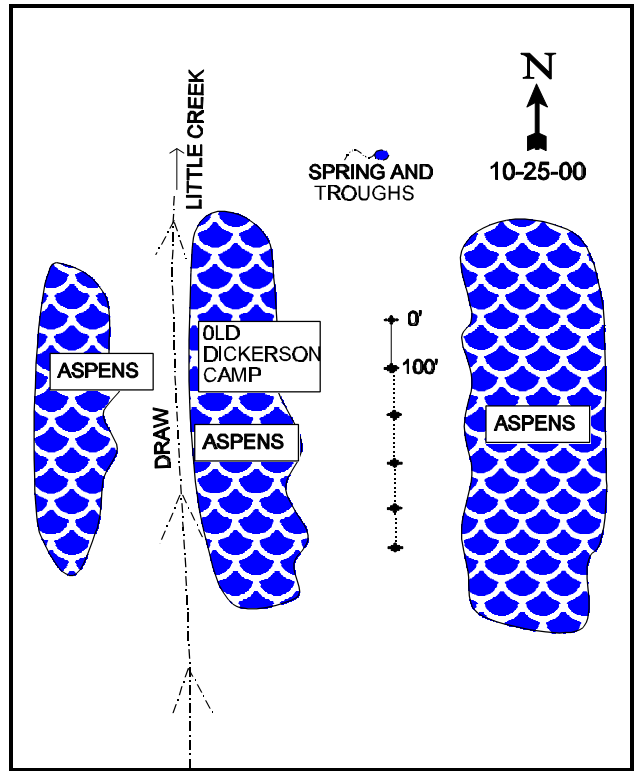
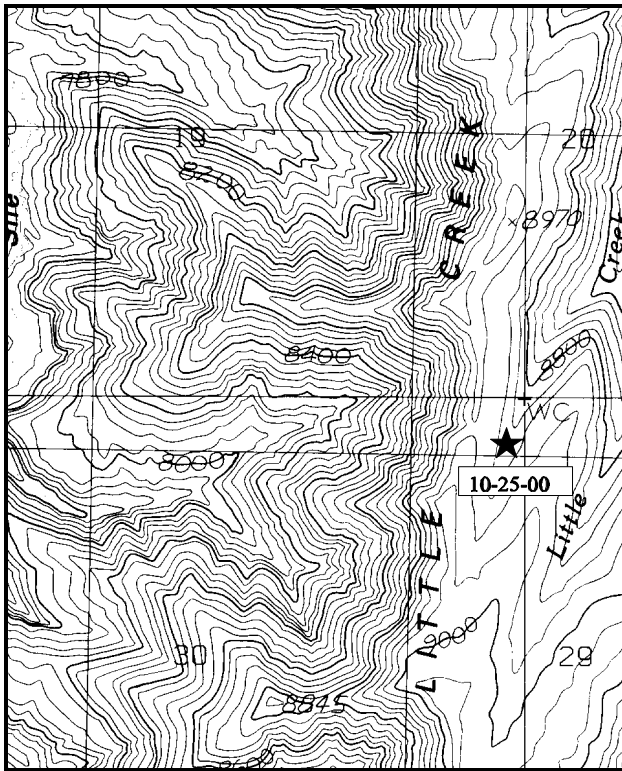
Range type: Meadow .

Compass bearing: frequency baseline 174°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

Go up Little Creek Trail (from east Willow Creek) to forks at head. Take the right fork (with water). Go up to the spring with trough, go up trail in draw to right where it opens up in park with aspens on both sides. You can see remains of camp on ridge to the left. Go up to the ridge. The study is marked with a witness post. The 0 foot baseline stake is 4 ½ paces at 240/.



Map Name: Bogart Canyon .

Diagrammatic Sketch

Township 18S , Range 21E , Section 20

DISCUSSION

Trend Study No. 10-25 (16B-12)

*** This site was not read in 2000. Text from the 1995 Utah Big Game Range Trend Studies report is included. Consult the 1995 report for maps and data tables.

This new transect established in 1995 samples a dry grass park on Little Creek Ridge in the roadless area of the Book Cliffs. Elevation at the site is approximately 8,800 feet with a slightly northern aspect and a slope of only 4%. The slopes surrounding the site are covered with conifers and patches of aspen. The Little Creek Ridge area has been historically severely grazed with the exception of the last 5 years, when livestock have been excluded.

Soil on the site appears very deep, light brown in color, and finely textured. The soil surface has rock and pavement cover of about 2%. Vegetation cover is estimated at 50% and provides excellent protection for the soil. Litter cover is also high and estimated at 64%. There is some bare ground (11%) which is likely the result of past grazing pressure. Due to the abundant vegetative and litter cover and lack of steep slope, there are no signs of active erosion at this time.

Although mountain big sagebrush is the most numerous browse on the site, snowberry offers the most browse cover. The mountain big sagebrush population is estimated at 700 plants/acre with a majority (80%) being classified as young plants. Biotic potential for this population is tremendous this year with an estimated 2,460 seedlings/acre. This is 3½ times as many plants as the entire population of mature and young combined. None of the plants sampled exhibited any hedging and vigor was reported as good. Snowberry density is estimated at 280 plants/acre, of which, 71% were classified as mature. There appears to be some moderate hedging on these plants, but vigor remains good.

The dominant grass on the site is needle-and-thread which accounts for 39% of the total vegetative cover. Although this area has been rested from livestock grazing for five years, there is more needle-and-thread grass than likely desired. The increaser Kentucky bluegrass is not as abundant as in other open grass parks in the surrounding areas. Letterman needlegrass, big mountain brome, Columbian needlegrass, and carex are all present but in low abundance.

Most forbs species are low growing increasers and/or invaders with low forage values. The exception to this is thistle which is moderately sought after by wildlife and livestock. Annual forbs are scattered throughout and contribute only 4% to the total vegetative cover. This composition of many increaser forbs is due to the high grazing pressure exerted on this site historically.

1995 APPARENT TREND ASSESSMENT

The mountain big sagebrush population density is quite low at this time, but could increase if the seedlings reported in 1995 become established. Browse trend at this time is stable with the possibility of the mountain big sagebrush population increasing. The herbaceous understory is dominated by grasses, with the most dominant being needle-and-thread grass. This is likely not the preferred grass for this area and may decrease in time with increased competition from other more desirable species. The forbs are mostly low growing species with low palatability, but do help protect soils from eroding downslope. Therefore, the herbaceous understory trend is stable although it is made up mostly of increaser species, which should change through time with no more livestock use. There are no signs of soil movement and there is abundant vegetative and litter cover. These factors lead to a stable soil trend.

Trend Study 10-26-00

Study site name: Bitter Creek .

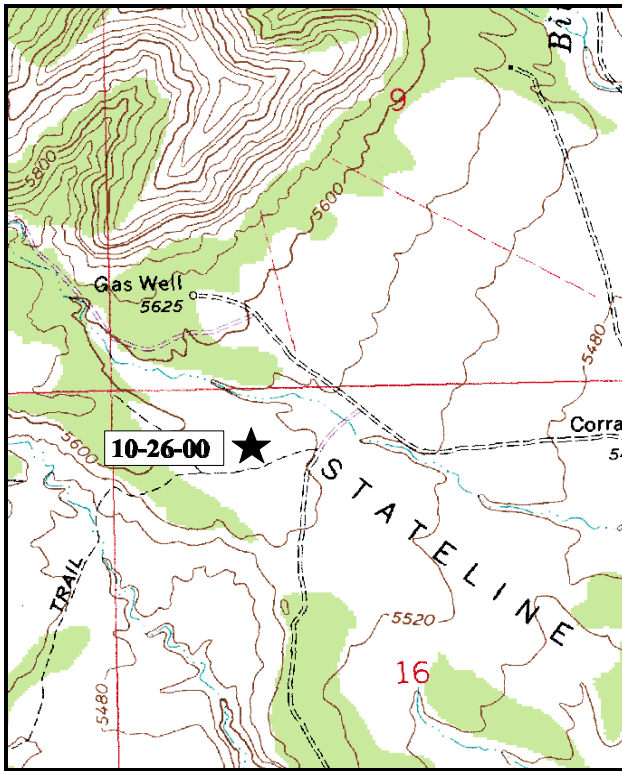
Range type: Big Sagebrush .

Compass bearing: frequency baseline 291°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

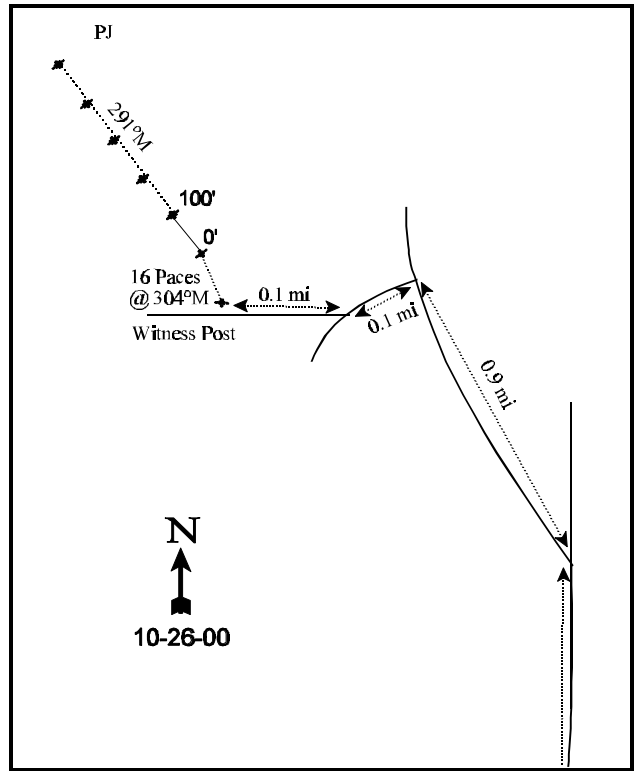
LOCATION DESCRIPTION

Take I-70 exit #225 Westwater and turn left to the Book Cliff area. Travel 0.35 miles to a “T” intersection and turn right (northeast). Proceed 2.2 miles to a fork and keep right. Stay on the main road for 6.35 miles to a dirt road on the left. Turn left traveling north-northwest. Proceed 4.2 miles and stay left on the main road. Continue 1.7 and turn right. Travel another 4.25 to a fork. Turn left at this fork and go 0.9 miles. At the next fork turn left and go 0.1 miles. Then take the right fork and go 0.1 miles to the witness post on the right side of the road. The 0-foot stake is 16 paces away at 304°M.



Map Name: Bryson Canyon .

Township 17S, Range 25E, Section 16



Diagrammatic Sketch

UTM. 4348535.088 N, 623523.418 E

DISCUSSION

Trend Study No. 10-26

The Bitter Creek transect is a new trend study established to monitor essential winter range for big game, primarily elk. The site is located near the Utah-Colorado state line on the South Book Cliffs. The area has a gentle slope (5%) and a southeast exposure at an elevation of 5,500 feet. The transect was placed on the alluvial fan that was deposited where Bitter Creek comes off of the cliffs. The site lies in a Wyoming big sagebrush flat surrounded by stands of pinyon-juniper. According to DWR biologists, a moderate herd of elk are year round residents to this area. Pellet group transect data from 2000 estimate high elk use at 82 elk days use/acre (203 edu/ha) and light use by deer at 4 deer days use/acre (10 ddu/ha).

Soils are of sandy clay loam texture with an average temperature of nearly 63°F at 11 inches in depth. Estimated effective rooting depth is only about 12 inches. A profile stoniness index shows the majority of rock to occur between 4-12 inches in depth. Phosphorus is low at 4.5 ppm, where 10 ppm has been shown necessary for normal plant growth and development. Soils are neutral in reactivity (pH of 7.1) and organic matter is very low at 0.4%. Shrub interspaces are bare with pedestaling occurring around and underneath shrub canopies. Some heavy localized erosion was noted in the general area of this transect with deep gullies, but erosion is not as severe directly on the site with the gentle slope. Currently, vegetation and litter cover appear to be adequate to minimize erosion.

Wyoming big sagebrush is the key browse species and it provides 98% of the browse cover and 84% of the total vegetative cover at this site. Sagebrush cover is estimated at 20% with an estimated 5,320 plants/acre. Age class composition shows the population to consist of 44% mature plants with a moderately high rate of decadency (56%). Forty-six percent of the decadent plants are classified as dying and 27% of the population displaying poor vigor. Recruitment and biotic potential are currently nonexistent. Use is at a moderate to heavy level with 59% showing moderate use and 24% displaying heavy use. This overly mature stand of sagebrush needs to be thinned both to increase sagebrush reproduction and also to rejuvenate the understory which is undoubtedly suppressed by high sagebrush cover and density. Leader growth is sparse with average growth being about 4 inches. This is a dry site and the sagebrush appears to be showing the effects of the extended drought. Other browse include: broom snakeweed and spiny hopsage. Snakeweed density is estimated at 620 plants/acre with 68% of the population being mature plants.

Herbaceous vegetation is sparse and found mainly underneath sagebrush canopies. Cheatgrass is the most abundant grass having a quadrat frequency of 72%. Mutton bluegrass and bottlebrush squirreltail were the only perennial grasses sampled in 2000. These species are not as abundant as cheatgrass in nested and quadrat frequency values, but do provide as much cover. Grasses contribute only 3% average cover at the present time. Forbs are infrequent with 5 perennial and 2 annual species being sampled in 2000. Forbs provide less than one-half of one percent cover. The high density and cover from sagebrush has suppressed the herbaceous component in this vegetative community. The population would have to be reduced if the understory is ever going to improve.

2000 APPARENT TREND ASSESSMENT

Trend for soil appears stable, but is somewhat vulnerable to high intensity thunderstorms with very little herbaceous cover on the site. The ratio of protective ground cover to bare soil is still appears adequate to protect against severe erosion at the present time. The browse population appears to be in a state of decline with no recruitment, high decadency (56%), and 46% of the decadent plants classified as dying. Also, 27% of the sagebrush display poor vigor. Sagebrush density and cover are very high and need to be thinned to increase vigor and reproduction as well as to rejuvenate the understory. The understory is depleted and will remain so without some type of treatment to reduce sagebrush density and cover.

HERBACEOUS TRENDS --

Herd unit 10 , Study no: 26

T y p e	Species	Nested Frequency	Quadrat Frequency	Average Cover %
		'00	'00	'00
G	Bromus tectorum (a)	203	72	1.02
G	Poa fendleriana	114	40	1.09
G	Sitanion hystrix	78	36	1.04
G	Vulpia octoflora (a)	4	2	.01
Total for Annual Grasses		207	74	1.03
Total for Perennial Grasses		192	76	2.13
Total for Grasses		399	150	3.17
F	Erodium cicutarium (a)	3	1	.00
F	Erigeron spp.	8	5	.02
F	Erigeron pumilus	15	5	.05
F	Leucelene ericoides	12	4	.05
F	Phlox longifolia	6	2	.01
F	Plantago patagonica (a)	2	1	.00
F	Schoenrambe linifolia	23	12	.06
Total for Annual Forbs		5	2	0.00
Total for Perennial Forbs		64	28	0.19
Total for Forbs		69	30	0.20

BROWSE TRENDS --

Herd unit 10 , Study no: 26

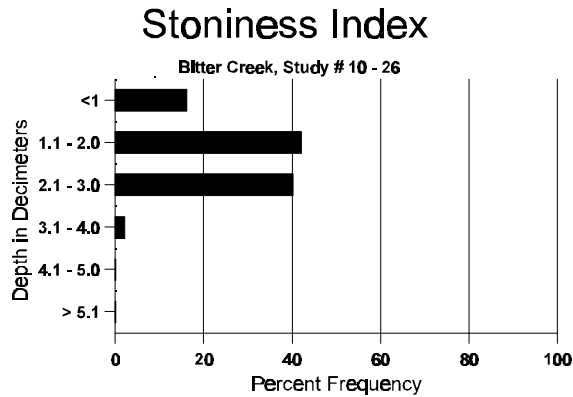
T y p e	Species	Strip Frequency	Average Cover %
		'00	'00
B	Artemisia tridentata wyomingensis	91	20.00
B	Grayia spinosa	1	-
B	Gutierrezia sarothrae	8	.30
B	Opuntia spp.	6	.18
Total for Browse		106	20.48

BASIC COVER --
Herd unit 10 , Study no: 26

Cover Type	Nested Frequency	Average Cover %
	'00	'00
Vegetation	329	27.48
Rock	30	.89
Pavement	101	.75
Litter	444	34.70
Cryptogams	287	14.39
Bare Ground	399	44.19

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 26, Study Name: Bitter Creek

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.76	62.8 (11.42)	7.1	60.0	17.4	22.6	0.4	4.5	99.2	0.5



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 26

Type	Quadrat Frequency	Pellet Transect	
		Pellet Groups per Acre	Days Use per Acre (ha)
	'00	'00	'00
Rabbit	5	52	N/A
Elk	44	1070	82 (203)
Deer	18	52	4 (10)

BROWSE CHARACTERISTICS --

Herd unit 10 , Study no: 26

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
M	00	9	57	29	5	17	-	-	-	-	117	-	-	-	2340	20	31	117
D	00	7	52	23	17	32	12	6	-	-	78	-	2	69	2980			149
X	00	-	-	-	-	-	-	-	-	-	-	-	-	-	760			38
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'00		59%			24%			27%										
Total Plants/Acre (excluding Dead & Seedlings)														'00	5320	Dec:	56%	
<i>Grayia spinosa</i>																		
M	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	10	16	1
X	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'00	20	Dec:	-	
<i>Gutierrezia sarothrae</i>																		
S	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
M	00	21	-	-	-	-	-	-	-	-	21	-	-	-	420	8	9	21
D	00	4	-	-	-	-	-	-	-	-	-	-	4	80			4	
X	00	-	-	-	-	-	-	-	-	-	-	-	-	100			5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'00		00%			00%			13%										
Total Plants/Acre (excluding Dead & Seedlings)														'00	620	Dec:	13%	
<i>Opuntia spp.</i>																		
M	00	5	-	-	-	-	-	1	-	-	6	-	-	-	120	5	16	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'00	120	Dec:	-	

Trendy Study 10R-2-00

Study site name: Lone Spring

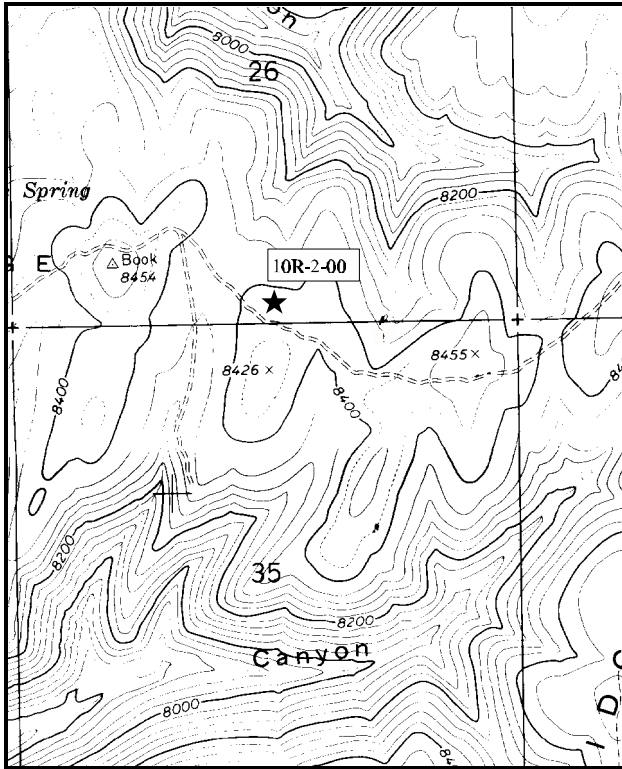
Range Type: Mixed Mountain Brush

Compass bearing: frequency baseline 125°M. (Line 3 118°M, line 4 107°M)

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (95ft), line 5 (71ft).

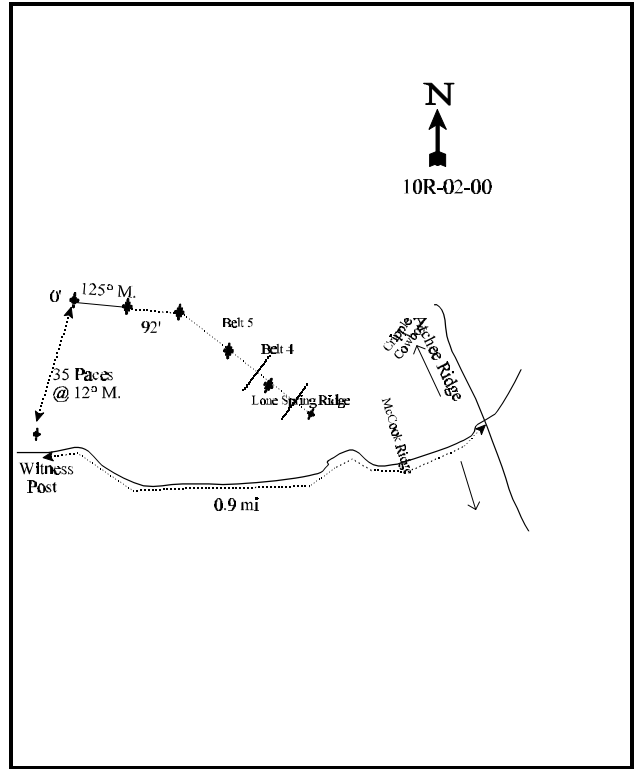
LOCATION DESCRIPTION

From the intersection of McCook Ridge road, Atchee Ridge, Cripple Cowboy and Lone Spring Ridge, travel west on Lone Spring Ridge for 0.9 miles to a witness post on the right (north) side of the road. From the witness post walk 35 paces at 12°M to the 0-foot stake. The 0-foot stake is marked with a red browse tag numbered 93.



Map name: Rat Hole Ridge

Township 5S, Range 104 E, Section 26



Diagrammatic Sketch

UTM 4383741.336 N, 668527.585 E

DISCUSSION

Trend Study 10R-2

The Lone Spring study was established in 1997 to monitor perceived conflicts over elk and livestock use on the North Book Cliffs. It samples a mountain brush site located on the east-west running Lone Spring Ridge which is relatively flat on top. Elevation at the site is approximately 8,100 feet. Aspect is northwest with a minimal slope of 2% to 3%. North of the site is a small aspen stand which deer were observed in when the study was established. The site is dominated by scattered, very large clumps of serviceberry averaging nearly 7 feet in height with 7 foot crowns. Pellet group transect data from 1997 indicated 21 elk, 17 cow, and 7 deer days use/acre (52 elk, 42 cow and 17 deer days use/ha). Data from the 2000 reading estimate 28 elk, 7 cow and 9 deer days use/acre (69 elk, 17 cow and 22 deer days use/ha). All of the deer pellet groups and about 25% of the elk pellet groups encountered in 2000 were from spring. All of the cow pats were from the previous grazing season. This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soil on the site is moderately deep but variable. Average effective rooting depth (see methods) is just over 14 inches with a stony profile encountered at 9 inches below the soil surface. Areas of bare soil have significantly more shallow soil depths of about 4 to 6 inches. Soil parent material is sandstone and texture is a clay loam with a neutral pH. Calcium carbonate coating of rocks is evident within the soil profile. The soil is well protected by vegetation and litter cover with little apparent erosion problems.

Very large Utah serviceberry dominate the site. They average 7 feet in height but many are in the 12 to 15 foot height class making many only partly available to browsing. Serviceberry provided 37% of the browse cover in 1997 with an estimated density of 660 plants/acre. Use was moderate on available plants but vigor was good and young plants common. During the 2000 reading, density of serviceberry increased to 840 plants/acre, 64% of which were classified as young. They show mostly light use and currently ('00) provide 44% of the browse cover. Average leader growth of serviceberry is fairly low at only 2 to 4 inches due to dry conditions in 2000.

Mountain big sagebrush and snowberry dominate the understory. Density of sagebrush was estimated at 1,980 plants/acre in 1997. The majority (63%) were mature plants. Use was moderate, vigor good and percent decadence low at only 16%. In 2000, density increased to 3,280 plants/acre primarily due to a large increase in young plants which currently account for 41% of the population. Use is light and percent decadence slightly higher at 21%. Many of the mature and decadent sagebrush appear to be quite old with some showing partial crown death which can be caused by winter injury, coupled with drought. About half of the decadent plants were classified as dying (vigor class 4). Many of the plants in poor vigor are growing on more shallow soil of about 8 to 10 inches in depth compared to slightly deeper soil of about 12 to 14 inches where more healthy plants are found. Average leader growth for sagebrush is about 4 inches. Some additional forage is offered by the moderately abundant snowberry. It displayed mostly light use in 1997 and the majority appeared unutilized in 2000.

The herbaceous understory provides fairly uniform and abundant cover. Kentucky bluegrass dominates the grasses by providing 63% of the grass cover in 1997 and 73% in 2000. Other common grasses include thickspike wheatgrass and a sedge. Forbs are abundant and diverse and produce more cover than grasses. However, many are low growing, prostrate species like desert and long leaf phlox, mat penstemon, cinquefoil and sulfur eriogonum. Desert phlox is the most abundant forb. It provided 45% of the forb cover in 1997 and 53% in 2000. Looseflower milkvetch is also common and accounted for 24% of the forb cover in 1997 and 18% in 2000.

1997 APPARENT TREND ASSESSMENT

Bare ground cover is low with no apparent erosion. Vegetation and litter provide good protective ground cover. Utilization of the browse species is moderate with some of the grass species (Kentucky bluegrass and muttongrass) showing utilization as well. Some of the serviceberry plants are so large that they are not fully available to wildlife. Most of the use appears to be on the mountain big sagebrush. The grasses and forbs are abundant and diverse, but the composition is dominated by Kentucky bluegrass and low growing forbs.

2000 TREND ASSESSMENT

Trend for soil is stable with abundant protective ground cover and limited unprotected bare ground. Vegetative and litter cover increased since 1997, while percent cover of bare ground increased slightly. Trend for the key browse species, serviceberry and mountain big sagebrush is up. Density of both species increased, use declined and young recruitment has increased. The dry conditions of 2000 have reduced leader growth and vigor of sagebrush. Percent decadence has increased from 16% to 21% and half of the decadent sagebrush (340 plants/acre) are classified as dying. However, young plants account for 41% of the population and there are more than enough to replace decadent and dying plants at this time. Trend for the herbaceous understory is stable. Sum of nested frequency for grasses and forbs have remained similar to 1997. Nested frequency of Kentucky bluegrass increased significantly with frequency of the most abundant forbs remaining stable.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	232	*150	71	46	2.51	3.26
G	Agropyron trachycaulum	-	*12	-	5	-	.12
G	Bromus inermis	5	-	1	-	.03	-
G	Carex spp.	75	78	30	33	2.04	1.39
G	Festuca ovina	-	*13	-	7	-	.33
G	Koeleria cristata	5	-	2	-	.03	-
G	Poa fendleriana	23	16	9	7	.22	.13
G	Poa pratensis	275	*356	68	87	8.66	14.96
G	Sitanion hystrix	-	*20	-	10	-	.27
G	Stipa columbiana	-	2	-	1	-	.00
G	Stipa comata	14	8	6	4	.15	.12
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		629	655	187	200	13.67	20.61
Total for Grasses		629	655	187	200	13.67	20.61

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
		F	Agoseris glauca	4	11	2	4
F	Antennaria rosea	1	6	1	2	.03	.03
F	Androsace septentrionalis (a)	-	3	3	2	.39	.01
F	Arabis spp.	-	*6	-	4	-	.07
F	Astragalus tenellus	178	151	62	63	6.04	6.15
F	Aster spp.	-	*16	-	9	-	.12
F	Castilleja flava	5	6	2	3	.01	.18
F	Chaenactis douglasii	-	1	-	1	-	.00
F	Comandra pallida	1	2	1	2	.00	.03
F	Crepis acuminata	18	25	10	13	.16	.38
F	Delphinium bicolor	14	*-	6	-	.04	-
F	Erigeron eatonii	140	*72	53	35	1.15	.77
F	Eriogonum spp.	-	2	-	1	-	.03
F	Eriogonum umbellatum	194	183	65	65	3.72	3.84
F	Haplopappus acaulis	-	1	-	1	-	.00
F	Hackelia patens	-	4	-	2	-	.01
F	Lupinus argenteus	4	5	3	3	.07	.48
F	Lychnis drummondii	-	*6	-	4	-	.02
F	Penstemon caespitosus	19	32	9	14	.46	.61
F	Pedicularis centranthera	2	-	2	-	.01	-
F	Penstemon watsonii	49	46	20	20	1.08	.40
F	Phlox austromontana	275	245	78	63	11.18	17.89
F	Phlox longifolia	-	*47	-	14	-	1.74
F	Polygonum douglasii (a)	14	-	6	-	.08	-
F	Potentilla gracilis	11	11	4	4	.09	.48
F	Potentilla pennsylvanica	-	7	-	3	-	.21
F	Taraxacum officinale	47	*21	23	10	.45	.22
F	Thlaspi montanum	-	*11	-	6	-	.03
F	Tragopogon dubius	-	-	-	-	-	.00
Total for Annual Forbs		14	3	9	2	0.47	0.00
Total for Perennial Forbs		962	917	341	346	24.54	33.80
Total for Forbs		976	920	350	348	25.01	33.81

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --
Herd unit 10R, Study no: 2

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Amelanchier utahensis	23	25	9.53	12.88
B	Artemisia tridentata vaseyana	57	70	7.21	5.68
B	Chrysothamnus viscidiflorus viscidiflorus	3	8	.15	.19
B	Quercus gambelii	0	1	-	.00
B	Symphoricarpos oreophilus	66	63	9.02	10.67
Total for Browse		149	167	25.92	29.44

CANOPY COVER --
Herd unit 10R, Study no: 2

Species	Percent Cover '00
Amelanchier utahensis	2

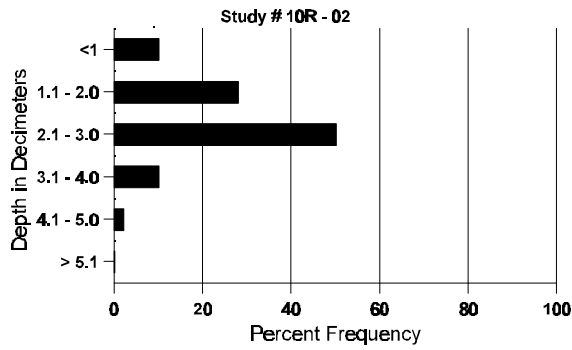
BASIC COVER --
Herd unit 10R, Study no: 2

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	470	460	52.68	69.53
Rock	31	16	.33	.38
Pavement	72	51	.31	.25
Litter	499	484	63.95	72.55
Cryptogams	58	32	.68	.46
Bare Ground	176	232	8.10	12.21

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 02

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.6	57.6 (14.9)	6.7	31.0	37.8	31.2	4.98	7.15	153.6	0.65

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 2

Type	Quadrat Frequency		Pellet Transect			
	'97	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'97	'00	'97	'00
Rabbit	1	1	-	9	N/A	N/A
Sage Grouse	-	1	-	-	-	-
Elk	9	14	278	358	7 (17)	27 (68)
Deer	7	1	87	113	21 (52)	9 (22)
Cattle	-	3	200	87	17 (42)	7 (18)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 2

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																		
S	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	97	5	4	-	5	-	-	-	-	-	14	-	-	-	280			14
	00	27	-	-	-	-	-	-	-	-	27	-	-	-	540			27
M	97	5	5	2	4	3	-	-	-	-	18	-	-	1	380	83	79	19
	00	13	1	-	1	-	-	-	-	-	15	-	-	-	300	89	106	15
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
'97		36%			06%			03%				+21%						
'00		02%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	660	Dec:	-			
												'00	840		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	26	-	-	-	-	-	-	-	-	26	-	-	-	520		26	
Y	97	21	-	-	-	-	-	-	-	-	21	-	-	-	420		21	
	00	68	-	-	-	-	-	-	-	-	68	-	-	-	1360		68	
M	97	9	45	8	-	-	-	-	-	-	62	-	-	-	1240	26	32	
	00	55	6	-	-	-	-	-	-	-	61	-	-	-	1220	27	34	
D	97	4	9	3	-	-	-	-	-	-	11	-	-	5	320		16	
	00	31	2	-	2	-	-	-	-	-	18	-	-	17	700		35	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	900		45	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	560		28	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		55%			11%			05%			+40%							
'00		05%			00%			10%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	1980	Dec:	16%			
												'00	3280		21%			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	13	17	
	00	11	-	-	-	-	-	-	-	-	11	-	-	-	220	14	14	
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+80%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	60	Dec:	0%			
												'00	300		13%			
<i>Purshia tridentata</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	31	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			
<i>Quercus gambelii</i>																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Symphoricarpos oreophilus																	
S	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
Y	97	32	1	-	1	-	-	-	-	-	34	-	-	-	680		34
	00	60	-	-	-	-	-	10	-	-	70	-	-	-	1400		70
M	97	78	19	8	20	4	-	-	-	-	129	-	-	-	2580	13 21	129
	00	135	-	3	47	-	-	1	-	-	184	1	1	-	3720	17 31	186
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'97		15%			05%			00%			+36%						
'00		00%			01%			.39%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	3260	Dec:	-		
												'00	5120		-		

Trend Study 10R-3-00

Study site name: Burnt Timber .

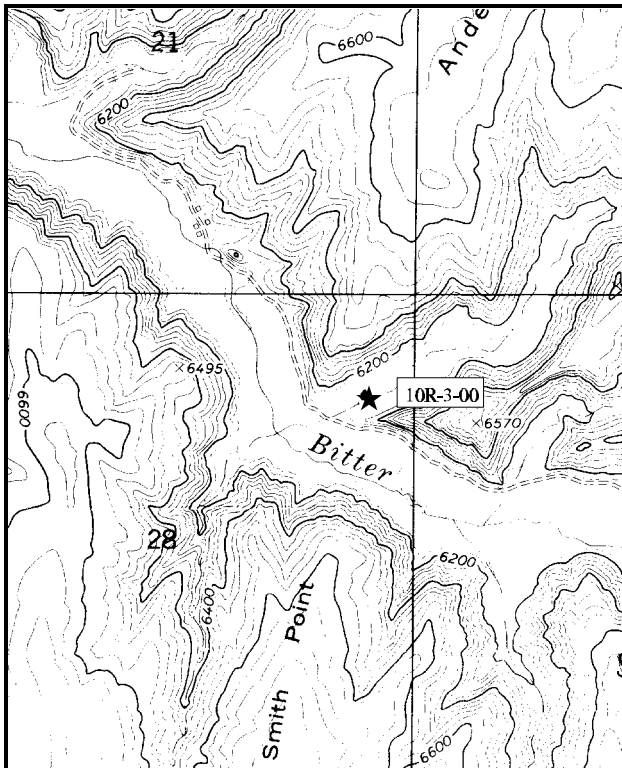
Range type: Burn-Cheatgrass

Compass bearing: frequency baseline 50°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

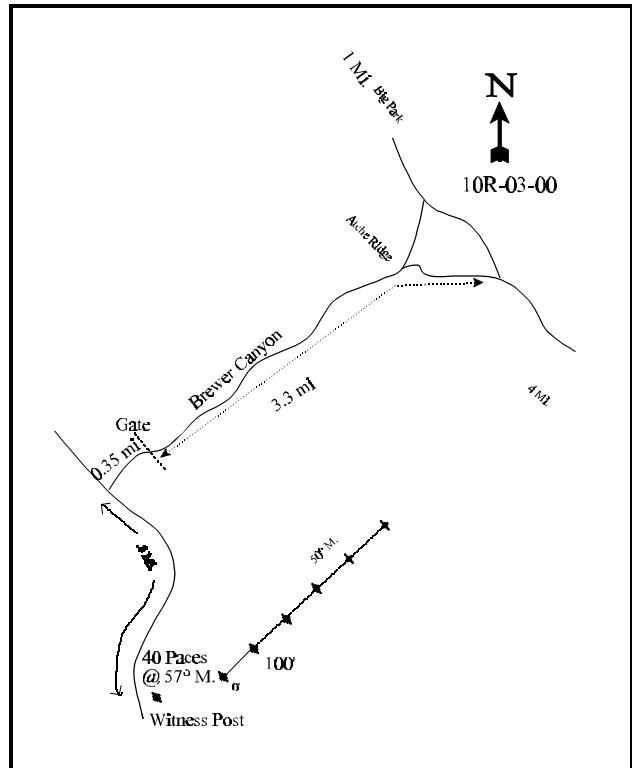
LOCATION DESCRIPTION

Head southwest down Brewer Canyon to the road just past a gated fence at the bottom of the canyon. Turn left on this road and travel 0.8 miles to a witness post on the left (east) side of the road. The 0-foot stake is 40 paces from the witness post at 57°M. The 0-foot stake is marked with browse tag number 81.



Map name: Burnt Timber Canyon .

Township 13 S, Range 24 E, Section 28



Diagrammatic Sketch

UTM 4391499.285 N, 651964.959 E

DISCUSSION

Trend Study 10R-3

The Burnt Timber site is located in Sweetwater Canyon about 1 mile south of Brewer Canyon. The study area was prescribed burned to remove a dense stand of black greasewood and then seeded. It has a nearly level slope of about 3% with a southwest aspect at an elevation of 6,400 feet. The area is considered winter range for deer and elk, with use being light to moderate. Pellet group data from 1997 estimated 37 elk days use/acre (91 edu/ha) and 6 cow days use/acre (15 cdu/ha). Data from 2000 estimate 26 elk, 2 cow and 7 deer days use/acre (64 edu/ha, 5 cdu/ha and 17 ddu/ha). This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soil is alluvially deposited and deep with no rock in the profile. Textural analysis indicates a loam soil with a moderately alkaline pH of 8.0 and a high electrical conductivity of 4.2 (moderately saline). The black greasewood has translocated salt from the soil to the leaves and now the salt has been incorporated into the upper layer of the soil. The effective rooting depth (see methods) is 18 inches with an average temperature of 66°F. Litter and vegetation cover combined provide good soil protection and erosion control. Percent bare ground was estimated at 11% in 1997 and almost 15% in 2000, leaving little possibility for onsite erosion to occur. Rock cover is almost nonexistent with no cryptogamic crusts reported.

The only shrub sampled on the site is black greasewood with an estimated density of 260 plants/acre in 1997. Most of the black greasewood plants sampled were classified as young with many showing moderate hedging. The population consisted of sprouts originating from the burned stumps. Average height was 1½ feet with an average crown of 2 feet. Burned stumps were classified as dead plants and had an estimated density of 800 plants/acre. In 2000, density of greasewood increased to 640 plants/acre and average height doubled. Seedlings are abundant (1,700 plants/acre) and young plants account for 53% of the population. This age class distribution would indicate a rapidly increasing population. Use was light on all plants sampled and many young and seedlings were unavailable to browsing because they were growing under mature plants.

This site is dominated by cheatgrass which accounted for 98% of the total vegetative cover in 1997. At the time the study was established, cheatgrass averaged 1½ to 2 feet in height. Crested wheatgrass was sampled in one quadrat and Great Basin wildrye was widely scattered in large clumps, but was not sampled in any of the quadrats. All forbs encountered were annuals and accounted for only 1% of the vegetative cover. In 2000, cheatgrass continued to dominate the site. Average cover declined from 54% in 1997 to 24% in 2000 and nested frequency declined significantly due to drought. However, quadrat frequency is nearly unchanged. The only perennial grasses encountered include a few crested wheatgrass and one Russian wildrye plant. Forb cover increased from less than 1% in 1997 to 22% in 2000. All species are weeds however. Composition and condition of the herbaceous understory is poor and will likely remain so without re-treatment.

1997 APPARENT TREND ASSESSMENT

The soil appears to be adequately protected from on-site erosion, although cheatgrass would not offer much protection to any off-site erosion coming down the canyon due to cheatgrass's shallow root system. The black greasewood population was classified as mostly young with one plant flowering this year. Many of the young plants were moderately hedged with the young, tender shoots being browsed. The dominant vegetation is cheatgrass. It accounts for 98% of the vegetative cover with only a few other perennial species present. Cheatgrass has now had a season to establish an extensive seed bank and may be extremely difficult to suppress on this site. Some of the cheatgrass showed signs of utilization, but at the time data was collected, June 6, 1997, the cheatgrass had dried out. Utilization by wildlife and livestock will occur in the early spring when the cheatgrass is greening up and immature or when there is late fall germination.

2000 TREND ASSESSMENT

Trend for soil is stable. There is little unprotected bare ground due to the abundant vegetation and litter cover. However, nearly all of the vegetation cover consists of cheatgrass. Trend for browse is down due to a complete lack of preferred browse and an expanding population of greasewood. It is apparent that control measures on the greasewood were ineffective. Trend for the herbaceous understory is stable, and remains in extremely poor condition. Cheatgrass is still dominant and provides 99% of the grass cover even though it declined significantly in nested frequency. Weedy forbs including Fremont goosefoot, musk mustard, and summer cypress significantly increased in nested frequency and now account for 99% of the forb cover and 47% of the herbaceous cover. Perennial species are nearly non-existent. This site currently offers very little for wintering big game.

TREND ASSESSMENT

soil - stable (3)

browse - down, no useful species present and greasewood increasing (1)

herbaceous understory - stable and in extremely poor condition (3)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 3

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron cristatum	5	5	1	4	.00	.19
G	Bromus tectorum (a)	457	*342	97	95	53.90	23.76
G	Elymus cinereus	-	-	-	-	.00	-
G	Elymus junceus	-	1	-	1	-	.03
Total for Annual Grasses		457	342	97	95	53.90	23.76
Total for Perennial Grasses		5	6	1	5	0.01	0.22
Total for Grasses		462	348	98	100	53.91	23.98
F	Chenopodium fremontii (a)	1	*96	1	37	.00	8.03
F	Chorispora tenella (a)	5	*52	3	17	.07	2.18
F	Descurainia pinnata (a)	1	5	1	3	.00	.21
F	Kochia scoparia (a)	24	*95	10	42	.53	11.44
Total for Annual Forbs		31	248	15	99	0.61	21.88
Total for Perennial Forbs		0	0	0	0	0	0
Total for Forbs		31	248	15	99	0.61	21.88

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 3

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Sarcobatus vermiculatus	11	17	.71	-
Total for Browse		11	17	0.70	0

BASIC COVER --

Herd unit 10R, Study no: 3

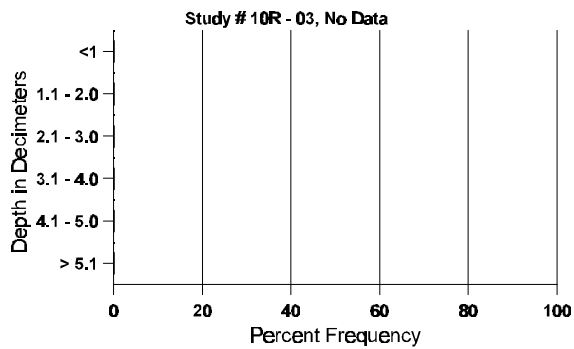
Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	465	375	55.68	45.15
Rock	8	6	.04	.03
Pavement	16	2	.05	.00
Litter	498	491	70.36	76.77
Bare Ground	189	175	11.30	14.50

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 03

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.1	66.2 (19.7)	8.0	33.3	42.2	24.5	3.97	25.94	176.0	4.2

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 3

Type	Quadrat Frequency		Pellet Transect			
			Pellet Groups per Acre		Days Use per Acre (ha)	
	'97	'00	'97	'00	'97	'00
Elk	15	28	479	339	37 (91)	26 (65)
Deer	1	3	-	87	-	7 (17)
Cattle	4	3	70	17	6 (15)	2 (4)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 3

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Sarcobatus vermiculatus																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	42	-	-	29	-	-	14	-	-	85	-	-	-	1700			85
Y	97	2	8	2	-	-	-	-	-	-	12	-	-	-	240			12
	00	8	-	-	3	-	-	6	-	-	17	-	-	-	340			17
M	97	-	1	-	-	-	-	-	-	-	1	-	-	-	20	17	26	1
	00	6	-	-	9	-	-	-	-	-	15	-	-	-	300	36	55	15
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	800			40
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>						<u>% Change</u>				
'97		69%			15%			00%						+59%				
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	260	Dec:	-			
												'00	640		-			

Trend Study 10R-4-00

Study site name: Two Water WMA .

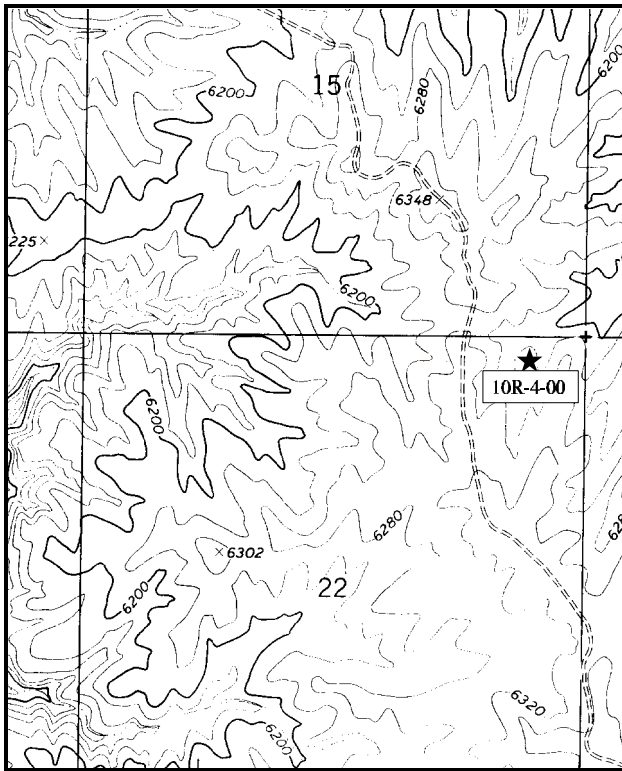
Range type: Black Sagebrush

Compass bearing: frequency baseline 162°M. (Line 3 177°M, line 4 180°M, line 5 182°M)

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Belt 2 rebar at 5ft., belt 5 rebar at 10ft.

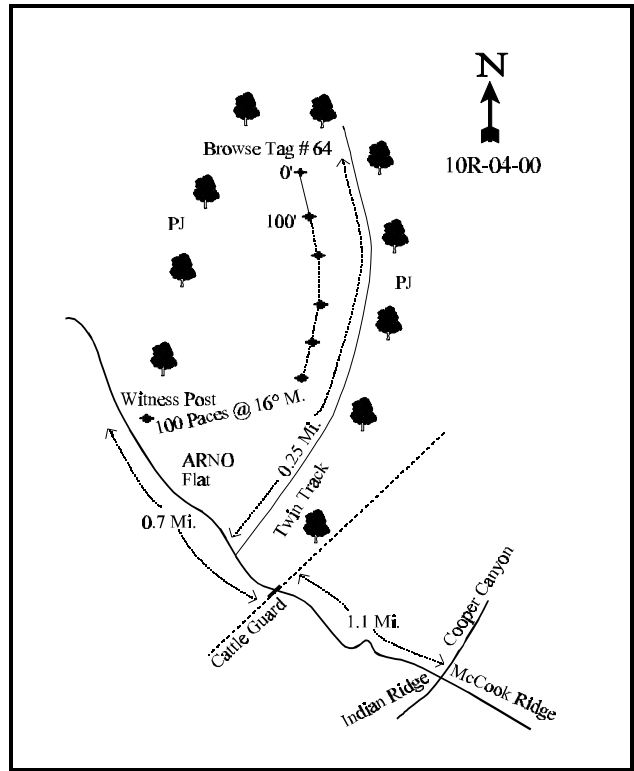
LOCATION DESCRIPTION

From the intersection of Cooper Canyon, Indian Ridge and McCook Ridge go northwest on McCook Ridge road. Travel 1.1 miles to a cattle guard. Go 0.7 miles past the cattle guard to a sage brush flat on the right and a witness post. The 500-foot stake is 100 paces into the sagebrush flat at an azimuth of 16°M. It is also possible to reach the site by taking the two track road on the east side of the chaining 0.25 miles to the 0-foot stake. The 0-foot stake is marked with browse tag number 64.



Map name: Cooper Canyon .

Township 13 S, Range 23 E, Section 22



Diagrammatic Sketch

UTM 4393244 N, 643846 E

DISCUSSION

Trend Study No. 10R-4

This study is located in a black sagebrush flat in the Two Water Wildlife Management Area. The site is surrounded by pinyon and juniper and located about 1/4 of a mile from a main road. It is on gently sloping (3-5%) terrain with a northerly aspect and elevation of approximately 6,300 feet. Pellet group transect data from 1997 indicated moderately low use on this flat with 13 elk, 33 deer, and 1 cow days use/acre (32 elk, 82 deer and 2 cow days use/ha). Pellet group data from 2000 estimate 5 elk and 60 deer days use/acre (12 edu/ha and 148 ddu/ha). Most of these groups appeared to be from the previous fall and early winter.

The soil is moderately shallow with an effective rooting depth (see methods) of almost 15 inches. It has a clay loam texture with a neutral pH. The soil surface is cracked, indicating shrink-swell potential. Rocks are found throughout the soil profile with over 15% cover for rock and pavement on the surface. Average soil temperature is relatively high at 67° F at a depth of 14 inches. Phosphorus is low at 3.6 ppm, as values less than 10 ppm may be limiting to normal plant growth and development. Pedestaling was noted around the base of black sagebrush plants with cryptogamic crust found mostly under the sagebrush. Erosion appears minimal due to the level terrain and adequate protective ground cover of vegetation and litter.

The dominant browse on the flat is black sagebrush which provided 85% of the browse cover in 1997 and 87% in 2000. It is a relatively low growing form, averaging only 6 to 8 inches in height. Density is currently ('00) high at an estimated 21,180 plants/acre. Use was light to moderate in 1997 and mostly moderate in 2000. Seventy-five percent of the population is currently mature with young plants accounting for 14% of the population. Percent decadence increased from 5% to 12%, although vigor is good on most plants.

Winterfat provides some additional preferred forage on the site. It had an estimated density of 4,060 plants/acre in 1997 declining to 2,960 by 2000. The population is mostly mature with light to moderate use. It has a low growth form of only 8 to 10 inches in height perhaps due to continual use. Fringed sagebrush and shadscale are widely scattered on the site. Shadscale currently ('00) displays moderate use. Other browse species sampled include broom snakeweed and cactus.

The herbaceous understory is limited and dominated by cheatgrass in 1997. It provided 43% of the grass cover and 38% of the total herbaceous cover. That year it had a quadrat frequency of 62%. During the 2000 reading, cheatgrass declined significantly in nested frequency and cover went down from 4% in 1997 to less than a 1/4 of 1%. Quadrat frequency declined from 62% to only 8%. The most common perennial grasses are needle-and-thread and bottlebrush squirreltail. Galleta, blue grama, and Indian ricegrass are also fairly abundant. Thickspike wheatgrass and bluebunch wheatgrass were also sampled, but only occasionally.

Forbs are fairly diverse yet not particularly abundant. Twelve species were sampled in 1997 with only seven species encountered in 2000. They only provided a little over 1% cover during either reading. Most of the forbs were found within the protective cover of black sagebrush canopies. Scarlet globemallow is the most common forb.

1997 APPARENT TREND ASSESSMENT

Erosion on the site does not currently appear to be a problem with the abundant litter and vegetative cover. Percent bare ground cover is moderately high, yet should not be a problem except under extreme conditions. Seedhead formation from last year is abundant on the black sagebrush and percent decadency is low at only 5%. Biotic potential (# of seedlings) for all species is low at this time, likely due to a combination of past drought conditions and moderately shallow soils. Herbaceous understory is very limiting with the dominate species

being cheatgrass. Other perennial grasses are present in low numbers that help add stability to the herbaceous understory community.

2000 TREND ASSESSMENT

Trend for soil is slightly down. Percent bare ground has increased and sum of nested frequency of grasses and forbs have declined by nearly half. Most of this change is due to a significant decline in the nested frequency and cover of cheatgrass. Perennial grass cover and nested frequency remained fairly stable. Trend for browse is up for the key species black sagebrush. Density has increased, use is mostly moderate, vigor good, and young plants account for 14% of the population. The herbaceous trend is stable with respect to perennial grasses and forbs. Needle-and-thread grass and bottlebrush squirreltail remained stable while Indian ricegrass declined significantly. The increase in blue grama and decline in galleta appears to be due to a misidentification of blue grama in 1997. As mentioned earlier, cheatgrass declined dramatically in cover and nested frequency. This was due to the very dry spring and early summer conditions of this season. The most abundant perennial forb, scarlet globemallow, declined slightly in frequency but increased in cover with less competition from cheatgrass.

TREND ASSESSMENT

soil - down slightly (2)

browse - up for the key species, black sagebrush (5)

herbaceous understory - stable for perennials (3)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	6	2	2	1	.06	.03
G	Agropyron spicatum	13	5	4	3	.36	.30
G	Bouteloua gracilis	-	*25	-	14	-	.31
G	Bromus tectorum (a)	215	*28	62	8	4.02	.11
G	Hilaria jamesii	75	*46	30	17	1.10	.82
G	Oryzopsis hymenoides	64	*34	30	16	.91	.51
G	Sitanion hystrix	84	92	38	39	.87	1.02
G	Stipa comata	92	90	39	38	2.01	2.87
Total for Annual Grasses		215	28	62	8	4.02	0.11
Total for Perennial Grasses		334	294	143	128	5.32	5.89
Total for Grasses		549	322	205	136	9.35	6.01
F	Castilleja spp.	4	-	2	-	.01	-
F	Cryptantha spp.	10	*-	6	-	.13	-
F	Descurainia pinnata (a)	32	*6	15	2	.10	.01
F	Erigeron spp.	3	-	2	-	.03	-
F	Lappula occidentalis (a)	69	*12	30	5	.40	.17

T y p e	Species	Nestled Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
F	Lepidium spp.	6	-	2	-	.01	-
F	Machaeranthera grindelioides	-	1	-	1	-	.03
F	Navarretia intertexta (a)	5	-	2	-	.01	-
F	Penstemon spp.	2	-	2	-	.03	-
F	Schoenrambe linifolia	4	2	2	1	.03	.00
F	Sphaeralcea coccinea	100	85	39	33	.57	.82
F	Townsendia incana	-	8	-	3	-	.04
F	Tragopogon dubius	2	2	1	1	.00	.00
F	Unknown forb-annual (a)	9	-	3	-	.01	-
Total for Annual Forbs		115	18	50	7	0.52	0.18
Total for Perennial Forbs		131	98	56	39	0.83	0.90
Total for Forbs		246	116	106	46	1.36	1.08

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 10R, Study no: 4

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Artemisia frigida	28	31	.62	1.00
B	Artemisia nova	92	96	19.72	21.10
B	Atriplex confertifolia	34	32	.85	.79
B	Ceratoides lanata	71	57	2.12	1.41
B	Gutierrezia sarothrae	12	3	-	.01
B	Opuntia spp.	2	3	-	-
B	Sclerocactus	1	1	.00	.00
Total for Browse		240	223	23.32	24.31

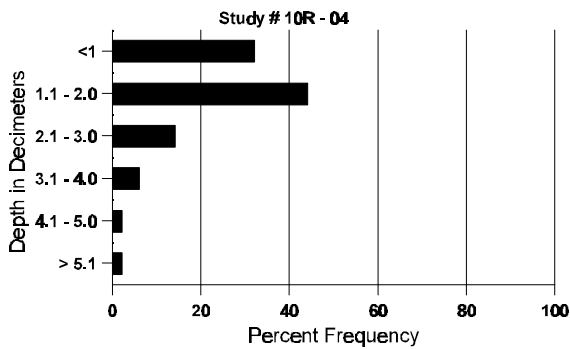
BASIC COVER --
Herd unit 10R, Study no: 4

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	390	346	28.09	33.27
Rock	296	256	5.72	5.38
Pavement	412	404	13.89	10.66
Litter	483	440	21.39	21.67
Cryptogams	305	262	6.80	7.54
Bare Ground	364	389	23.37	31.45

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 04

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.5	67.2 (14.3)	7.25	25.6	37.8	36.6	2.03	3.63	198.4	0.65

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 4

Type	Quadrat Frequency		Pellet Transect			
	'97	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'97	'00	'97	'00
Rabbit	8	14	35	191	N/A	N/A
Elk	11	9	165	61	13 (32)	5 (12)
Deer	33	32	435	774	33 (82)	60 (148)
Cattle	-	1	9	-	1 (2)	-

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 4

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia frigida																	
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1
Y	97	11	-	-	2	-	-	-	-	-	13	-	-	-	260		13
	00	23	-	-	-	-	-	-	-	-	23	-	-	-	460		23
M	97	76	-	-	1	-	-	-	-	-	77	-	-	-	1540	10 10	77
	00	73	2	-	2	-	-	-	-	-	77	-	-	-	1540	4 7	77
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'97		00%			00%			00%			+10%						
'00		02%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	1800	Dec:	-		
												'00	2000		-		
Artemisia nova																	
S	97	19	-	-	2	-	-	-	-	-	21	-	-	-	420		21
	00	13	-	-	-	-	-	-	-	-	13	-	-	-	260		13
Y	97	134	9	-	10	-	-	-	-	-	153	-	-	-	3060		153
	00	111	34	-	-	-	-	-	-	-	138	7	-	-	2900		145
M	97	314	162	-	-	-	-	-	-	-	476	-	-	-	9520	8 17	476
	00	277	431	82	-	-	-	-	-	-	790	-	-	-	15800	6 15	790
D	97	11	13	10	-	-	-	-	-	-	32	-	-	2	680		34
	00	31	70	23	-	-	-	-	-	-	88	-	-	36	2480		124
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	560		28
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'97		28%			02%			.30%			+37%						
'00		51%			10%			03%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	13260	Dec:	5%		
												'00	21180		12%		
Atriplex confertifolia																	
Y	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	97	16	7	5	2	-	-	-	-	-	30	-	-	-	600	16 16	30
	00	17	11	-	-	-	-	-	-	-	28	-	-	-	560	14 16	28
D	97	9	-	1	1	-	-	-	-	-	4	-	-	7	220		11
	00	7	7	-	1	-	-	-	-	-	6	-	-	9	300		15
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'97		16%			14%			16%			- 2%						
'00		42%			00%			21%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	880	Dec:	25%		
												'00	860		35%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ceratoides lanata</i>																		
S	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	97	16	2	-	3	-	-	-	-	-	21	-	-	-	420		21	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
M	97	122	42	6	10	-	-	-	-	-	180	-	-	-	3600	10	10	
	00	80	37	1	3	-	-	-	-	-	121	-	-	-	2420	8	8	
D	97	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
	00	1	15	10	1	-	-	-	-	-	11	-	-	16	540		27	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		22%			03%			.49%			-27%							
'00		35%			07%			11%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	4060	Dec:	1%				
											'00	2960		18%				
<i>Gutierrezia sarothrae</i>																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
M	97	13	-	-	-	-	-	-	-	-	13	-	-	-	260	8	6	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	2	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			-64%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	280	Dec:	-				
											'00	100		-				
<i>Opuntia spp.</i>																		
M	97	2	-	-	1	-	-	-	-	-	3	-	-	-	60	5	9	
	00	7	-	-	-	-	-	-	-	-	7	-	-	-	140	2	5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+57%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	60	Dec:	-				
											'00	140		-				
<i>Sclerocactus</i>																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	20	Dec:	-				
											'00	20		-				

Trend Study 10R-5-00

Study site name: Lower Tom Patterson Point .

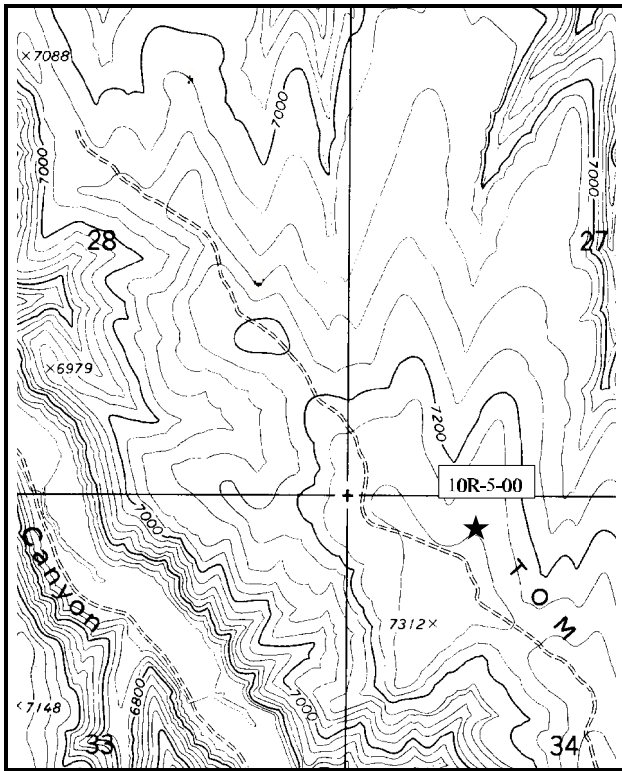
Range type: Chaining-Burn .

Compass bearing: frequency baseline 0 °M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

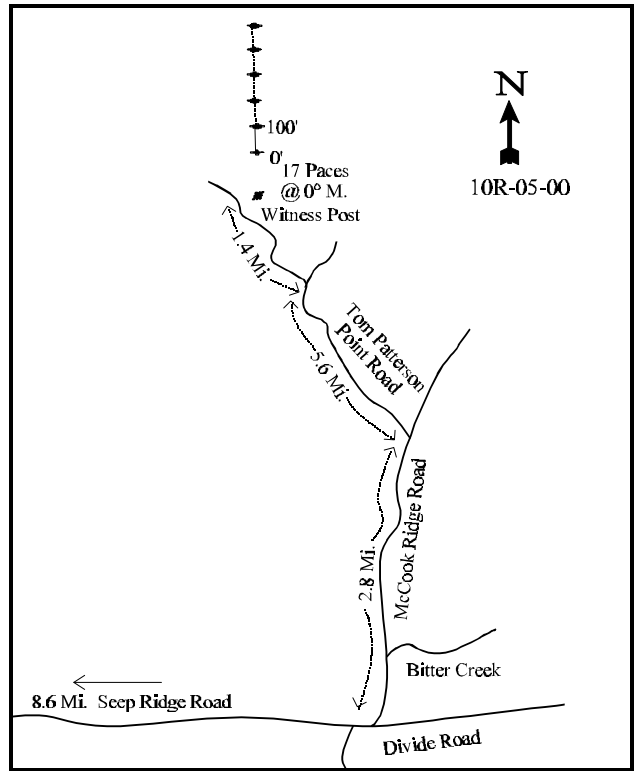
LOCATION DESCRIPTION

From the intersection of McCook Ridge Road and Seep Ridge Road travel north on McCook Ridge Road for 2.8 miles. Turn left onto Tom Patterson Point Road and go 5.6 miles to a fork. Take the left fork and travel 1.4 miles to a witness post on the right (east) side of the road. From the witness post walk 17 paces due north to the 0-foot stake. The study is marked with green, steel fenceposts approximately 12-18 inches in height.



Map name: Tom Patterson Canyon

Township 14S, Range 24 E, Section 34



Diagrammatic Sketch

UTM. 4380458.602 N, 652854.084 E

DISCUSSION

Trend Study 10R-5

The Lower Tom Patterson Point study is located about 2 miles north of the Upper Tom Patterson Point study (10R-8). This area was chained in the late 1960's and was burned by a wildfire in the mid-1980's. Aspect is north with a gentle 3-5% slope and an elevation of about 7,100 feet. A water tank is located about ½ mile south of the site where water must be hauled to it. Water tanks are scattered along this entire point in an attempt to better distribute livestock use. Pellet transect data from 1997 estimated 143 elk, 22 cow, and 1 deer day use/acre (353 edu/ha, 54 cdu/ha and 3 ddu/ha). Use declined in 2000 with 101 elk, 14 cow and 1 deer day use/acre estimated (250 edu/ha, 35 cdu/ha and 3 ddu/ha). Elk use appears to have taken place during winter. This area is within the Sweetwater allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soil on the site is moderately deep with an effective rooting depth estimated at nearly 17 inches. There is very little rock in the upper soil profile. Soil textural analysis indicates a sandy clay loam with a neutral pH. Potassium is low at just 38 ppm, where values less than 70 ppm may limit normal plant growth and development. Some slight pedestaling has occurred in the past although there was no sign of recent erosion and protective ground cover is adequate to protect the soil.

Shrubs are scarce but some browse species are slowly returning following the fire. Shrubs encountered on the site include small numbers of mountain big sagebrush, true mountain mahogany, snowberry, broom snakeweed, dwarf rabbitbrush, and rubber rabbitbrush. All shrubs combined produced less than 1% cover in 1997 and 2000. Point-center quarter data from 1997 estimated only 5 pinyon and 5 juniper trees/acre. The trees are all less than 3 feet in height.

Perennial grasses dominate the site and currently ('00) provide 84% of the vegetative cover. The dominant species is crested wheatgrass, which was seeded after the fire. It is present in nearly every quadrat and has an estimated cover value of nearly 14% in 1997 and 18% in 2000. Other grasses occur only rarely and include: a sedge, Russian wildrye, Sandberg bluegrass, needle-and-thread, and smooth brome. No utilization of grasses was apparent in 1997 but use was light to moderate during the 2000 reading. A variety of forbs found on the site offer additional preferred spring and early summer forage. Common species include: thistleleaf penstemon, lobeleaf groundsel, and scarlet globe mallow.

1997 APPARENT TREND ASSESSMENT

There is no apparent erosion. Low levels of soil potassium may be a limiting factor on the site. Few browse species are present with mountain big sagebrush having an estimated density of 180 plants/acre. Other species are slowly returning, but are in very low densities. Crested wheatgrass is the dominant grass providing 73% of the total vegetative cover. Other grasses and forbs are present, but are mostly incidental.

2000 TREND ASSESSMENT

Trend for soil is stable. Relative cover of bare ground is similar to 1997 estimates and herbaceous frequency and cover are more than adequate to protect the soil from erosion. There are few shrubs on the site and trend is considered down slightly with a decline in the already low density of mountain big sagebrush and mahogany. Currently, all shrubs combined produce less than 1% cover. Trend for the herbaceous understory is considered stable. Sum of nested frequency of the dominant grass, crested wheatgrass, declined significantly but quadrat frequency remained high at 97% and cover increased from 14% to 18%. Sum of nested frequency of all grasses combined declined slightly. Frequency of forbs also declined slightly but cover remained similar. This change

is obviously caused by the dry conditions of this season. Herbaceous vegetation is still abundant and vigorous and it provides nearly all of the vegetation cover on the site. The slight decline in nested frequency of grasses and forbs is not enough to warrant a downward trend.

TREND ASSESSMENT

soil - stable (3)

browse - down slightly with few shrubs present (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 5

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron cristatum	434	*397	99	97	13.75	17.73
G	Agropyron intermedium	-	5	-	2	-	.03
G	Bromus inermis	3	-	1	-	.03	-
G	Carex spp.	25	28	12	11	.33	.49
G	Elymus junceus	2	-	1	-	.15	-
G	Poa secunda	8	8	4	2	.09	.03
G	Stipa comata	-	3	-	1	-	.03
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		472	441	117	113	14.35	18.32
Total for Grasses		472	441	117	113	14.35	18.32
F	Antennaria rosea	7	*14	3	8	.33	.38
F	Arabis spp.	10	3	5	1	.02	.03
F	Astragalus convallarius	4	-	2	-	.06	-
F	Astragalus spp.	4	13	3	6	.04	.40
F	Astragalus utahensis	-	3	-	2	-	.01
F	Chaenactis douglasii	1	-	1	-	.00	-
F	Erigeron spp.	8	7	4	3	.07	.04
F	Eriogonum spp.	-	1	-	1	-	.00
F	Gutierrezia sarothrae	3	-	1	-	.00	-
F	Hedysarum boreale	33	*-	13	-	.82	-
F	Lygodesmia spp.	4	-	2	-	.03	-
F	Machaeranthera spp	25	*-	10	-	.17	-
F	Penstemon spp.	6	*-	4	-	.07	-
F	Penstemon pachyphyllus	81	*52	36	24	1.23	.74
F	Phlox austromontana	8	12	4	3	.21	.06
F	Phlox longifolia	-	3	-	1	-	.00

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
		F	Senecio multilobatus	46	*70	20	31
F	Sphaeralcea coccinea	49	60	22	27	.38	.36
F	Taraxacum officinale	24	*9	11	5	.23	.05
F	Tragopogon dubius	15	*46	6	20	.03	.15
Total for Annual Forbs		0	0	0	0	0	0
Total for Perennial Forbs		328	293	147	132	3.99	2.73
Total for Forbs		328	293	147	132	3.99	2.73

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 5

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
		B	Artemisia tridentata vaseyana	6	2
B	Cercocarpus montanus	2	1	.15	-
B	Gutierrezia sarothrae	1	0	.01	.45
B	Chrysothamnus nauseosus	1	1	-	-
B	Chrysothamnus viscidiflorus	2	10	-	-
B	Symphoricarpos oreophilus	2	2	.00	.00
Total for Browse		14	16	0.54	0.84

BASIC COVER --

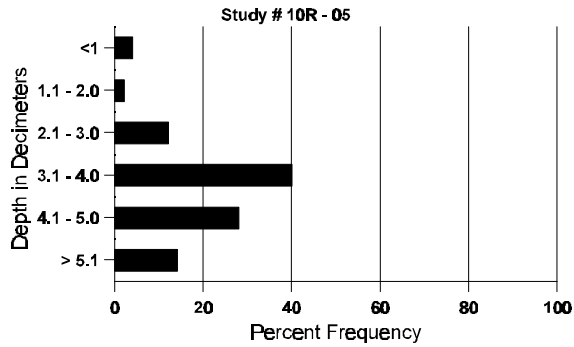
Herd unit 10R, Study no: 5

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
	Vegetation	444	418	20.14
Rock	83	28	1.58	.43
Pavement	248	183	7.10	2.22
Litter	500	495	24.71	33.69
Cryptogams	152	129	1.08	2.92
Bare Ground	388	435	27.13	35.46

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 05

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.9	60.6 (17.7)	6.8	48.0	28.8	23.2	3.11	7.41	38.4	2.0

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 5

Type	Quadrat Frequency	
	'97	'00
Rabbit	3	5
Elk	70	58
Deer	2	5
Cattle	4	3

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
-	9	-	N/A
1861	1314	143 (353)	101 (250)
17	9	1 (2)	1 (2)
261	165	22 (54)	14 (35)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 5

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	97	3	1	-	-	-	-	-	-	-	2	2	-	-	80	26 31	4	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	33 35	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		11%			00%			00%			-78%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	180	Dec:	-			
												'00	40		-			
<i>Cercocarpus montanus</i>																		
M	97	-	2	-	-	-	-	-	-	-	2	-	-	-	40	38 35	2	
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	37 35	1	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		100%			00%			00%			-50%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	40	Dec:	-			
												'00	20		-			
<i>Chrysothamnus depressus</i>																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7 16	1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	20	Dec:	-			
												'00	0		-			
<i>Chrysothamnus nauseosus</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	14 17		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Chrysothamnus viscidiflorus</i>																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8	14	1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	20	Dec:	-			
												'00	20		-			
<i>Gutierrezia sarothrae</i>																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	40			2	
M	97	2	-	-	-	-	-	-	-	-	2	-	-	40	7	6	2	
	00	10	-	-	1	-	-	-	-	-	11	-	-	220	7	9	11	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%			+85%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	40	Dec:	-			
												'00	260		-			
<i>Symphoricarpos oreophilus</i>																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	20	34	36	1	
	00	-	1	-	-	-	-	-	-	-	1	-	-	20	-	-	1	
D	97	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
	00	-	1	-	-	-	-	-	-	-	1	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%			+ 0%							
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	40	Dec:	50%			
												'00	40		50%			

Trend Study 10R-6-00

Study site name: Sweetwater Canyon .

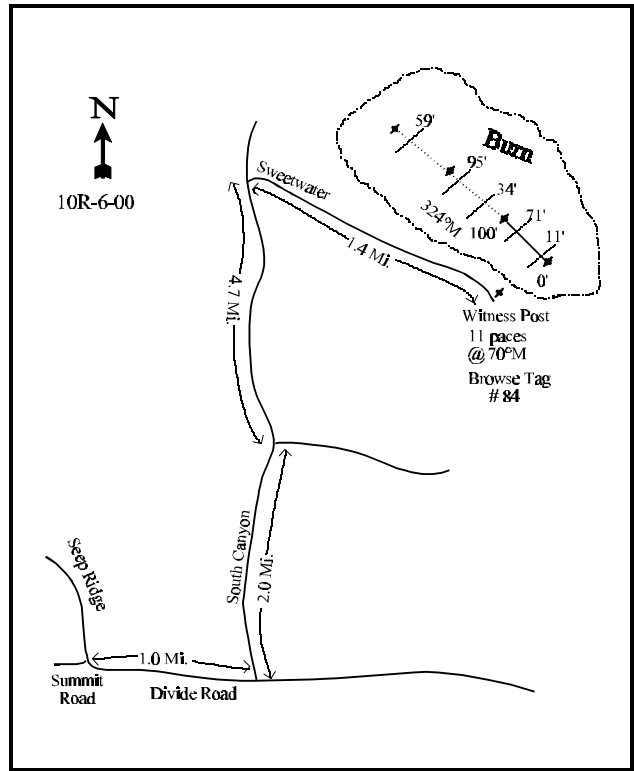
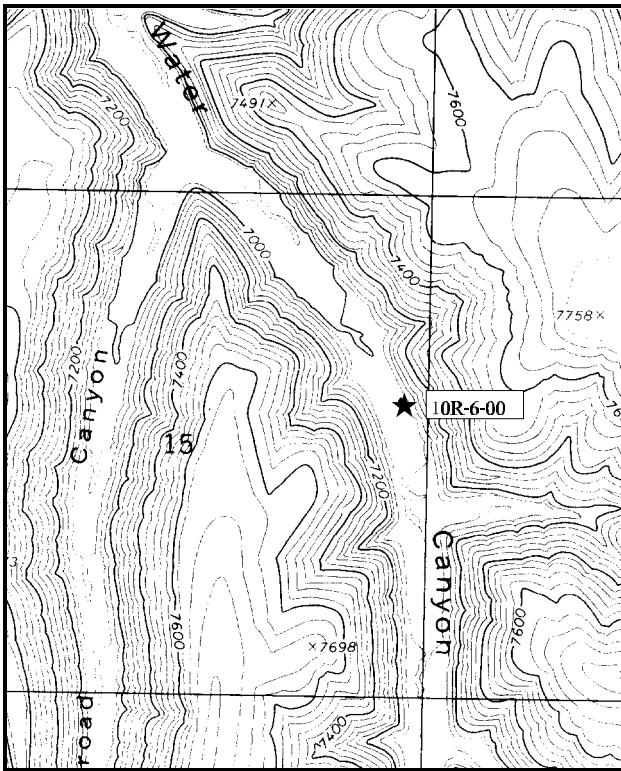
Range type: Burned-Seeded Grass

Compass bearing: frequency baseline 324°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

LOCATION DESCRIPTION

From the intersection of Seep Ridge Road, Summit Road and Divide Road, take Divide Road 1 mile to South Canyon. Turn left and drive 2.0 miles to an intersection. Go straight 4.7 miles to another intersection. Turn right and travel 1.4 miles up Sweetwater Canyon to a witness post on the left (north) side of the road. From the witness post walk 11 paces at 70°M to the 0-foot stake. The study is marked with green, steel fenceposts and the 0-foot stake is marked with browse tag # 84.



Map name: Tom Patterson Canyon

Diagrammatic Sketch

Township 15S, Range 24E, Section 15

UTM 4375016.455 N, 654114.363 E

DISCUSSION

Trend Study 10R-6

The Sweetwater Canyon study is located in the bottom of the canyon in an area that was previously dominated by basin big sagebrush then burned and seeded. The canyon has very steep sides covered mostly with conifers. Slope at the study site is 3-5% with a northwest aspect at an elevation of 6,800 feet. The burned area is small, about 350 feet x 100 feet. At the time the study was established in June of 1997, some water was running down the canyon with the main channel about 300 feet away. Grazing will likely be concentrated in this burn due to the lack of any significant understory in the surrounding basin big sagebrush. Pellet group data from 1997 estimated 25 elk days/acre and 135 cow days/acre (62 edu/ha and 333 cdu/ha). Data from 2000 estimate 19 elk days use/acre (47 edu/ha) which appeared to be from the previous winter. Some cattle pats were observed (23 cow days use/acre, 57 cdu/ha), but all appeared to be from the previous summer. This area is within the Sweetwater allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

The soil is relatively deep and sandy with an effective rooting depth (see methods) of nearly 37 inches. It has a sandy clay loam texture and a slightly alkaline soil reaction (pH of 7.4). There were no rocks encountered in the profile and the upper 4-6 inch layer had a thick mat of roots. Due to abundant vegetative and litter cover and the lack of bare ground, erosion is not a concern.

The most abundant browse is fringed sagebrush with an estimated density of 3,200 plants/acre in 1997 and 3,180 in 2000. These plants are scattered throughout the burn and average less than a foot in height. In contrast, basin big sagebrush was encountered mostly around the edges of the burn where the fire was not as intense. It has a moderate density of around 2,500 plants/acre and it provides most of the shrub cover (75% in 1997, 85% in 2000). Sagebrush is vigorous and mostly unutilized. During the 2000 reading, several mature sagebrush were apparently girdled by voles and most of the dead plants sampled were girdled. Rubber rabbitbrush was also encountered but is in low abundance and similarly distributed like basin big sagebrush, being sampled mostly around the edges of the burn.

Perennial seeded and native grasses dominate the burned area. Seventy-nine percent to 85% of the total vegetative cover is contributed by four grass species; crested and thickspike wheatgrass, smooth brome, and Kentucky bluegrass. Other perennial species include: Russian wildrye, needle-and-thread grass, Sandberg bluegrass, and basin wildrye. A few forbs are present in very small numbers due to the thick grass cover. All forbs combined produced only about 2% cover in 1997 and less than 1% in 2000.

1997 APPARENT TREND ASSESSMENT

This deep soil is well protected by a dense stand of grass and the associated litter. There is no current erosion evident. The fringed sagebrush density is not high at this time with the very competitive grass cover. Biotic potential for fringed sagebrush is low with very few seedling sampled. Basin big sagebrush was encountered around the edges of the burn where the fire was not as intense. Eighty-five percent of this population was classified as young and only one burned stump was encountered in the burn itself. This site has an excellent stand of mixed grasses. Smooth brome and Kentucky bluegrass are known to compete extremely well with other plants and may eventually dominate the site. The mixture at this site will likely keep it from being dominated by any one species. The most abundant forbs are weedy increasers that will also most likely be crowded out by this dense stand of perennial grasses.

2000 TREND ASSESSMENT

Trend for soil is stable with abundant herbaceous vegetation and litter cover to prevent any noticeable erosion. Trend for browse is stable for fringed and basin big sagebrush. These are vigorous and mostly unutilized. Young plants are not as numerous as 1997 estimates, but they are still abundant. Trend for the herbaceous understory is stable with similar sum of nested frequencies of perennial grasses and forbs compared to 1997. Composition of the grasses has changed with a significant decline in the frequency of thickspike wheatgrass and a significant increase in smooth brome and crested wheatgrass. Perennial forbs are still limited and produce little cover.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 6

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron cristatum	278	*359	80	92	15.14	18.80
G	Agropyron dasystachyum	252	*91	67	35	6.51	2.19
G	Bromus inermis	108	*163	32	44	6.04	9.76
G	Bromus tectorum (a)	20	*-	7	-	.11	-
G	Elymus cinereus	1	4	1	2	.04	.17
G	Elymus junceus	13	15	6	5	.39	.36
G	Poa fendleriana	-	7	-	2	-	.18
G	Poa pratensis	109	67	35	21	4.51	1.50
G	Poa secunda	20	14	8	6	.33	.10
G	Stipa comata	21	18	8	8	.38	.55
Total for Annual Grasses		20	0	7	0	0.10	0
Total for Perennial Grasses		802	738	237	215	33.38	33.64
Total for Grasses		822	738	244	215	33.49	33.64
F	Artemisia ludoviciana	3	5	1	2	.03	.06
F	Astragalus spp.	-	-	-	-	.03	-
F	Balsamorhiza sagittata	1	-	1	-	.00	-
F	Descurainia pinnata (a)	8	*-	4	-	.02	-
F	Lappula occidentalis (a)	114	*3	46	3	.79	.01
F	Penstemon spp.	-	2	-	1	-	.00
F	Potentilla pennsylvanica	12	*6	7	3	.11	.04
F	Senecio multilobatus	-	5	-	2	-	.01
F	Taraxacum officinale	60	48	24	18	.91	.63

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
F	Tragopogon dubius	18	18	9	8	.07	.04
Total for Annual Forbs		122	3	50	3	0.81	0.01
Total for Perennial Forbs		94	84	42	34	1.16	0.79
Total for Forbs		216	87	92	37	1.98	0.81

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 10R, Study no: 6

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Artemisia frigida	49	46	.56	.89
B	Artemisia tridentata tridentata	38	40	1.92	5.42
B	Chrysothamnus nauseosus hololeucus	6	9	.07	.07
Total for Browse		93	95	2.56	6.38

BASIC COVER --

Herd unit 10R, Study no: 6

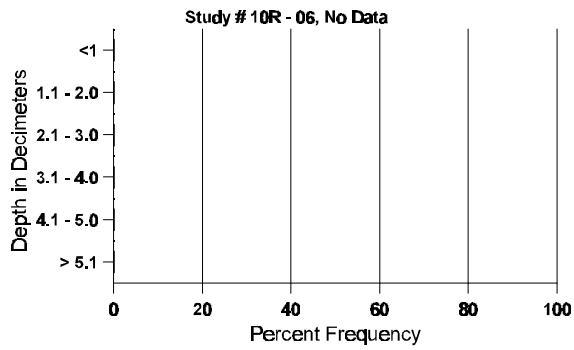
Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	462	444	41.25	48.75
Rock	23	10	.08	.05
Pavement	116	56	1.18	.26
Litter	500	489	61.65	67.43
Cryptogams	54	13	.45	.26
Bare Ground	209	230	7.31	15.60

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 06

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
36.7	61.5 (17.7)	7.4	53.6	32.2	14.2	2.43	11.31	230.4	0.51

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 6

Type	Quadrat Frequency		Pellet Transect			
	'97	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'97	'00	'97	'00
Rabbit	-	17	-	618	-	N/A
Elk	9	20	322	252	25 (62)	19 (48)
Deer	1	-	-	9	-	1 (2)
Cattle	27	17	922	270	135 (334)	23 (56)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 6

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia frigida																		
S	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	97	49	-	-	-	-	-	-	-	-	49	-	-	-	980		49	
	00	17	-	-	3	-	-	-	-	-	20	-	-	-	400		20	
M	97	111	-	-	-	-	-	-	-	-	111	-	-	-	2220	10	7	111
	00	126	11	-	2	-	-	-	-	-	139	-	-	-	2780	7	8	139
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>						<u>% Change</u>				
'97		00%			00%			00%						- 1%				
'00		07%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	3200	Dec:	-			
												'00	3180		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata tridentata</i>																		
S	97	44	-	-	-	-	-	-	-	-	44	-	-	-	880		44	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	97	94	-	-	-	-	-	-	-	-	94	-	-	-	1880		94	
	00	44	-	-	-	-	-	-	-	-	43	1	-	-	880		44	
M	97	16	-	-	-	-	-	-	-	-	16	-	-	-	320	42	37	
	00	93	-	-	-	-	-	-	-	-	91	2	-	-	1860	33	26	
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+20%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	2200	Dec:	0%			
												'00	2760		1%			
<i>Chrysothamnus nauseosus hololeucus</i>																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	30	25	
	00	2	3	-	1	-	-	-	-	-	6	-	-	-	120	37	39	
D	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	2	-	-	-	-	2	-	-	2	-	-	2	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+17%							
'00		42%			00%			17%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	200	Dec:	10%			
												'00	240		33%			
<i>Symphoricarpos oreophilus</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	38	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			

Trend Study 10R-7-00

Study site name: Monument Ridge .

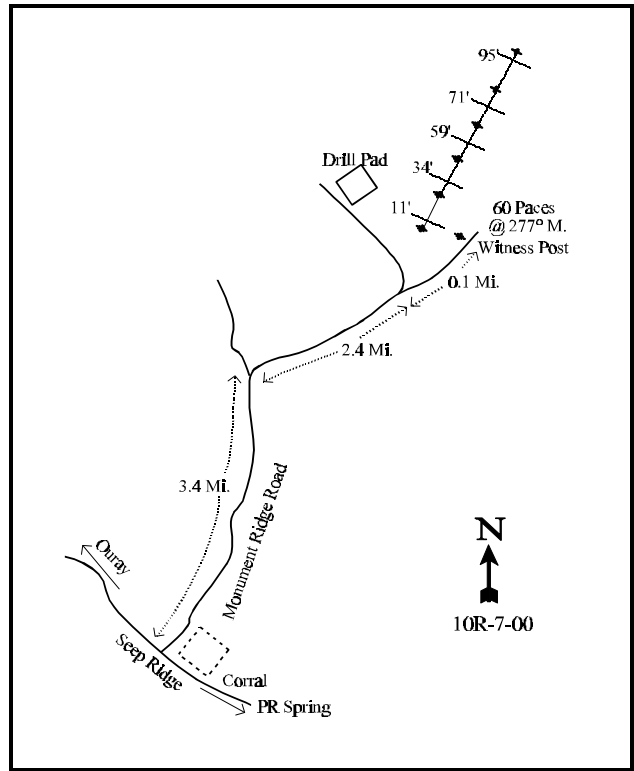
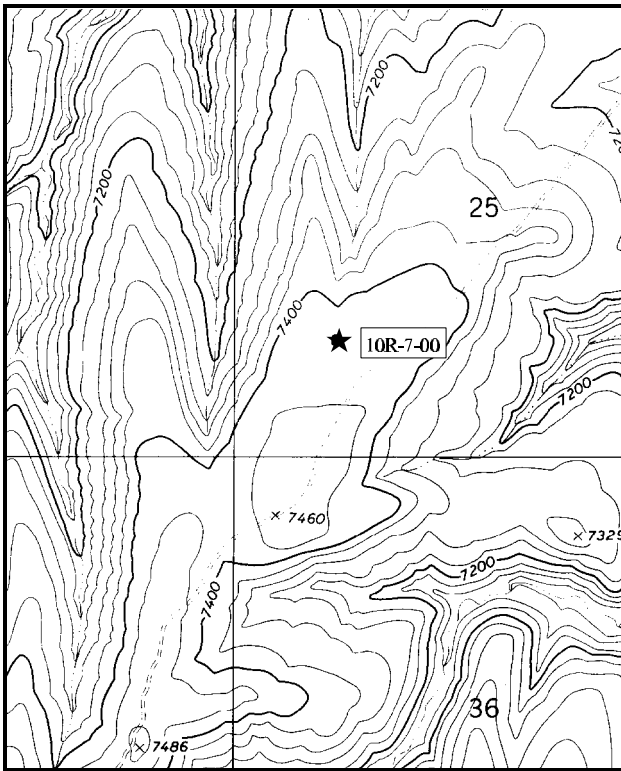
Range type: Chained-Burn

Compass bearing: frequency baseline 27°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From Seep Ridge Road turn north onto Monument Ridge Road. Drive 3.8 miles to a fork. Take the right fork and travel 1.9 miles to a turnoff to a drill pad. Go straight past this turnoff 0.1 miles to a witness post on the left (north) side of the road. From the witness post walk 60 paces at 27°M to the 0-foot stake. The study is marked by green, steel fencepost approximately 12-18 inches in height. The 0' stake is marked with browse tag #88 DWR.



Map name: Seep Canyon .

Diagrammatic Sketch

Township 14 S, Range 23 E, Section 25

UTM. 4380795.547 N, 646308.262 E

DISCUSSION

Trend Study 10R-7

The Monument Ridge study is located about 2½ miles from the Monument Ridge Road at the head of Monument Canyon which drains into Sweetwater Canyon. The area was chained and seeded in the 1960's. In the 1980's, a wild fire burned through the area removing the most of chaining debris. Pinyon and juniper trees are becoming reestablished. The study area is almost level and about ½ mile wide, with canyons sloping off to the east and west. A drill pad is located to the southwest of the site. The area is used heavily by elk in the fall and spring. Pellet group data from 1997 estimated 166 elk days use/acre and 20 cow days use/acre (410 edu/ha and 50 cdu/ha). In 2000, elk use was significantly lower at 72 days use/acre (178 edu/ha). No cattle use was noted, although deer use was estimated at 11 days use/acre (27 ddu/ha). This area is within the Sweetwater allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soil at the site is moderately shallow with an average effective rooting depth (see methods) of about 14 inches. A rocky layer is found about 6 inches below the soil surface. The deepest soil measurements are characteristically associated with the stumps of dead juniper and pinyon trees, while areas of bare soil are indicative of very shallow soils (2-3 inches) above bed rock. Erosion is not a problem on the site due to the gentle terrain combined with the adequate vegetation and litter cover.

Preferred browse are limited to a few scattered mountain big sagebrush, mountain mahogany, and rubber rabbitbrush. The dominant browse species is the increaser broom snakeweed. This species had an estimated density of 15,900 plants/acre in 1997 and 14,320 in 2000. Age structure shows a mostly mature population. Although broom snakeweed is quite dense, it is small averaging only 4 to 5 inches in height. Pinyon and juniper trees are scattered over the site at an estimated density of 14 trees/acre in 2000. Average diameter of pinyon is on one inch, while that of juniper is not quite two inches.

Most of the vegetative cover is contributed by crested wheatgrass. It currently ('00) provides 98% of the grass cover, 67% of the herbaceous cover, and 60% of the total vegetation cover. Several other grasses occur on the site in small numbers. Forbs are diverse but only a few species are abundant. Tufted milkvetch (*Astragalus spatulatus*) currently ('00) accounts for 78% of the forb cover. Scarlet globemallow is the next most abundant forb, although it had a cover value of less than 1%.

1997 APPARENT TREND ASSESSMENT

This site was chained in the 1960's and subsequently burned in the 1980's. The study is located on a level area. This combined with adequate protective cover is enough to prevent erosion. The soil is moderately shallow and in some places does not allow vegetation to become establish. The deepest soil is found near the stumps of burned juniper and pinyon. The dominant browse species is broom snakeweed. Although the density is estimated at 15,900 plants/acre, these plants are very small averaging only 5 inches in height and crown. Mountain big sagebrush is present, but in low numbers. Not many seedlings were found for any browse species. Herbaceous cover is dominated by crested wheatgrass. This species offers good forage and supplies most of the protective ground cover. Other native perennial grasses are present, but in low abundance. The dominate forb is tufted milkvetch with other forbs providing very little cover.

2000 TREND ASSESSMENT

Trend for soil appears stable. Percent cover of bare ground increased but percent litter cover is similar to 1997 estimates and vegetative cover increased. Due to the levelness of the site, combined with the good protective ground cover, erosion is not a problem. Trend for browse is stable but in poor condition due to a lack of

preferred shrubs combined with the abundance of the increaser, broom snakeweed. Trend for the herbaceous understory is down slightly. Sum of nested frequency of both grasses and forbs declined slightly since 1997. In addition, nested frequency of crested wheatgrass and several forb species declined significantly. This trend will probably reverse itself with a return to normal precipitation patterns.

TREND ASSESSMENT

soil - stable (3)

browse - stable but in poor condition (3)

herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 7

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron cristatum	444	*405	99	99	12.07	16.14
G	Agropyron dasystachyum	5	2	3	1	.01	.03
G	Bouteloua gracilis	5	-	3	-	.04	-
G	Carex spp.	13	20	5	8	.24	.30
G	Oryzopsis hymenoides	6	2	3	1	.06	.03
G	Poa fendleriana	22	*-	9	-	.19	-
G	Poa secunda	3	1	2	1	.01	.00
G	Stipa comata	5	-	1	-	.03	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		503	430	125	110	12.67	16.52
Total for Grasses		503	430	125	110	12.67	16.52
F	Antennaria rosea	2	*13	2	7	.01	.08
F	Arabis spp.	37	*17	20	8	.12	.06
F	Artemisia dracunculus	5	*26	3	10	.09	.61
F	Arenaria fendleri	-	5	-	1	-	.03
F	Astragalus spatulatus	155	162	58	55	2.37	5.93
F	Aster spp.	13	*-	4	-	.19	-
F	Cryptantha spp.	7	*-	4	-	.02	-
F	Descurainia pinnata (a)	3	-	2	-	.01	-
F	Erigeron spp.	46	*17	24	9	.45	.04
F	Hymenoxys acaulis	-	7	-	2	-	.01
F	Machaeranthera grindelioides	-	*9	-	5	-	.05
F	Penstemon pachyphyllus	28	28	16	13	.13	.41
F	Phlox longifolia	1	2	1	1	.00	.00
F	Schoenocrambe linifolia	10	-	3	-	.04	-
F	Senecio multilobatus	-	3	-	2	-	.01

Type	Species	Nest Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
		F	<i>Sphaeralcea coccinea</i>	106	*67	44	34
F	<i>Taraxacum officinale</i>	-	1	-	1	-	.00
F	<i>Tragopogon dubius</i>	-	3	-	1	-	.01
Total for Annual Forbs		3	0	2	0	0.00	0
Total for Perennial Forbs		410	360	179	149	4.18	7.65
Total for Forbs		413	360	181	149	4.19	7.65

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 7

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
		B	<i>Artemisia frigida</i>	14	24
B	<i>Artemisia tridentata vaseyana</i>	6	6	.18	.03
B	<i>Cercocarpus montanus</i>	3	2	-	-
B	<i>Chrysothamnus depressus</i>	1	0	.00	-
B	<i>Chrysothamnus nauseosus hololeucus</i>	1	5	.30	.76
B	<i>Gutierrezia sarothrae</i>	97	96	2.33	1.76
Total for Browse		122	133	2.96	2.65

BASIC COVER --

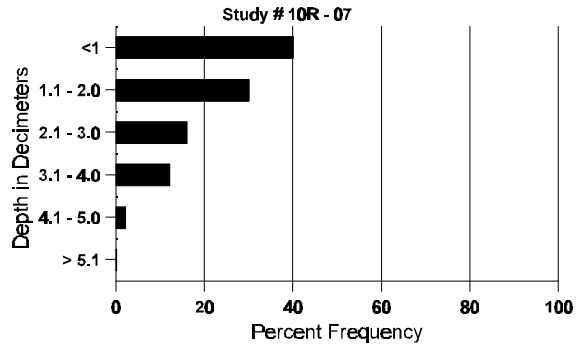
Herd unit 10R, Study no: 7

Cover Type	Nest Frequency		Average Cover %	
	'97	'00	'97	'00
	Vegetation	456	428	23.26
Rock	215	184	7.60	7.85
Pavement	341	216	8.05	1.02
Litter	494	414	24.22	23.26
Cryptogams	239	197	3.00	6.57
Bare Ground	354	423	13.55	26.27

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 07

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.5	58.8 (13.8)	7.0	40.0	35.4	24.6	3.54	5.0	115.2	3.3

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 7

Type	Quadrat Frequency	
	'97	'00
Rabbit	1	10
Elk	53	65
Deer	2	5
Cattle	1	1

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
-	35	-	N/A
2157	931	166 (410)	72 (177)
-	148	-	11 (29)
235	-	20 (49)	-

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 7

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia frigida</i>																		
S	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
	00	13	-	-	-	-	-	-	-	-	13	-	-	-	260		13	
M	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200	7	8	
	00	16	-	-	1	-	-	-	-	-	17	-	-	-	340	3	5	
D	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			05%			+39%							
'00		00%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	380	Dec:	5%				
											'00	620		3%				
<i>Artemisia tridentata vaseyana</i>																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	2	-	-	1	-	-	-	-	-	3	-	-	-	60		3	
M	97	1	2	-	-	-	-	-	-	-	3	-	-	-	60	15	22	
	00	-	4	-	-	-	1	-	-	-	5	-	-	-	100	13	21	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		33%			00%			00%			+25%							
'00		50%			13%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	120	Dec:	-				
											'00	160		-				
<i>Cercocarpus montanus</i>																		
M	97	-	-	2	-	-	-	-	-	-	2	-	-	-	40	23	37	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	39	43	
D	97	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	1	1	-	-	-	-	1	-	1	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			100%			00%			-33%							
'00		50%			50%			50%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	60	Dec:	33%				
											'00	40		100%				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus depressus																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	20	Dec:	-			
												'00	0		-			
Chrysothamnus nauseosus hololeucus																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15	20	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24	33	0
D	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	1	-	-	1	-	-	1	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+83%							
'00		00%			00%			17%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	20	Dec:	100%			
												'00	120		33%			
Gutierrezia sarothrae																		
S	97	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
Y	97	155	-	-	-	-	-	-	-	-	155	-	-	-	3100			155
	00	106	-	-	3	-	-	-	-	-	109	-	-	-	2180			109
M	97	640	-	-	-	-	-	-	-	-	640	-	-	-	12800	5	5	640
	00	580	-	-	-	-	-	-	-	-	580	-	-	-	11600	4	5	580
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	26	-	-	1	-	-	-	-	-	14	-	-	13	540			27
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	420			21
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	580			29
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			-10%							
'00		00%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	15900	Dec:	0%			
												'00	14320		4%			

Trend Study 10R-8-00

Study site name: Upper Tom Patterson Point .

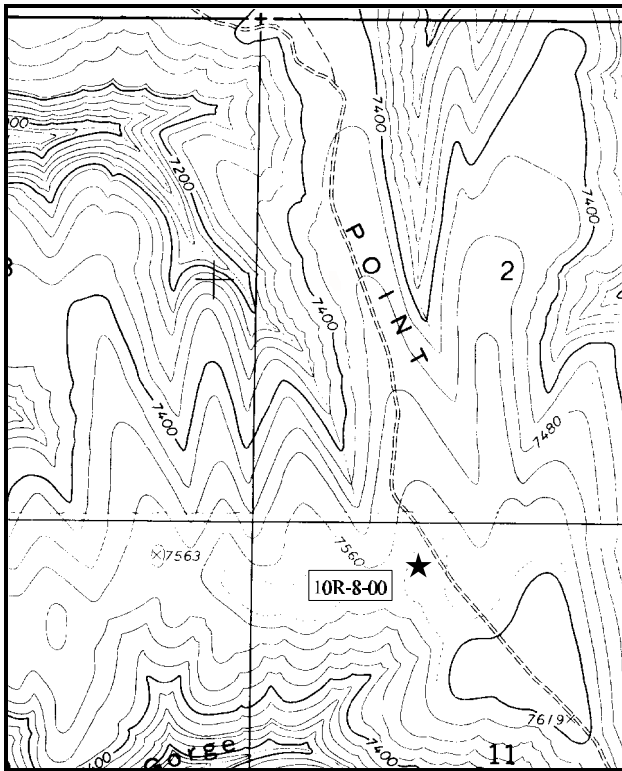
Range type: Mountain Brush-Burn

Compass bearing: frequency baseline 146°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

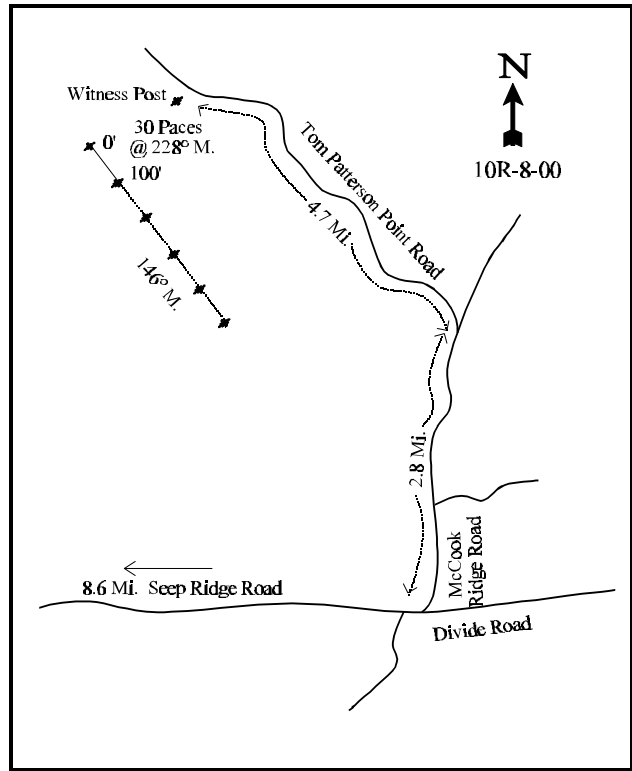
LOCATION DESCRIPTION

From the intersection of Seep Ridge, Divide Road and McCook Ridge Road, take McCook Ridge Road north 2.8 miles. Turn left (west) onto Tom Patterson Point Road. Drive 4.7 miles to a witness post on the left (southwest) side of the road. From the witness post walk 30 paces at 228°M to the 0-foot stake. The study is marked with green steel fenceposts approximately 12-18 inches in height.



Map name: Tom Patterson Canyon

Township 15S, Range 24 E, Section 11



Diagrammatic Sketch

UTM. 4377372.462 N, 654624.283 E

DISCUSSION

Trend Study 10R-8

The Upper Tom Patterson Point study was established in 1997 and is located in a pinyon-juniper woodland that was chained and seeded in the late 1960's. The area now supports a mixed mountain brush community. A prescribed burn was conducted in the area in 1998. The fire was not uniform, leaving patches of unburned browse scattered throughout the study site. Aspect is northerly with a gentle slope of 3-5% and an elevation of 7,340 feet. This area was grazed by cattle before the burn and there is a water tank located about 1/4 mile north of the site, however water must be hauled to it. Pellet group transect data from 1997 estimated 47 elk, 14 cow and 3 deer days use/acre (116 edu/ha, 35 cdu/ha and 8 ddu/ha). This area is within the Sweetwater allotment which permits cattle grazing from June through September on a deferred rest rotation basis. After the burn, the pellet group transect determined use lower at 5 elk and 4 deer days use/acre (12 edu/ha and 10 ddu/ha).

Soil at the site is moderately deep with an effective rooting depth estimated at nearly 15 inches. It has a clay loam texture with a slightly acidic soil reaction (6.3 pH). Phosphorous is low at 3.6 ppm where values less than 10 ppm may limit normal plant growth and development. About 6-8 inches below the soil surface is a layer of shale. In some areas the shale layer was shallow enough to prohibit vegetative growth. The shale layer was discontinuous and varied in depth in some areas. Shale is also found scattered across the soil surface. A layer of organic matter was also noted on the soil surface prior to the burn in 1997. Due to the abundant litter and gentle slope, there was no significant erosion occurring. Some slight pedestaling of plants was apparent, but this appeared to be from past events. After the burn, vegetation and litter cover were significantly reduced and percent bare ground increased from 13% in 1997 to 64% in 2000. Some soil movement is now apparent yet due to the gentle terrain, erosion is not severe.

In 1997 and prior to the prescribed burn, mountain big sagebrush was abundant and provided nearly half of the total browse cover with a population of 4,540 plants/acre. Use was light to moderate, vigor good, and percent decadence low at 7%. Other preferred browse included mountain mahogany, serviceberry, and squaw-apple. Snowberry were also abundant. Pinyon and juniper trees released by the chaining are fairly common. Point-center quarter data from 1997 estimated 87 pinyon and 84 juniper trees/acre.

After the burn, total browse cover declined from 26% to 5%. Mountain big sagebrush still provides nearly half of the shrub cover with a density of 620 plants/acre. Mountain mahogany has a similar density, mostly young resprouting plants. Squaw-apple has declined in density from 600 to 120 plants/acre. The surviving mahogany, squaw-apple, and sagebrush display mostly light use, good vigor and low decadence.

The herbaceous understory is dominated by crested wheatgrass followed by muttongrass, both before and after the burn. Other grasses found in low numbers include: a sedge, prairie junegrass, Kentucky bluegrass, needle-and-thread, and thickspike wheatgrass. Many forbs are scattered throughout the site and offer some forage. The dominate forb, looseflower milkvetch, currently ('00) provides 70% of the forb cover. All forb cover combined amounted to only 3% cover in 1997 and 2% in 2000. Herbaceous cover is still low but will most likely increase significantly in the future.

1997 APPARENT TREND ASSESSMENT

There is currently no erosion apparent on the site. The gentle slope and abundant vegetation and litter cover should protect the site from both wind and water erosion in the future. Some utilization on the browse species was apparent, but this was only moderate use. The browse species have responded well to the chaining and are suppressing the herbaceous understory. Browse plants are large and spaced close together making it somewhat difficult to walk through the site. The herbaceous understory contains mostly perennial species with crested

wheatgrass the most dominant. A fire might be considered a viable treatment for the site which should greatly increase herbaceous understory production, but sagebrush would most likely be lost from the community for 10-15 years.

2000 TREND ASSESSMENT

A prescribed burn took place in the fall of 1998. It burned in a mosaic fashion leaving scattered unburned patches around the study site. Trend for soil is considered down due to an increase in unprotected bare ground from 13% to 63%. Vegetation and litter cover have both declined due to the burn. Erosion is not a serious problem however, due to the level terrain. Trend for browse is also considered down due to a decline in cover and density of the preferred browse species. This trend will likely reverse itself as the surviving shrubs have time to grow and reproduce. Trend for the herbaceous understory is down due to a decline in the sum of nested frequency of both grasses and forbs.

TREND ASSESSMENT

soil - down (1)

browse - down (1)

herbaceous understory - down (1)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 8

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron cristatum	266	*175	78	55	4.98	4.67
G	Agropyron dasystachyum	2	-	1	-	.00	-
G	Carex spp.	37	22	14	10	.41	.17
G	Koeleria cristata	6	-	2	-	.01	-
G	Poa fendleriana	145	*42	45	17	1.71	.62
G	Poa pratensis	-	11	-	3	-	.68
G	Stipa comata	-	1	-	1	-	.00
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		456	251	140	86	7.13	6.16
Total for Grasses		456	251	140	86	7.13	6.16
F	Antennaria rosea	8	*-	5	-	.05	-
F	Astragalus tenellus	42	34	18	14	1.08	1.60
F	Aster spp.	1	-	1	-	.00	-
F	Astragalus utahensis	-	1	-	1	-	.00
F	Castilleja flava	38	*14	20	6	.40	.05
F	Calochortus nuttallii	3	-	1	-	.00	-
F	Chaenactis douglasii	1	-	1	-	.00	-
F	Comandra pallida	7	3	4	2	.02	.03

T y p e	Species	Nestled Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
F	<i>Crepis acuminata</i>	24	21	12	9	.22	.17
F	<i>Delphinium bicolor</i>	2	-	2	-	.01	-
F	<i>Erigeron</i> spp.	24	*2	14	1	.15	.03
F	<i>Eriogonum racemosum</i>	-	2	-	2	-	.01
F	<i>Eriogonum umbellatum</i>	29	*9	12	3	.31	.21
F	<i>Gayophytum ramosissimum</i> (a)	49	*5	17	2	.08	.01
F	<i>Penstemon watsonii</i>	31	*7	15	5	.60	.10
F	<i>Phlox longifolia</i>	16	14	7	4	.04	.04
F	<i>Polygonum douglasii</i> (a)	50	*-	20	-	.10	-
F	<i>Senecio integerrimus</i>	7	4	5	2	.05	.03
Total for Annual Forbs		99	5	37	2	0.18	0.00
Total for Perennial Forbs		233	111	117	49	2.96	2.29
Total for Forbs		332	116	154	51	3.14	2.30

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 8

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	<i>Amelanchier alnifolia</i>	2	1	.38	.15
B	<i>Artemisia tridentata vaseyana</i>	83	15	12.09	2.41
B	<i>Cercocarpus montanus</i>	24	22	2.25	.65
B	<i>Chrysothamnus depressus</i>	1	0	.03	-
B	<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	28	20	.24	.20
B	<i>Juniperus osteosperma</i>	10	0	1.31	-
B	<i>Opuntia</i> spp.	2	1	.00	.03
B	<i>Peraphyllum ramosissimum</i>	23	5	3.37	.53
B	<i>Pinus edulis</i>	6	1	1.50	.03
B	<i>Symphoricarpos oreophilus</i>	45	40	4.61	1.11
Total for Browse		224	105	25.81	5.12

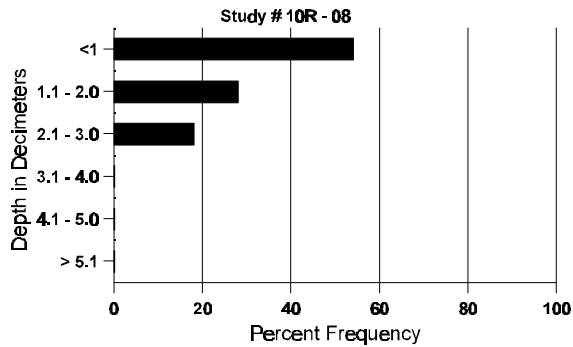
BASIC COVER --
Herd unit 10R, Study no: 8

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	403	235	35.82	13.81
Rock	72	46	1.52	2.25
Pavement	183	297	6.99	3.27
Litter	497	427	57.16	19.05
Cryptogams	114	11	1.90	.21
Bare Ground	179	459	12.67	63.62

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 08

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.8	55.8 (16.0)	6.3	37.3	30.2	32.5	2.75	3.57	96.0	0.77

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 8

Type	Quadrat Frequency		Pellet Transect			
	'97	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'97	'00	'97	'00
Rabbit	18	8	70	322	N/A	N/A
Elk	17	4	609	78	47 (116)	6 (14)
Deer	7	1	35	52	3 (7)	4 (10)
Cattle	4	-	165	13	14 (35)	1 (2)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 8

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Amelanchier alnifolia</i>																		
M	97	-	2	-	-	-	-	-	-	-	2	-	-	-	40	35	27	2
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	26	23	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		100%			00%			00%			-50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	40	Dec:	-			
												'00	20		-			
<i>Artemisia tridentata vaseyana</i>																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	97	28	13	6	5	-	-	-	-	-	52	-	-	-	1040			52
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	97	72	72	-	16	-	-	-	-	-	160	-	-	-	3200	24	35	160
	00	20	6	-	-	-	-	-	-	-	26	-	-	-	520	22	28	26
D	97	8	4	1	1	-	1	-	-	-	8	-	-	7	300			15
	00	4	-	-	-	-	-	-	-	-	2	-	-	2	80			4
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		39%			04%			03%			-86%							
'00		19%			00%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	4540	Dec:	7%			
												'00	620		13%			
<i>Cercocarpus montanus</i>																		
S	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	97	1	2	-	2	-	-	-	-	-	5	-	-	-	100			5
	00	20	-	-	8	-	-	-	-	-	28	-	-	-	560			28
M	97	6	6	6	3	4	-	-	-	-	25	-	-	-	500	50	38	25
	00	1	1	1	-	-	-	-	-	-	3	-	-	-	60	41	31	3
D	97	-	-	2	-	-	-	-	-	-	1	-	-	1	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		38%			25%			03%			- 3%							
'00		03%			03%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	640	Dec:	6%			
												'00	620		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus depressus																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	12	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	20	Dec:	-			
												'00	0		-			
Chrysothamnus viscidiflorus viscidiflorus																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	97	3	-	-	1	-	-	-	-	-	4	-	-	-	80			4
	00	29	-	-	-	-	-	-	-	-	29	-	-	-	580			29
M	97	30	-	1	-	1	-	-	-	-	32	-	-	-	640	12	14	32
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180	7	7	9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		03%			03%			00%			+ 5%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	720	Dec:	-			
												'00	760		-			
Juniperus osteosperma																		
Y	97	6	-	-	1	-	-	-	-	-	7	-	-	-	140			7
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	200	Dec:	-			
												'00	0		-			
Opuntia spp.																		
M	97	3	-	-	-	-	-	-	-	-	1	-	-	2	60	3	13	3
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	3	1
D	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	0				0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			75%			-75%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	80	Dec:	25%			
												'00	20		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Peraphyllum ramosissimum</i>																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	97	10	10	1	3	5	-	-	-	-	29	-	-	-	580	46	55	29
	00	1	1	-	-	-	-	-	-	-	2	-	-	-	40	55	66	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		50%			03%			00%			-80%							
'00		17%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	600	Dec:	-			
												'00	120		-			
<i>Pinus edulis</i>																		
Y	97	3	-	-	1	-	-	-	-	-	4	-	-	-	80		4	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	-	-	-	-	-	-	-	-	-	-	-	-	120		6		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			-88%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	160	Dec:	-			
												'00	20		-			
<i>Purshia tridentata</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	0	21	50	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
S	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	00	23	-	-	-	-	-	-	-	-	23	-	-	-	460		23	
Y	97	22	-	-	4	-	-	-	-	-	26	-	-	-	520		26	
	00	88	4	-	-	-	-	-	-	-	92	-	-	-	1840		92	
M	97	37	4	3	15	-	-	-	-	-	59	-	-	-	1180	19	33	59
	00	18	-	-	-	-	-	-	-	-	18	-	-	-	360	13	17	18
D	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		05%			03%			00%			+20%							
'00		04%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	1760	Dec:	3%			
												'00	2200		0%			

Trend Study 10R-9-00

Study site name: Winter Ridge Exclosure Out.

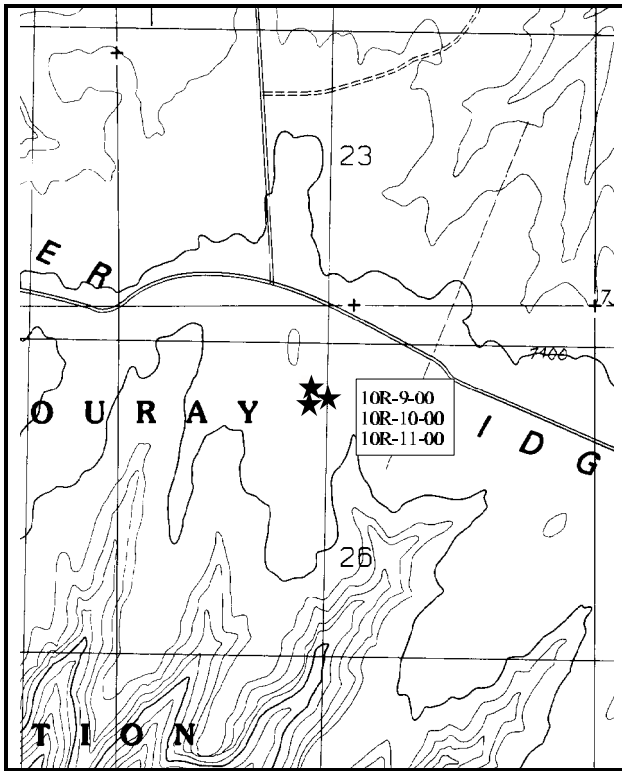
Range Type: Big Sagebrush

Compass bearing: Frequency baseline 94°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

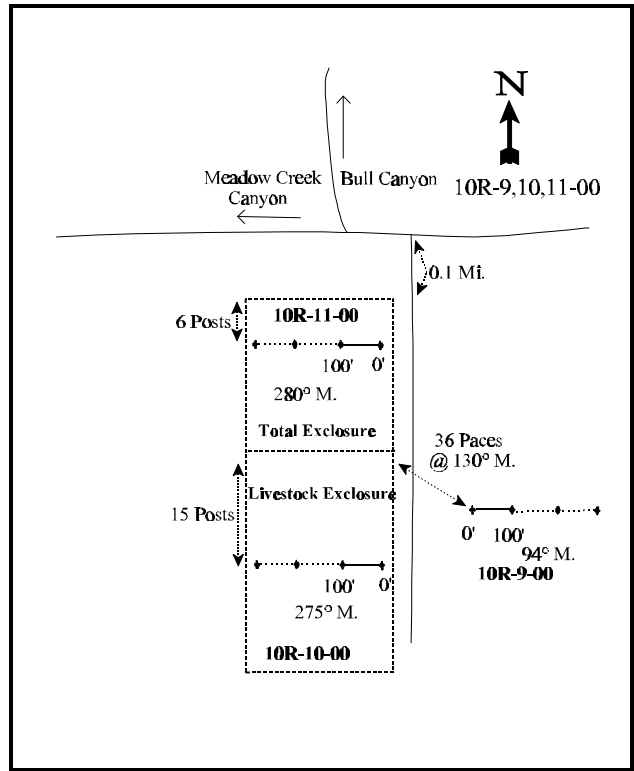
LOCATION DESCRIPTION

From the intersection where Meadow Creek Canyon and Bull Canyon meet, take the road to the south. Go 0.1 miles to the Winter Ridge Exclosure. From the "T" in the fence on the west side of the enclosure where the two parts of the enclosure meet, walk 36 paces at an azimuth of 130°M, to the 0-foot stake. The 0-foot stake is marked by browse tag number 63.



Map name: Tenmile Canyon North

Township 15S, Range 21 E, Section 26



Diagrammatic Sketch

UTM. 4371942.223 N, 625694.757 E

DISCUSSION

Trend Study 10R-9

The Winter Ridge Enclosure study is found outside of the enclosure complex on Winter Ridge. The enclosure was constructed in 1964. The trend study was established in 1997. The site has a slope of 4% with a westerly aspect and an elevation of 7,200 feet. The area is a mountain big sagebrush/grass type in association with scattered pinyon and juniper. It is used as winter range for deer and elk and is grazed by cattle during the summer. At the time the study was established in June 5, 1997, cattle were grazing on the site. Pellet group data estimated 44 elk, 2 deer and 30 cow days use/acre (109 edu/ha, 5 edu/ha and 74 cdu/ha). Data from 2000 estimate 22 elk, 2 deer and 19 cow days use/acre (54 edu/ha, 5 ddu/ha and 47 cdu/ha). Most of the cattle pats sampled in 2000 appear to be from the late summer or fall of 1999.

Soil at the site is moderately deep with an effective rooting depth estimated at just over 15 inches. It has a loam texture with a neutral soil reaction (7.2 pH). Phosphorus and potassium are low at 5.4 and 3.2 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium may limit normal plant growth and development. Soil pedestaling is evident around the base of shrubs, indicative of soil loss in the past. Current erosion appears minimal.

Mountain big sagebrush dominates this site with a current ('00) estimated density of 9,760 plants/acre which provides 86% of the browse cover. These plants show moderate to heavy use. Percent decadence was estimated at 24% in 1997, increasing to 49% in 2000. In addition, 33% (1,580 plants/acre) of the decadent sagebrush were classified as dying. Seedling and young plants are not abundant which is a cause of concern with regard to replacements of the decadent/dying plants.

Broom snakeweed was present at an estimated density of only 1,440 plants/acre in 1997. Density rapidly increased in 2000 to 21,940 plants/acre. About 75% of the population is currently mature, although young plants are still common and none are decadent. This would indicate a stable to slowly increasing population. Other browse species encountered in low densities include dwarf and stickleaf low rabbitbrush, and winterfat. Perennial grasses are abundant with six species sampled. Thickspike, mutton bluegrass, and Sandberg bluegrass are the most abundant. Forbs are diverse but most provide little cover. Two perennial forbs, mat penstemon and desert phlox, account for two-thirds of the forb cover. Most of the forbs associated with this site are low growing species. Although they afford some protection to the soil, they offer little forage value. Other prevalent species include Rose's pussytoes, globemallow, and longleaf phlox.

1997 APPARENT TREND ASSESSMENT

Soil is adequately protected at this time with some past erosion apparent. Bare ground is most vulnerable in the unprotected shrub interspaces. Cryptogams also protect the soil and could be used as an indicator of condition in the future. Mountain big sagebrush is the dominate browse with an overly mature age structure. Other browse are present, but in low densities. Grass accounts for two-thirds of the herbaceous cover with thickspike wheatgrass being the most abundant. Forbs are mostly low growing increaser species providing little forage.

2000 TREND ASSESSMENT

Trend for soil appears fairly stable. There is some limited erosion occurring within the shrub interspaces, but the abundant herbaceous vegetation and litter cover adequately protect the soil from serious erosion. Trend for browse is down slightly for the key species, mountain big sagebrush. Use is moderate to heavy (74% of the population), percentage of plants classified with poor vigor has increased (10 to 17%), and percent decadence has doubled from 24% to 49%. There are currently not enough seedlings and young to replace the decadent

plants that are dying. In addition, the density of the increaser, broom snakeweed has increased almost exponentially to 21,940 plants/acre, a 15-fold increase. Trend for the herbaceous understory is slightly up. Sum of nested frequency for grasses and forbs has increased and nested frequency of mutton bluegrass and Sandberg bluegrass has increased significantly.

TREND ASSESSMENT

soil - stable (3)

browse - down slightly (2)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 9

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	340	400	94	111	3.00	5.98
G	Bouteloua gracilis	26	50	9	16	.93	2.45
G	Koeleria cristata	152	*56	52	22	1.75	.84
G	Poa fendleriana	171	*271	57	88	2.79	6.46
G	Poa secunda	191	*286	64	94	2.06	4.77
G	Stipa comata	56	*14	19	6	.26	.10
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		936	1077	295	337	10.83	20.63
Total for Grasses		936	1077	295	337	10.83	20.63
F	Antennaria rosea	28	25	12	10	.53	.32
F	Arabis spp.	17	*2	6	1	.03	.00
F	Arenaria fendleri	-	6	-	2	-	.01
F	Astragalus convallarius	12	10	4	5	.02	.05
F	Castilleja linariaefolia	7	3	4	1	.04	.00
F	Crepis acuminata	4	-	1	-	.03	-
F	Cryptantha spp.	4	*-	4	-	.04	-
F	Erigeron eatonii	30	22	12	15	.06	.08
F	Erigeron pumilus	-	55	-	26	-	.22
F	Lesquerella spp.	22	*18	11	8	.10	.38
F	Lithospermum spp.	-	2	-	1	-	.00
F	Lygodesmia grandiflora	1	-	1	-	.03	-
F	Penstemon caespitosus	64	64	24	26	1.02	1.03
F	Petradoria pumila	-	6	-	4	-	.07
F	Phlox austromontana	190	273	73	88	2.20	4.28
F	Phlox longifolia	56	*22	26	8	.15	.06
F	Physaria acutifolia	-	3	-	1	-	.15

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
F	<i>Sphaeralcea coccinea</i>	78	*133	31	54	.70	.87
Total for Annual Forbs		0	0	0	0	0	0
Total for Perennial Forbs		513	644	209	250	4.98	7.56
Total for Forbs		513	644	209	250	4.98	7.56

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 10R, Study no: 9

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	<i>Artemisia tridentata vaseyana</i>	94	98	12.95	19.15
B	<i>Ceratoides lanata</i>	1	2	.03	-
B	<i>Chrysothamnus depressus</i>	6	7	.16	.19
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	-	-	.00
B	<i>Gutierrezia sarothrae</i>	30	75	.16	2.89
B	<i>Pediocactus simpsonii</i>	6	8	.01	.01
B	<i>Pinus edulis</i>	0	2	.03	-
B	<i>Tetradymia canescens</i>	0	1	-	-
Total for Browse		137	193	13.34	22.25

BASIC COVER --

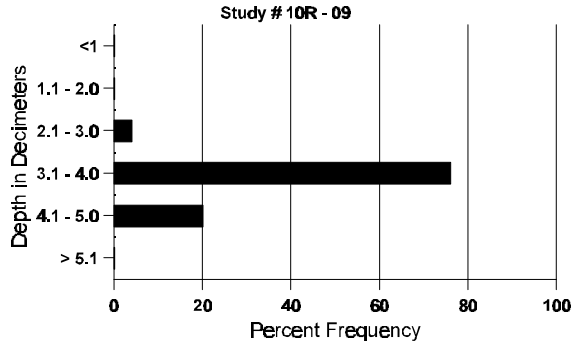
Herd unit 10R, Study no: 9

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	453	559	31.92	47.74
Rock	26	22	.11	.04
Pavement	73	62	.54	.18
Litter	497	539	25.17	40.56
Cryptogams	351	322	15.88	14.20
Bare Ground	396	468	31.46	38.67

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 09

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.4	61.2 (14.6)	7.2	35.6	38.8	25.6	1.44	5.41	3.2	0.45

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 9

Type	Quadrat Frequency	
	'97	'00
Rabbit	14	5
Elk	24	17
Deer	4	11
Cattle	2	4

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
44	44	N/A	N/A
566	287	44 (107)	22 (55)
26	26	2 (5)	2 (5)
357	226	30 (73)	19 (47)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 9

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	97	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
	00	23	8	-	9	-	-	-	-	-	40	-	-	-	800		40	
M	97	18	147	75	4	2	-	5	-	-	251	-	-	-	5020	21	27	251
	00	41	64	32	14	2	56	-	-	-	207	-	2	-	4180	20	23	209
D	97	42	24	11	2	3	-	-	-	-	47	-	-	35	1640		82	
	00	20	93	64	14	20	23	5	-	-	160	-	-	79	4780		239	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1600		80	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1680		84	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		51%			25%			10%			+30%							
'00		38%			36%			17%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	6880	Dec:	24%				
											'00	9760		49%				
<i>Ceratoides lanata</i>																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	6	1
	00	-	-	3	-	-	-	-	-	-	3	-	-	-	60	4	5	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+67%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	20	Dec:	-				
											'00	60		-				
<i>Chrysothamnus depressus</i>																		
Y	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	97	11	-	-	-	-	-	-	-	-	11	-	-	-	220	3	7	11
	00	12	-	1	-	-	-	-	-	-	13	-	-	-	260	3	7	13
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	1	-	-	-	-	-	1	-	-	2	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+38%							
'00		00%			05%			10%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	260	Dec:	0%				
											'00	420		14%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	57	-	-	-	-	-	-	-	-	57	-	-	-	1140		57	
Y	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
	00	276	-	-	-	-	-	-	-	-	276	-	-	-	5520		276	
M	97	64	-	-	-	-	-	-	-	-	64	-	-	-	1280	5	6	
	00	795	-	-	23	-	-	-	-	-	818	-	-	-	16360	4	4	
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+93%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	1440	Dec:	0%			
												'00	21940		0%			
<i>Opuntia spp.</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			
<i>Pediocactus simpsonii</i>																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	2	-	-	-	-	-	3	-	-	5	-	-	-	100		5	
M	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100	1	3	
	00	8	-	-	-	-	-	1	-	-	9	-	-	-	180	1	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+57%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	120	Dec:	-			
												'00	280		-			
<i>Pinus edulis</i>																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	2	-	-	-	-	-	4	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	80		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Tetradymia canescens																	
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'97		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-		
												'00	20		-		

Trend Study 10R-10-00

Study site name: Winter Ridge Livestock Enclosure .

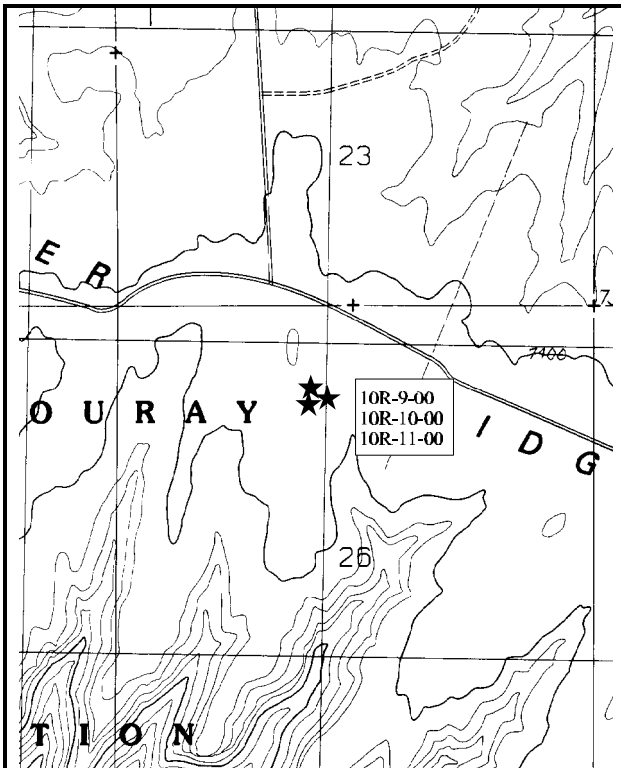
Range Type: Big Sagebrush

Compass bearing: Frequency baseline 275°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

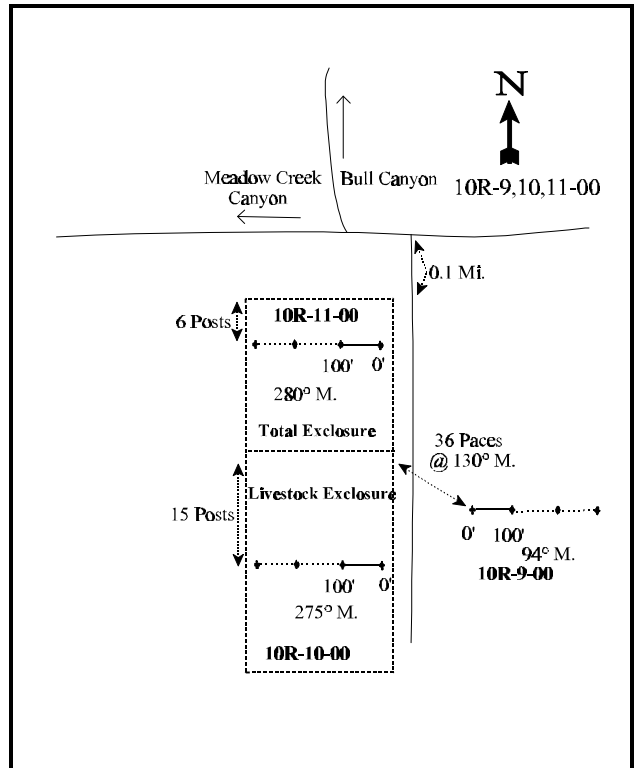
LOCATION DESCRIPTION

From the intersection where Meadow Creek Canyon and Bull Canyon meet, take the road to the south. Go 0.1 miles to the Winter Ridge Enclosure. Go to the northwest corner of the livestock part of the enclosure. From here walk down 15 posts and the 300-foot stake is to the east. The 0-foot stake is on the east end and marked by browse tag number 76.



Map name: Tenmile Canyon North

Township 15S, Range 21 E, Section 26



Diagrammatic Sketch

UTM. 4371942.223 N, 625694.757 E

DISCUSSION

Trend Study 10R-10

The Winter Ridge Livestock Exclosure study is located within the Winter Ridge livestock exclosure which excludes livestock use. The exclosure was constructed in 1964 and the trend study established in 1997. The site has a mild slope of 5% with a westerly aspect and an elevation of 7,200 feet. Pellet group data indicated high elk use within the livestock exclosure in 1997 with 100 elk days use/acre (247 edu/ha). Deer use was only 4 days use/acre (10 ddu/ha). Data from the 2000 reading estimated a lower use of 28 elk days use/acre (69 edu/ha). Pellet groups appear to be from fall and winter use. The decline in use in this area is probably due to the mild winters of the past few years.

Soil in the exclosure is moderately deep with an effective rooting depth estimated at nearly 16 inches. It has a loam texture and neutral soil reaction (pH of 7.2). Phosphorus and potassium are both low at 5.4 and 3.2 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium may limit normal plant growth and development. Percent bare ground is fairly high at about 31%. Some soil pedestaling is evident in the shrub interspaces, although current erosion appears minimal.

As with the surrounding mountain big sagebrush community outside of the exclosure, sagebrush within the exclosure has a mostly mature age structure. Sagebrush within the exclosure are noticeably larger than the plants sampled on the outside. They show light to moderate hedging. Percent decadence was estimated at 31% in 1997 with 33% of those sagebrush classified as dying (vigor class 4). In 2000, percent decadence declined to 23% but 67% (720 plants/acre) of those were classified as dying. Young plants currently ('00) number only 520 plants/acre. The only other common browse on the site include dwarf and stickleaf low rabbitbrush, and broom snakeweed.

Grasses are abundant and diverse. Thickspike wheatgrass, prairie Junegrass, mutton bluegrass, and Sandberg bluegrass are all abundant. Forbs are diverse yet few species are very abundant. The most common forb is desert phlox which currently ('00) provides 53% of the forb cover.

1997 APPARENT TREND ASSESSMENT

There is some slight rill erosion apparent in the shrub interspaces. As with most of the surrounding area, the soil is most vulnerable in the unprotected interspaces between the mountain big sagebrush. Cryptogams also protect the soil and could be used as an indicator of condition in the future. Mountain big sagebrush is the dominate browse with an overly mature age structure and very low biotic potential (# of seedlings). At this time there does not appear to be enough seedling or young plants present to replace the decadent and/or dying population. Other browse are present but in low densities. Grass accounts for three-fourths of the herbaceous cover with muttongrass being the most abundant. No annual forbs are present and the perennial forbs consist of primarily low growing species that provide little forage.

2000 TREND ASSESSMENT

Trend for soil is considered stable with similar amounts of bare ground estimated in 1997 and 2000. Vegetation and litter cover are abundant and adequate to protect the soil from significant erosion events. Trend for the key browse species, mountain big sagebrush, is stable. Use of the sagebrush is similar to 1997 levels. Percent decadence declined slightly, however the proportion of plants displaying poor vigor increased from 10% to 23% due to drought conditions. Density of young plants have increased, although there are currently not enough to replace decadent sagebrush that appear to be dying. Another unfavorable factor is the increase in broom snakeweed which occurred rarely in 1997. Now it numbers 1,240 plants/acre and 44% of these are young

plants. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of perennial grasses and forbs. Mutton bluegrass was the most abundant grass on the site in 1997 with a quadrat frequency of 93% and a cover value of 8%. It has since declined significantly to a quadrat frequency of 56% and a cover value of less than 5%. All other grass frequencies remained similar. Sum of nested frequency of perennial forbs declined to less than half of the 1997 level.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 10

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	226	227	73	73	.86	3.01
G	Bouteloua gracilis	17	15	7	5	.28	.51
G	Koeleria cristata	230	255	72	67	3.71	10.16
G	Oryzopsis hymenoides	-	6	-	2	-	.30
G	Poa fendleriana	299	*158	93	56	7.85	3.38
G	Poa secunda	99	99	40	33	1.83	1.02
G	Stipa comata	6	10	3	6	.06	.13
G	Stipa lettermani	3	-	1	-	.15	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		880	770	289	242	14.76	18.53
Total for Grasses		880	770	289	242	14.76	18.53
F	Antennaria rosea	15	18	6	9	.15	.11
F	Arabis spp.	11	2	6	2	.03	.01
F	Astragalus convallarius	18	5	7	3	.06	.01
F	Castilleja linariaefolia	41	*7	25	3	.69	.01
F	Crepis acuminata	22	*10	11	6	.33	.25
F	Cryptantha spp.	5	14	3	5	.01	.07
F	Erigeron eatonii	35	*13	21	6	.22	.05
F	Erigeron pumilus	-	*8	-	4	-	.07
F	Lesquerella spp.	1	-	1	-	.00	-
F	Machaeranthera canescens	-	2	-	2	-	.06
F	Machaeranthera grindelioides	13	6	3	3	1.38	.06
F	Penstemon caespitosus	31	*4	10	1	.58	.15
F	Phlox austromontana	174	*55	62	26	2.32	1.12
F	Phlox longifolia	28	*-	14	-	.09	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
F	Senecio multilobatus	-	3	-	2	-	.01
F	Sphaeralcea coccinea	11	12	4	6	.02	.10
Total for Annual Forbs		0	0	0	0	0	0
Total for Perennial Forbs		405	159	173	78	5.92	2.13
Total for Forbs		405	159	173	78	5.92	2.13

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 10

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Artemisia tridentata vaseyana	96	93	13.12	14.75
B	Ceratoides lanata	1	1	.03	-
B	Chrysothamnus depressus	34	34	1.22	1.37
B	Chrysothamnus viscidiflorus viscidiflorus	4	17	.09	.53
B	Gutierrezia sarothrae	2	21	.03	.04
B	Opuntia spp.	4	1	.00	-
B	Pediocactus simpsonii	0	1	.00	.00
B	Pinus edulis	-	-	.15	.00
B	Sclerocactus	-	-	-	.00
Total for Browse		141	168	14.66	16.71

BASIC COVER --

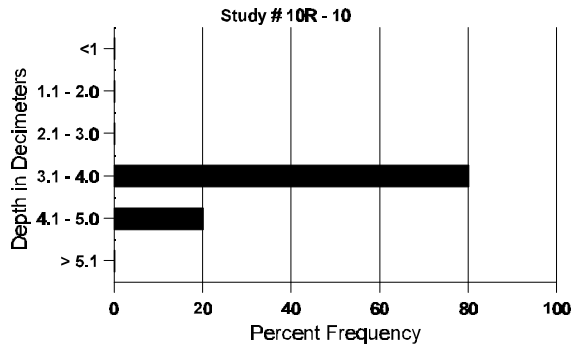
Herd unit 10R, Study no: 10

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	439	446	33.37	47.15
Rock	15	-	.04	0
Pavement	72	11	.18	.04
Litter	490	488	29.62	30.74
Cryptogams	371	109	16.89	2.14
Bare Ground	386	386	30.52	31.20

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 10

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.8	61.2 (15.6)	7.2	35.6	38.8	25.6	1.44	5.41	3.2	0.45

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 10

Type	Quadrat Frequency	
	'97	'00
Rabbit	9	4
Elk	49	22
Deer	-	3
Cattle	-	1

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
17	17	N/A	N/A
1305	365	100 (247)	28 (70)
52	17	4 (10)	1 (4)
-	-	-	-

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 10

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	97	17	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
	00	26	1	-	-	-	-	-	-	-	26	-	1	-	540		27	
M	97	99	80	1	-	-	-	-	-	-	179	1	-	-	3600	48	54	
	00	87	58	10	-	-	-	-	-	-	144	-	11	-	3100	30	33	
D	97	63	24	3	-	-	-	-	-	-	60	-	-	30	1800		90	
	00	15	29	6	-	2	-	-	-	-	10	-	6	36	1080		54	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1500		75	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1020		51	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		36%			01%			10%			-18%							
'00		38%			07%			23%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	5740	Dec:	31%				
											'00	4720		23%				
<i>Ceratoides lanata</i>																		
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	11	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	20	Dec:	-				
											'00	20		-				
<i>Chrysothamnus depressus</i>																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	97	103	-	-	-	-	-	-	-	-	103	-	-	-	2060	5	9	
	00	94	-	-	-	-	-	-	-	-	94	-	-	-	1880	5	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			-11%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	2140	Dec:	-				
											'00	1900		-				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	3	2	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	13 23	4	
	00	19	-	-	1	-	-	-	-	-	20	-	-	-	400	7 9	20	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%			+80%							
'00		08%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	100	Dec:	-			
												'00	500		-			
<i>Gutierrezia sarothrae</i>																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	27	-	-	-	-	-	-	-	-	27	-	-	-	540		27	
M	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6 7	1	
	00	33	-	-	1	-	-	-	-	-	34	-	-	-	680	5 5	34	
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%			+97%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	40	Dec:	0%			
												'00	1240		2%			
<i>Opuntia spp.</i>																		
Y	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2 6	2	
	00	1	-	-	-	-	-	-	-	-	-	-	1	-	20	1 6	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%			-75%							
'00		00%			00%			100%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	80	Dec:	-			
												'00	20		-			
<i>Pediocactus simpsonii</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	20		-			

Trend Study 10R-11-00

Study site name: Winter Ridge Total Exclosure.

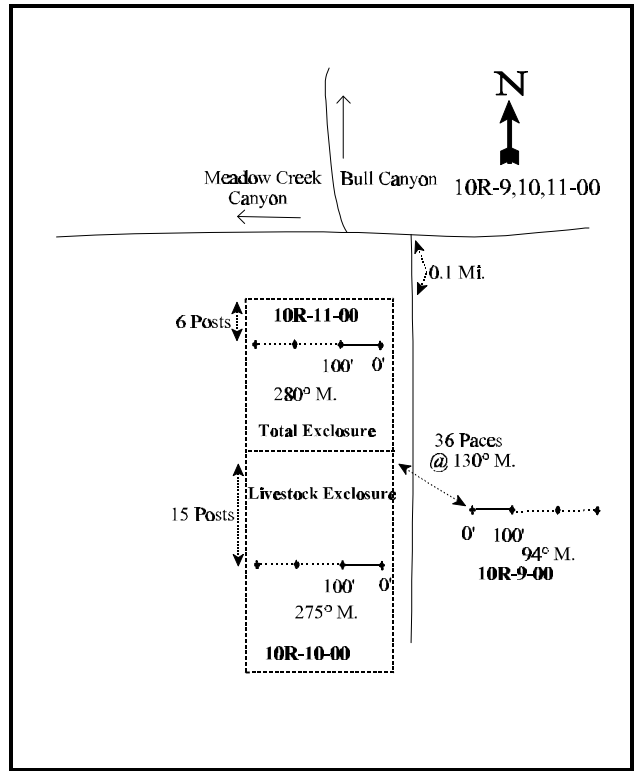
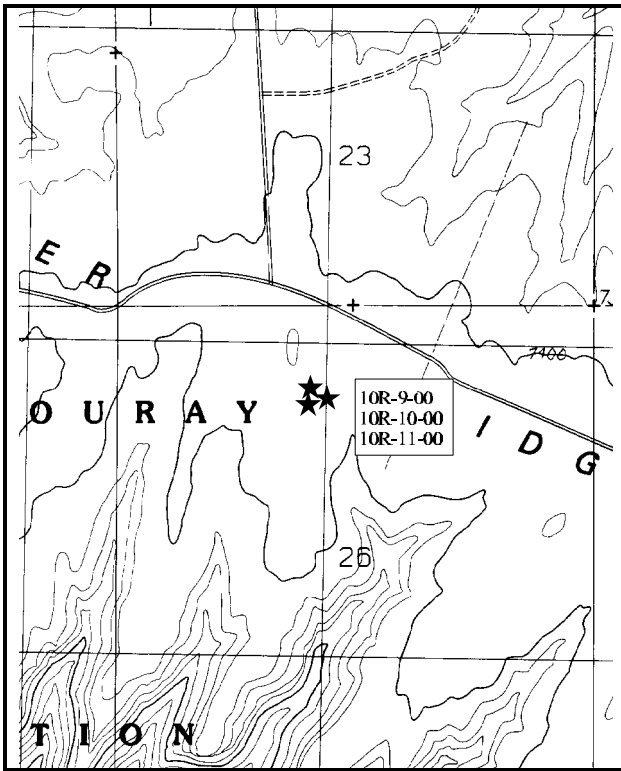
Range Type: Big Sagebrush

Compass bearing: Frequency baseline 280°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

LOCATION DESCRIPTION

From the intersection where Meadow Creek Canyon and Bull Canyon meet, take the road to the south. Go 0.1 miles to the Winter Ridge Exclosure. From the northwest corner of the total exclosure, walk down six fenceposts. The 300-foot stake is just east of the sixth post. The 0-foot stake is on the east end and is marked by browse tag number 86.



Map name: Tenmile Canyon North

Diagrammatic Sketch

Township 15S, Range 21 E, Section 26

UTM. 4371942.223 N, 625694.757 E

DISCUSSION

Trend Study 10R-11

The Winter Ridge total enclosure study is found within the enclosure complex on Winter Ridge. The enclosure was constructed in 1964 and the trend study was established in 1997. The study samples the area of the total enclosure which excludes livestock and big game use. The site has a slope of 5% with a westerly aspect and an elevation of 7,200 feet.

Soil within the total enclosure is moderately deep with an effective rooting depth (see methods) estimated at nearly 18 inches. There is a compacted layer at that depth. There is a slight soil depth gradient with more shallow soils near the west fence and deeper soils near the east end of the enclosure fence. It has a loam texture with a neutral soil reaction (7.2 pH). Phosphorus and potassium are low at 5.4 and 3.2 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium may limit normal plant growth and development. Cracks are apparent from the soil drying and shrinking. Percent bare ground is low with an estimated cover of 22% in 1997 and 15% in 2000. There is some pedestaling apparent around plants, but there is currently enough vegetation and litter cover to protect the soil.

Mountain big sagebrush is the dominant browse within the enclosure. It provides over 90% of shrub cover with an overly mature population of 7,460 plants/acre in 2000. There are few seedlings and young plants account for only 6% of the population. Mature plants are large and vigorous averaging 30 inches in height. Nearly one-quarter of the population was classified as decadent in 1997, increasing to 51% in 2000. There are few seed heads apparent from the last few growing seasons and leader growth is currently ('00) poor averaging only 2 inches. The plants on the east side of the enclosure (deeper soils) appear to be in better vigor than the plants further west. Other browse species are scattered throughout the area, although none are very abundant. These include: winterfat, dwarf and stickleaf low rabbitbrush, broom snakeweed, and cactus.

Grasses are abundant and vigorous with six species providing 36% cover in 2000. Mutton bluegrass dominates the composition by providing over half of the grass cover. Thickspike wheatgrass, blue grama, prairie Junegrass, and Sandberg bluegrass are also common. Forbs are fairly diverse but provide less than 10% of the total herbaceous cover. The only common forbs are desert phlox and scarlet globemallow.

1997 APPARENT TREND ASSESSMENT

The soil within the total enclosure shows little erosion but there are signs of past erosion events. Some of the plants are pedestaled, although it appears that this has not occurred recently. Vegetation, litter, and cryptogams protect the soil adequately to prevent runoff, except in severe cases. Mountain big sagebrush does not have residual seed heads and there are very few seedling or young plants present. Although percent decadency is not overly high at this time, the lack of seedlings and young should be monitored as there are probably not enough now to replace the dying plants. Grasses dominate the herbaceous understory, specifically muttongrass. Forbs are not very abundant, but Indian paintbrush appears at a higher density within the enclosure than outside.

2000 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare ground, an increase in litter and vegetation cover, and an increase in herbaceous cover. Trend for the key browse, mountain big sagebrush, appears stable. Percent decadence increased from 24% to 51%, even though the number of plants classified as dying declined. The number of young plants appear abundant enough to replace those currently being lost. The proportion of sagebrush in poor vigor and the number of dead plants remains the same as before. It is apparent however, that the sagebrush are stressed from intraspecific competition (high densities) combined with drought. Trend for the

herbaceous understory is slightly up with an increase in the sum of nested frequency of perennial grasses being offset by losses to the forbs. Mutton bluegrass, the dominant species, increased significantly since 1997. Thickspike wheatgrass and Sandberg bluegrass also increased significantly. Sum of nested frequency of perennial forbs declined slightly but the most abundant species, desert phlox and scarlet globemallow, remained stable.

TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 11

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	<i>Agropyron dasystachyum</i>	259	*287	84	89	1.82	4.11
G	<i>Bouteloua gracilis</i>	30	42	9	11	.95	2.17
G	<i>Koeleria cristata</i>	195	*114	64	44	4.24	3.57
G	<i>Poa fendleriana</i>	290	*352	87	93	10.91	24.99
G	<i>Poa secunda</i>	47	99	20	36	.54	1.23
G	<i>Stipa comata</i>	21	17	7	6	.16	.13
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		842	911	271	279	18.64	36.21
Total for Grasses		842	911	271	279	18.64	36.21
F	<i>Antennaria rosea</i>	18	*6	7	2	.08	.06
F	<i>Arabis</i> spp.	19	14	7	6	.11	.05
F	<i>Astragalus convallarius</i>	27	19	11	11	.19	.10
F	<i>Castilleja linariaefolia</i>	32	*6	19	2	.64	.01
F	<i>Crepis acuminata</i>	7	-	3	-	.16	-
F	<i>Cryptantha</i> spp.	4	-	2	-	.01	-
F	<i>Erigeron eatonii</i>	5	15	3	7	.01	.03
F	<i>Lesquerella</i> spp.	-	3	-	1	-	.00
F	<i>Lygodesmia grandiflora</i>	8	3	3	1	.04	.00
F	<i>Penstemon caespitosus</i>	8	3	2	1	.30	.03
F	<i>Phlox austromontana</i>	125	119	45	43	1.69	3.45
F	<i>Phlox longifolia</i>	54	*14	22	6	.14	.03
F	<i>Sphaeralcea coccinea</i>	52	58	24	25	.44	.35
F	Unknown forb-annual (a)	-	4	-	1	-	.15

Type	Species	Nestled Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
	Total for Annual Forbs	0	4	0	1	0	0.15
	Total for Perennial Forbs	359	260	148	105	3.83	4.14
	Total for Forbs	359	264	148	106	3.83	4.29

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 11

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Artemisia tridentata vaseyana	96	97	19.43	20.13
B	Ceratoides lanata	5	6	.15	.03
B	Chrysothamnus depressus	3	1	.03	.00
B	Chrysothamnus viscidiflorus viscidiflorus	6	6	.45	.33
B	Gutierrezia sarothrae	6	30	.06	.61
B	Juniperus osteosperma	0	0	-	.00
B	Pediocactus simpsonii	5	11	.11	.16
B	Pinus edulis	0	2	-	.03
	Total for Browse	121	153	20.25	21.31

BASIC COVER --

Herd unit 10R, Study no: 11

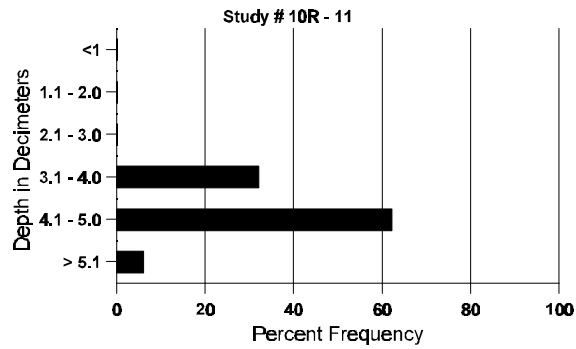
Cover Type	Nestled Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	434	447	40.81	58.45
Rock	10	4	.07	.06
Pavement	71	39	.19	.15
Litter	498	459	33.62	42.13
Cryptogams	334	322	13.07	20.97
Bare Ground	328	289	21.73	15.06

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 11

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.7	59.0 (16.5)	7.2	35.6	38.8	25.6	1.44	5.41	3.2	0.45

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 11

Type	Quadrat Frequency	
	'97	'00
Rabbit	5	3
Sage Grouse	-	2

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 11

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	97	17	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
	00	21	-	-	2	-	-	-	-	-	23	-	-	-	460		23	
M	97	201	-	-	-	-	-	-	-	-	201	-	-	-	4020	28	35	201
	00	101	2	-	55	-	-	-	-	-	142	-	16	-	3160	30	31	158
D	97	67	2	-	-	-	-	-	-	-	37	-	-	32	1380		69	
	00	73	-	-	116	-	-	3	-	-	167	-	2	23	3840		192	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1520		76	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1520		76	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		.69%			00%			11%			+23%							
'00		.53%			00%			11%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	5740	Dec:	24%			
												'00	7460		51%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ceratoides lanata</i>																		
M	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160	14	13	8
	00	8	-	-	1	-	-	-	-	-	9	-	-	-	180	17	11	9
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+20%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	160	Dec:	0%				
											'00	200		10%				
<i>Chrysothamnus depressus</i>																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	9	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			-67%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	60	Dec:	-				
											'00	20		-				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	97	10	-	-	2	-	-	-	-	-	12	-	-	-	240	14	16	12
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	16	19	2
D	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	6	-	-	-	-	-	-	-	-	5	-	-	1	120			6
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			-21%							
'00		00%			00%			09%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	280	Dec:	7%				
											'00	220		55%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	47	-	-	-	-	-	2	-	-	49	-	-	-	980		49	
M	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200	5	5	
	00	171	-	-	-	-	-	-	-	-	171	-	-	-	3420	4	6	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+95%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	200	Dec:	-			
												'00	4400		-			
Juniperus osteosperma																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			
Pediocactus simpsonii																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	1	-	-	2	-	-	-	40		2	
M	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100	3	4	
	00	6	-	-	-	-	-	3	-	-	9	-	-	-	180	2	3	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+55%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	100	Dec:	-			
												'00	220		-			
Pinus edulis																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	40		-			

WINTER RIDGE EXCLOSURE COMPARISON SUMMARY

Trend Study No. 10R-9 (outside), 10R-10 (livestock), and 10R-11 (total)

Ground cover characteristics are similar between the livestock enclosure and outside of the enclosure where percent bare ground is relatively high at around 30%, yet litter and vegetation cover are abundant and appear adequate to protect the soil. Inside the total enclosure, herbaceous cover is more abundant and percent bare ground significantly lower at only 15%.

The key browse for this study area is mountain big sagebrush. It shows moderate to heavy use outside of the enclosure which is expressed in sagebrush that are shorter in height by an average of 10 inches. Nearly half of the plants sampled were classified as decadent and a third of those were classified as dying (1,580 plants/acre). Seedlings are rare and young plants account for 8% of the population which is currently not enough to replace decadent/dying plants. Sagebrush in the livestock enclosure are taller, mostly light to moderate hedging, but show some similarities in trend to those outside of the enclosure. They have a moderate decadency rate of 23%, but 67% (720 plants/acre) were classified as dying. Reproduction is marginal with no seedlings sampled in 2000 and young plants accounting for 11% of the population (540 plants/acre). Under current conditions, this would not be enough to replace the decadent/dying plants. Even though the sagebrush in the total enclosure show no use, they have a high rate of decadence at 51%. Twelve percent of the decadent shrubs sampled were classified as dying. Seedlings are rare but young plants are abundant enough to replace decadent and dying plants. Taking all of this into consideration, the sagebrush on these sites appear to be suffering the effects of drought combined with intra and interspecific competition. The populations may decline slightly in the future, but a return to normal precipitation patterns will improve conditions.

The herbaceous understories are relatively abundant and diverse on all treatment effects with perennial grasses dominating the herbaceous understory. The most common species include: thickspike, blue grama, prairie Junegrass, mutton and Sandberg bluegrass. The biggest difference between the three site treatment effects is the abundance of mutton bluegrass in the total enclosure. It provides 69% of the grass cover in the total enclosure with a cover value nearly 4 times more than outside of the enclosure and 7 times more than the livestock enclosure. Forbs are diverse on all sites yet they provide only 27% of the total herbaceous cover outside of the enclosure, 10% in the livestock enclosure, and 11% in the total enclosure. The most common forb for all sites is desert phlox.

It is difficult much of the time to determine which of many factors may be the most influential in effecting the trend for a key species. Here we have a relatively high elevation three-way enclosure where transects were established in 1997 and read again in 2000. With only two data points, trends are not well developed, but in 2005 when it is read again, that data should give a better determination of long-range trends for mountain big sagebrush. With the data that is available now, numbers of young in the population vs the numbers of plants that are classified as dying is most important and meaningful in explaining trends. These data shows that on the outside, the young will only replace about 49% of the dying individuals; on the livestock enclosure, the young will only replace 71% of dying individuals within this treatment; and within the total enclosure the young will replace 98% of the dying individuals. One should use caution in interpreting these data because it is only two readings which occurred within three years. Drought currently appears to be the most influential factor effecting trend at this site, coupled with use.

2000 Trend Data Comparisons

	<u>Outside Exclosure</u>	<u>Livestock Exclosure</u>	<u>Total Exclosure</u>
Big sagebrush			
Average Cover	19.2	14.8	20.1
Density (plants/acre)	9,760	4,720	7,460
% young	8% (781/acre)	11% (519/acre)	6% (448/acre)
% decadent	49% (4,782/acre)	23% (1,086/acre)	51% (3,805/acre)
% decadent/ dying	33% (1,578/acre)	67% (728/acre)	12% (457/acre)
% poor vigor	17% (1,659/acre)	23% (1,086/acre)	11% (821/acre)
% heavy use	36% (3,514/acre)	7% (330/acre)	0% (0/acre)
Average height/crown	20/23	30/33	30/31

Trend Study 10R-12-00

Study site name: Horse Ridge .

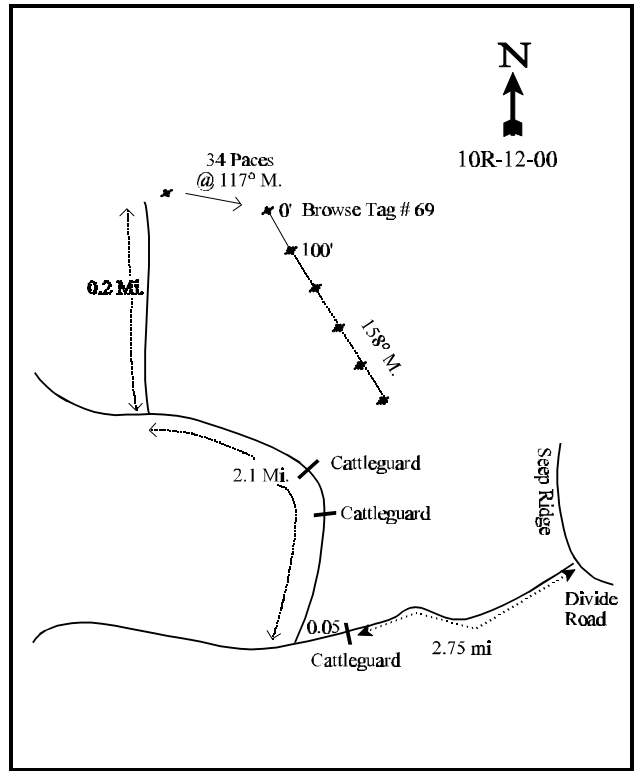
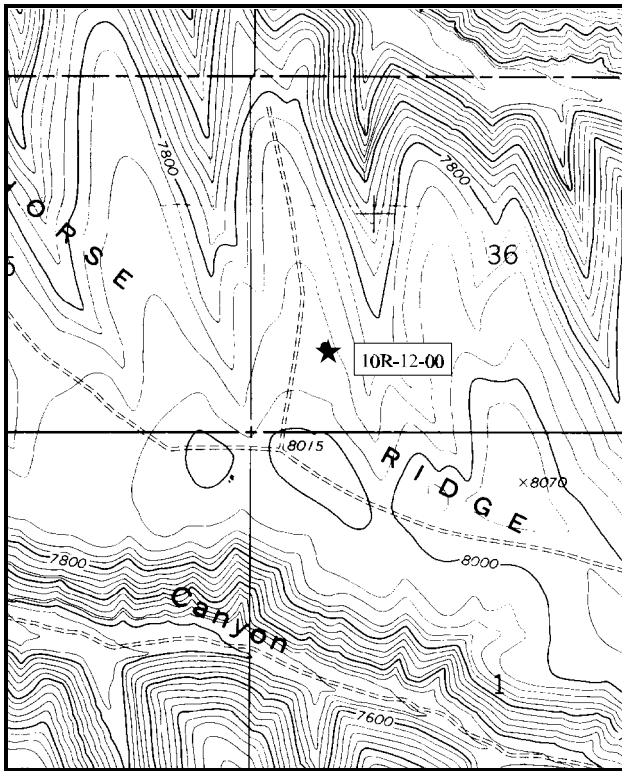
Range type: Mixed Mountain Brush

Compass bearing: frequency baseline 158°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From the intersection of Divide road and Seep Ridge, turn west off of Divide road. Drive down this road 2.75 miles to a cattle guard. Proceed 0.05 miles, turn right (north) and drive 2.1 miles crossing two cattle guards. At this point there is a fork. Take the right fork for 0.2 miles to a witness post on the right side of the road. The 0-foot stake is 34 paces from the witness post at 117°M. The study is marked by green, steel fenceposts approximately 12-18 inches in height. The 0-foot stake is marked by browse tag number 69.



Map name: P R Spring .

Diagrammatic Sketch

Township 15 ½ S, Range 23 E, Section 36

UTM 4368302.831 N, 643199.342 E

DISCUSSION

Trend Study 10R-12

The Horse Ridge trend study is located on Horse Ridge about 2½ miles west of the Seep Ridge Road and Divide Ridge Road intersection. The site has a slope of 5-10% with a slight northwest aspect and an elevation of approximately 7,900 feet. The area is dominated by mixed mountain brush, which includes serviceberry, bitterbrush, and mountain big sagebrush. Pellet group data indicated moderate big game use in 1997 with an estimated 71 elk and 68 deer days use/acre (175 edu/ha and 168 ddu/ha). Use was lighter in 2000 with 45 elk, 47 deer and 3 cow days use/acre estimated (111 edu/ha, 116 ddu/ha and 7 cdu/ha).

Soil at the site is moderately deep with an effective rooting depth of over 19 inches. It has a clay loam texture with a moderately acid soil reaction (5.9 pH). Soil organic matter is very high at 11%. There is little rock or pavement on the surface and percent bare ground is low. Some soil pedestaling is evident under shrubs, but the site has a low erosion potential due to the levelness of the terrain combined with the abundant vegetation and litter cover.

The area supports a variety of useful browse species including serviceberry, mountain big sagebrush, bitterbrush and snowberry. The most numerous browse is mountain big sagebrush which provides half of the browse cover with an estimated density of 7,380 plants/acre in 2000. They show light to moderate use, good vigor, and low decadence. Reproduction is good with a biotic potential (# of seedlings) at 13% and young plants making up 18% of the population.

Bitterbrush is the next most abundant preferred species. It currently ('00) provides 27% of the browse cover with an estimated density of 2,960 plants/acre. These plants were classified with moderate to heavy hedging in 1997 with many of the plants exhibiting a clubbed appearance. Some of the current years growth was protected by dead stems on the outer portions of the plants making it partially unavailable to browsing. During the 2000 reading, use was classified as heavy (>60% of stems browsed) on 74% of the population and nearly 30% of the bitterbrush were considered unavailable due to heavy browsing growth form. Even with this heavy use, vigor is good and percent decadence low. These bitterbrush have a prostrate growth form with an average height of only 14 inches. Some plants appear to be layering (vegetative reproduction) as well as reproducing from seed.

Serviceberry is visually more noticeable because of its height, averaging four to five feet in height with a crown of five feet. These plants exhibit good vigor and low decadence with moderate to heavy hedging. Some of the current years growth is protected by dead stems on the outer portions of the plants, making much of it unavailable to browsing. Snowberry is also present with an estimated density of over 1,000 plants/acre. Some showed moderate to heavy use in 1997, while use in 2000 was mostly light. Vigor is good and there are few decadent plants.

Grasses and forbs are diverse and abundant. The most abundant grass is mutton bluegrass which provided 30% of the grass cover in 1997, increasing to 50% in 2000. Other common grasses include: thickspike wheatgrass, a sedge, Kentucky bluegrass, and needle-and-thread grass. Some use was noted on grasses in 1997 but not in 2000. Twenty five species of forbs were sampled in 1997 and 27 in 2000. The most abundant forbs are low growing species, rose pussytoes and longleaf phlox.

1997 APPARENT TREND ASSESSMENT

Soil is classified as a clay loam with abundant vegetative and litter cover. Erosion potential is low due to the slight slope and well disbursed vegetative and litter cover. This site appears to receive use by elk and deer but may be too far removed from water to be utilized by livestock. Mountain big sagebrush appears to be stable at

this time with good biotic potential and many young plants in the population. Bitterbrush exhibits a mostly mature population with a clubbed appearance. Although these plants show moderate to heavy hedging, they still show good vigor with only one decadent plant classified as dying. The large serviceberry plants dominate the landscape because of their size. They appear to be moderate to heavily hedged. The dominate grasses encountered are muttongrass and thickspike wheatgrass, which all showed recent utilization. Many of the forbs encountered are caespitose and do not provide much forage.

2000 TREND ASSESSMENT

Trend for soil is fairly stable with abundant vegetation and litter cover protecting the soil. There is little bare ground on the site and no noticeable erosion. Trend for the key browse species, Utah serviceberry, mountain big sagebrush, and bitterbrush is stable. Use is heavy on most of the bitterbrush and some of the serviceberry but vigor is good, percent decadence low, and reproduction adequate. Due to the mild winters of the past couple of years, it appears that sagebrush is only being lightly utilized at the present time. Sagebrush also shows good vigor, low decadence, and excellent reproduction. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has declined slightly while frequency of perennial forbs has increased slightly. The biggest change is the significant decline in nested frequency of thickspike wheatgrass.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 12

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	252	*76	74	32	3.03	.50
G	Bromus anomalus	-	1	-	1	-	.00
G	Carex spp.	77	70	35	31	2.00	2.02
G	Koeleria cristata	46	45	18	15	.48	.70
G	Poa fendleriana	288	295	80	77	3.47	8.97
G	Poa pratensis	62	46	21	12	1.85	2.92
G	Poa secunda	-	*19	-	7	-	.08
G	Stipa comata	27	*50	10	13	.79	2.86
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		752	602	238	188	11.64	18.08
Total for Grasses		752	602	238	188	11.64	18.08
F	Agoseris glauca	7	*27	5	12	.02	.57
F	Antennaria rosea	126	133	46	44	5.01	3.18
F	Androsace septentrionalis (a)	3	5	3	2	.01	.01
F	Arabis spp.	-	*12	-	4	-	.02

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
		F	<i>Arenaria fendleri</i>	50	*67	16	21
F	<i>Astragalus convallarius</i>	31	41	16	16	.37	.55
F	<i>Astragalus tenellus</i>	33	*17	16	11	.40	.72
F	<i>Aster</i> spp.	5	9	3	4	.04	.02
F	<i>Astragalus utahensis</i>	-	2	-	1	-	.03
F	<i>Balsamorhiza sagittata</i>	21	*7	11	4	.21	.08
F	<i>Castilleja linariaefolia</i>	-	1	-	1	-	.00
F	<i>Calochortus nuttallii</i>	2	-	1	-	.00	-
F	<i>Comandra pallida</i>	23	30	12	17	.13	.16
F	<i>Collinsia parviflora</i> (a)	39	-	18	-	.14	-
F	<i>Crepis acuminata</i>	63	78	33	39	.42	.58
F	<i>Delphinium bicolor</i>	1	-	1	-	.00	-
F	<i>Eriogonum alatum</i>	-	2	-	1	-	.00
F	<i>Erigeron eatonii</i>	62	*33	32	13	.38	.06
F	<i>Erigeron pumilus</i>	-	*23	-	12	-	.16
F	<i>Eriogonum umbellatum</i>	29	*43	12	18	.57	.92
F	<i>Lesquerella</i> spp.	-	4	-	1	-	.00
F	<i>Linum lewisii</i>	3	8	2	3	.03	.06
F	<i>Lupinus argenteus</i>	9	9	4	7	.08	.20
F	<i>Lychnis drummondii</i>	-	3	-	1	-	.00
F	<i>Penstemon caespitosus</i>	33	*-	13	-	.70	-
F	<i>Pedicularis centranthera</i>	7	-	3	-	.04	-
F	<i>Penstemon watsonii</i>	3	*45	2	18	.01	.70
F	<i>Phlox longifolia</i>	107	145	49	55	.49	.82
F	<i>Polygonum douglasii</i> (a)	89	*5	36	1	.18	.00
F	<i>Senecio integerrimus</i>	44	*-	19	-	.27	-
F	<i>Sphaeralcea coccinea</i>	2	-	1	-	.00	-
F	<i>Taraxacum officinale</i>	50	*28	24	12	.76	.13
F	<i>Thlaspi</i> spp.	-	4	-	2	-	.01
F	<i>Tragopogon dubius</i>	-	2	-	1	-	.00
F	Unknown forb-perennial	19	*-	6	-	.30	-
Total for Annual Forbs		131	10	57	3	0.33	0.01
Total for Perennial Forbs		730	773	327	318	11.20	11.01
Total for Forbs		861	783	384	321	11.53	11.03

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 10R, Study no: 12

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Amelanchier utahensis	35	39	4.67	4.26
B	Artemisia tridentata vaseyana	92	93	16.44	25.25
B	Chrysothamnus depressus	0	1	-	.03
B	Chrysothamnus viscidiflorus viscidiflorus	42	53	1.00	.87
B	Purshia tridentata	60	74	8.35	12.19
B	Symphoricarpos oreophilus	28	33	2.30	1.96
B	Tetradymia canescens	4	5	.15	.36
Total for Browse		261	298	32.93	44.93

CANOPY COVER --

Herd unit 10R, Study no: 12

Species	Percent Cover
	'00
Amelanchier utahensis	.40

BASIC COVER --

Herd unit 10R, Study no: 12

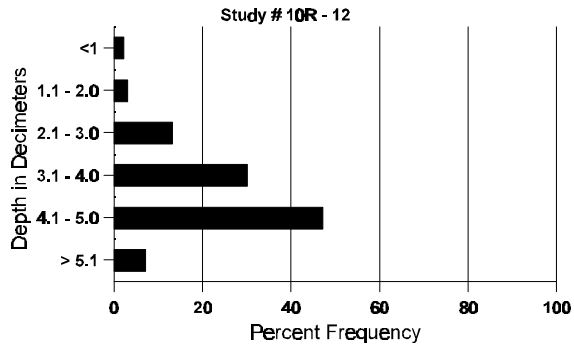
Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	472	452	44.94	62.26
Rock	10	9	.04	.03
Pavement	63	61	.95	.17
Litter	498	488	66.99	75.81
Cryptogams	72	23	.59	.41
Bare Ground	180	189	6.67	12.63

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 12

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
19.2	59.2 (16.7)	5.9	35.3	34.2	30.5	3.54	11.1	160.0	0.47

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 12

Type	Quadrat Frequency		Pellet Transect			
			Pellet Groups per Acre		Days Use per Acre (ha)	
	'97	'00	'97	'00	'97	'00
Rabbit	1	12	17	244	N/A	N/A
Elk	28	22	922	583	71 (175)	45 (111)
Deer	19	16	887	609	68 (168)	47 (116)
Cattle	-	-	17	35	1 (2)	3 (8)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 12

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4	5	6	7	8	9	1	2	3	4						
Amelanchier utahensis																				
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0		
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1		
Y	97	7	11	-	7	-	1	-	-	-	26	-	-	-	520			26		
	00	22	1	-	5	1	6	6	-	-	41	-	-	-	820			41		
M	97	-	9	8	1	7	-	-	-	-	25	-	-	-	500	51	59	25		
	00	-	1	1	3	6	5	4	-	-	18	1	1	-	400	60	55	20		
D	97	-	-	2	-	-	-	-	-	-	2	-	-	-	40			2		
	00	-	-	-	-	-	1	2	-	-	2	-	-	1	60			3		
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0		
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1		
% Plants Showing		<u>Moderate Use</u>									<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>% Change</u>	
'97		51%									21%				00%				+17%	
'00		14%									20%				03%					
Total Plants/Acre (excluding Dead & Seedlings)												'97	1060	Dec:	4%					
												'00	1280		5%					

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	97	31	-	-	-	-	-	-	-	-	31	-	-	-	620		31	
	00	46	-	-	3	-	-	-	-	-	49	-	-	-	980		49	
Y	97	48	5	-	3	-	-	-	-	-	56	-	-	-	1120		56	
	00	63	-	-	1	-	1	-	-	-	65	-	-	-	1300		65	
M	97	91	84	5	-	-	-	-	-	-	180	-	-	-	3600	27	36	180
	00	216	21	-	2	-	2	1	-	-	236	3	3	-	4840	27	30	242
D	97	2	1	-	-	-	1	-	-	-	1	-	-	3	80		4	
	00	43	11	-	8	-	-	-	-	-	59	-	-	3	1240		62	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	860		43	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	660		33	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		38%			03%			01%			+35%							
'00		09%			.81%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	4800	Dec:	2%			
												'00	7380		17%			
<i>Chrysothamnus depressus</i>																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	2	-	-	-	-	-	2	-	-	-	40	2	4	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	40		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	00	36	-	-	4	-	-	1	-	-	41	-	-	-	820		41	
M	97	78	-	-	-	-	-	-	-	-	78	-	-	-	1560	11	12	78
	00	112	-	1	5	-	-	1	-	-	119	-	-	-	2380	10	9	119
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	1	-	-	-	-	2	-	-	2	80		4	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+50%							
'00		.60%			.60%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	1640	Dec:	0%			
												'00	3280		2%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20		1	
Y	97	4	5	1	3	-	-	-	-	-	13	-	-	-	260		13	
	00	8	1	-	-	-	-	1	-	-	10	-	-	-	200		10	
M	97	-	3	9	10	40	35	-	-	-	97	-	-	-	1940	14	27	97
	00	-	1	12	-	14	42	12	-	27	108	-	-	-	2160	14	28	108
D	97	-	-	-	-	1	4	-	-	-	4	-	-	1	100		5	
	00	-	-	-	1	-	15	1	-	13	22	-	-	8	600		30	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		43%			43%			.86%			+22%							
'00		11%			74%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	2300	Dec:	4%				
											'00	2960		20%				
Symphoricarpos oreophilus																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	97	9	2	-	5	-	-	-	-	-	16	-	-	-	320		16	
	00	26	-	-	3	-	3	2	-	-	34	-	-	-	680		34	
M	97	12	6	6	15	-	-	-	-	-	39	-	-	-	780	13	20	39
	00	19	-	-	4	-	-	4	-	-	27	-	-	-	540	14	19	27
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		15%			11%			00%			+11%							
'00		00%			05%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	1100	Dec:	0%				
											'00	1240		2%				
Tetradymia canescens																		
M	97	2	-	1	1	-	-	-	-	-	4	-	-	-	80	13	14	4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	14	0
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	3	-	1	-	-	-	6	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			25%			00%			+33%							
'00		00%			17%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	80	Dec:	0%				
											'00	120		100%				

Trend Study 10R-13-00

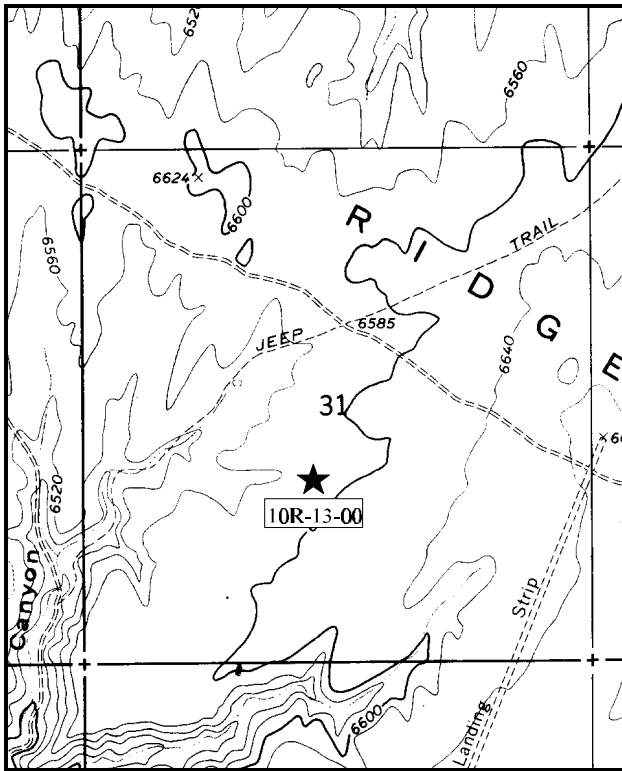
Study site name: Lower McCook Ridge Livestock Exclosure. Range type: Desert Shrub.

Compass bearing: frequency baseline 81°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

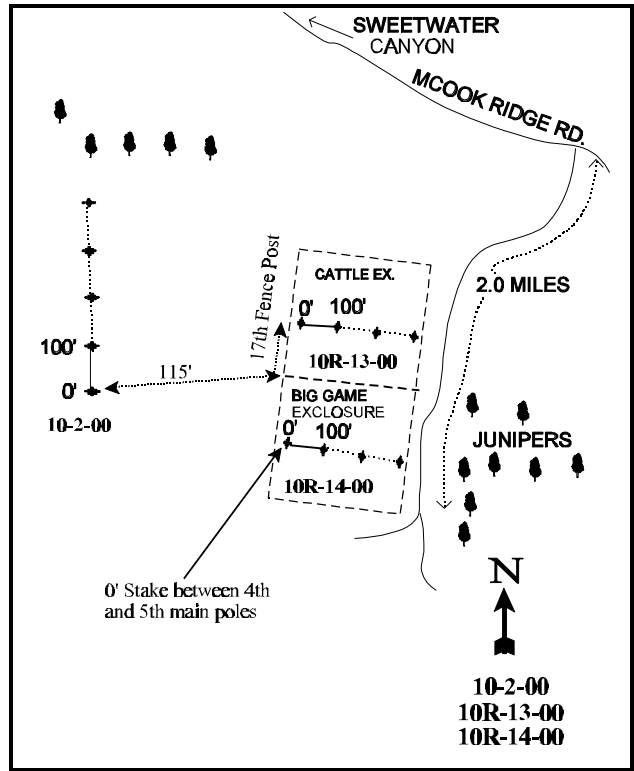
LOCATION DESCRIPTION

From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles. A large exclosure can be seen off the south side of the road. From the southwest corner of the livestock exclosure count down 17 fenceposts to the 0-foot baseline stake. The frequency baseline is marked by green fenceposts, 12-18 inches tall.



Map Name: Cooper Canyon.

Township 13S, Range 24E, Section 31



Diagrammatic Sketch

UTM 4389198 N, 647916 E

DISCUSSION

Trend Study No. 10R-13

The Lower McCook Ridge Livestock Enclosure study is located within the Lower McCook Ridge enclosure complex. The enclosure was constructed in 1964 and is approximately 300 feet by 500 feet. The trend study is located within the livestock enclosure and was established in 1997. The site has a slight southwest aspect and a 2-3% slope with an elevation of 6,600 feet. A pellet group transect in the livestock enclosure estimated 96 elk days use/acre (237 edu/ha) and 59 deer days use/acre (146 ddu/ha) in 1997. Pellet group data from 2000 estimate about the same level of deer use at 64 deer days use/acre (158 ddu/ha), but much lighter elk use at 12 elk days use/acre (30 edu/ha). This much lighter use by elk in 2000 is most likely due to several consecutive mild winters which did not force elk down to this important wintering area.

Vegetation cover is abundant with most being provided aurally by the browse species (72% in both 1997 and 2000). Litter cover was moderate in 1997 (35%) with most contributed by cheatgrass. Cover from litter increased in 2000 to over 51%. Effective rooting depth (see methods) was found to be nearly 15 inches with a majority of the rock (56%) in the soil profile found between 12 and 15 inches below the soil surface. Rock and pavement combined provided just 9% cover in 1997, decreasing to less than 4% in 2000. Percent bare ground represented 21% and 27% cover respectively in 1997 and 2000. There are some signs of past soil movement. However, at the present, erosion is not severe. Cryptogam cover is low and found mostly underneath the shrub crowns. Average soil temperature is 61°F at nearly 20 inches in depth.

There are several important browse species on this site including: basin big sagebrush, fourwing saltbush, and winterfat. Sagebrush on the site has characteristics of both basin big sagebrush (*Artemisia tridentata tridentata*) and Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). Identification was difficult due to the high level of hybridization, as a result, all sagebrush were classified as basin big sagebrush. Sagebrush is the dominant browse species and was estimated at 5,780 plants/acre in 1997, and 6,900 plants/acre in 2000. These plants average nearly two feet in height with a two foot crown. Sagebrush cover was estimated at nearly 22% in 2000. Over half of the population showed moderate to heavy use in both 1997 and 2000. Heavy use was estimated at 25% in 1997, increasing slightly to 30% in 2000. This level of use coupled with the smaller growth form is more indicative of Wyoming big sagebrush than basin big sagebrush. Percent decadency was quite low at 10% in 1997, but increased to 31% in 2000. The proportion of decadent plants classified as dying is currently low at 10%. Young recruitment is moderate at 14% in 2000, which is adequate to replace any individuals lost to die-off. The dead to live ratio is 1:13 which is acceptable for a moderately long lived species.

Fourwing saltbush provides just over 16% of the browse cover in 1997 and 2000. It has a relatively high density for fourwing saltbush at 1,100 plants/acre in 2000. This is an overly mature population with high decadency in both sampled years (over 60%). Use is mostly light to moderate with only 13% showing heavy use in 2000. Fourwing was noted as having very few seed stalks in both 1997 and 2000. Recruitment and reproductive potential (number of seedlings) are currently ('00) zero with no young or seedlings being sampled. Winterfat has a moderate density estimated of 5,920 plants/acre in 2000. Winterfat has a mostly mature population with low percent decadency (14%). Although percent decadency is relatively low, this is an increase from 3% in 1997. Currently, recruitment is low at 2%. Use is mostly light to moderate with good vigor on all but 3% of the population. Mature winterfat plants average only eight inches in height with an eight inch crown.

Other browse present on the site are fringed sagebrush, broom snakeweed, and cactus. Fringed sagebrush had an estimated density of 6,260 plants/acre in 1997, this slightly increased to 6,500 plants/acre in 2000. This species could increase in the future if the estimated 10,620 seedlings/acre sampled in 2000 are able to persist and mature. Use on fringed sagebrush is mostly light at this particular site, although on some ranges it is considered important fall, winter, and spring forage.

Cheatgrass appears in scattered dense patches throughout the area with other interspaces between the basin big sagebrush being bare. Cheatgrass is the dominant herbaceous species which provides 65% of the herbaceous cover and 18% of the total vegetative cover in 1997. Due to the drought in 2000, cheatgrass decreased in frequency and cover and currently makes up only 36% of the herbaceous cover or 10% of the total vegetative cover. However, even with this significant decrease, cheatgrass is still the single most abundant herbaceous species. Perennial grasses are few and consist of thickspike wheatgrass, Indian ricegrass, Sandberg bluegrass, and bottlebrush squirreltail. As a group, perennial grasses provide more cover than cheatgrass. All of these perennial species remained at stable frequencies in 2000 with the exception of squirreltail which significantly increased. Grasses had not been utilized when the site was read in June 2000.

Forbs contribute very little to the herbaceous understory with scarlet globemallow providing the most cover. Two annual species were encountered, annual stickseed and tumble mustard, but neither are abundant. All forbs combined provide less than 1% cover.

1997 APPARENT TREND ASSESSMENT

Soils are alluvially deposited and loamy in texture, with some rock and pavement on the surface (<10%). There are signs of past soil movement, yet erosion is not severe at this time. Vegetation and litter cover values are high enough to protect the soil from most wind and water erosion events. Pellet groups were abundant with an estimated 96 elk days use/acre and 59 deer days use/acre. Basin big sagebrush is moderately utilized and appears to have a good age structure. The basin big sagebrush shows more utilization than winterfat, probably due to its availability during periods of snow cover. Winterfat is only lightly hedged with a predominately mature age structure and very low biotic potential this year. Fourwing saltbush is light to moderately hedged with 61% of the population reported as decadent. Mature plants are relatively large (2½ feet by a 3 foot crown) with 16% of the fourwing saltbush population classified as dying. The herbaceous understory is dominated by cheatgrass. Cheatgrass is scattered throughout the site in dense patches, leaving few areas where perennial species may be able to withstand cheatgrass competition. The thickspike wheatgrass plants are small statured, usually containing only one culm with one or two leaves. Sandberg bluegrass appeared in small clumps with good vigor. Forbs are nearly nonexistent on this site. The herbaceous understory could be used as an indicator of trend in the future.

2000 TREND ASSESSMENT

Trend for soil is fairly stable. Average cover of vegetation and litter both increased and should counter the slight increase in bare soil. Sum of nested frequency for perennial herbaceous species increased in 2000 as well, which is a positive factor for holding soils in place. Trend for browse is stable. The key species, most likely a hybrid between basin big sagebrush and Wyoming big sagebrush, has shown a slight increase in heavy use and percent decadence has increased from 10% to 30%. However, vigor remains good and young recruitment is more than adequate to maintain the population. Trend for the herbaceous understory is slightly up as perennial species increased in sum of nested frequency and cheatgrass decreased in frequency due to drought.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 13

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	<i>Agropyron dasystachyum</i>	18	28	6	8	.49	2.15
G	<i>Bromus tectorum</i> (a)	339	*241	82	68	5.82	4.84
G	<i>Oryzopsis hymenoides</i>	1	1	1	1	.15	.18
G	<i>Poa secunda</i>	131	116	43	42	1.31	2.68
G	<i>Sitanion hystrix</i>	43	*107	19	38	.44	2.74
Total for Annual Grasses		339	241	82	68	5.82	4.84
Total for Perennial Grasses		193	252	69	89	2.40	7.75
Total for Grasses		532	493	151	157	8.22	12.59
F	<i>Arabis</i> spp.	2	-	1	-	.00	-
F	<i>Castilleja</i> spp.	-	*6	-	3	.03	.01
F	<i>Descurainia pinnata</i> (a)	23	*3	14	1	.07	.00
F	<i>Erigeron</i> spp.	12	*-	6	-	.05	-
F	<i>Erigeron pumilus</i>	13	*42	6	18	.09	.22
F	<i>Lappula occidentalis</i> (a)	8	6	5	2	.02	.03
F	<i>Phlox longifolia</i>	-	1	-	1	-	.00
F	<i>Schoenrambe linifolia</i>	19	*-	9	-	.04	-
F	<i>Sphaeralcea coccinea</i>	57	63	22	22	.41	.53
F	<i>Tragopogon dubius</i>	-	*17	-	7	-	.08
Total for Annual Forbs		31	9	19	3	0.09	0.03
Total for Perennial Forbs		103	129	44	51	0.63	0.85
Total for Forbs		134	138	63	54	0.73	0.89

* Indicates significant difference at % = 0.10

BROWSE TRENDS --
Herd unit 10R, Study no: 13

Type	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Artemisia frigida	66	69	2.56	3.62
B	Artemisia tridentata tridentata	75	78	13.35	21.68
B	Atriplex canescens	35	36	3.79	5.64
B	Ceratoides lanata	61	66	3.03	2.51
B	Gutierrezia sarothrae	7	19	.15	.19
B	Opuntia spp.	5	5	.15	.38
B	Sclerocactus	0	1	-	-
Total for Browse		249	274	23.06	34.05

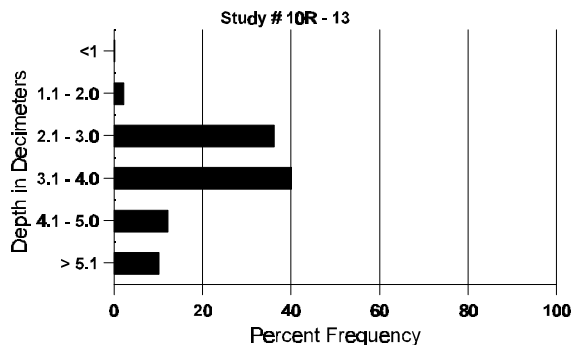
BASIC COVER --
Herd unit 10R, Study no: 13

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	408	397	32.47	45.88
Rock	96	54	.75	.20
Pavement	330	258	8.74	3.42
Litter	484	465	35.06	51.30
Cryptogams	219	107	3.60	1.75
Bare Ground	328	350	21.07	27.85

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 13

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.6	61.4 (20.0)	6.7	31.0	37.8	31.2	4.98	7.15	153.6	0.65

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 13

Type	Quadrat Frequency		Pellet Transect			
			Pellet Groups per Acre		Days Use per Acre (ha)	
	'97	'00	'97	'00	'97	'00
Rabbit	10	12	17	52	N/A	N/A
Elk	18	16	1253	157	96 (238)	12 (30)
Deer	36	41	766	827	59 (145)	64 (158)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 13

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia frigida																	
S	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5
	00	531	-	-	-	-	-	-	-	-	531	-	-	-	10620		531
Y	97	35	-	-	4	-	-	-	-	-	39	-	-	-	780		39
	00	19	-	-	-	-	-	-	-	-	19	-	-	-	380		19
M	97	249	-	-	23	-	-	-	-	-	272	-	-	-	5440	13 10	272
	00	243	50	-	-	-	-	2	-	-	295	-	-	-	5900	5 8	295
D	97	1	1	-	-	-	-	-	-	-	1	-	-	1	40		2
	00	5	4	2	-	-	-	-	-	-	7	4	-	-	220		11
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'97		.31%			00%			.31%			+ 4%						
'00		17%			.61%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	6260	Dec:	1%		
												'00	6500		3%		

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata tridentata</i>																		
S	97	17	-	-	3	-	-	-	-	-	20	-	-	-	400		20	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	97	62	13	1	15	-	-	-	-	-	91	-	-	-	1820		91	
	00	37	13	-	-	-	-	-	-	-	50	-	-	-	1000		50	
M	97	27	82	59	1	-	-	-	-	-	169	-	-	-	3380	24	29	
	00	26	97	47	13	1	4	-	-	-	188	-	-	-	3760	20	26	
D	97	8	6	13	-	2	-	-	-	-	19	-	-	10	580		29	
	00	12	26	51	-	15	3	-	-	-	96	-	-	11	2140		107	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	540		27	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	520		26	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		36%			25%			03%			+16%							
'00		44%			30%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	5780	Dec:	10%				
											'00	6900		31%				
<i>Atriplex canescens</i>																		
Y	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
M	97	8	4	2	-	-	-	-	-	-	14	-	-	-	280	30	35	
	00	9	9	-	-	-	-	-	-	-	18	-	-	-	360	31	38	
D	97	11	11	2	3	-	-	-	-	-	20	-	-	7	540		27	
	00	18	5	3	5	-	4	2	-	-	30	-	-	7	740		37	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'97		34%			09%			16%			+20%							
'00		25%			13%			13%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	880	Dec:	61%				
											'00	1100		67%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Ceratoides lanata																		
S	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	97	12	4	-	3	2	-	-	-	-	21	-	-	-	420		21	
	00	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	97	102	75	35	5	2	-	-	-	-	218	-	-	1	4380	10	11	219
	00	143	73	5	27	-	-	-	-	-	248	-	-	-	4960	8	8	248
D	97	-	2	6	-	-	-	-	-	-	8	-	-	-	160		8	
	00	12	24	2	-	-	3	-	-	-	32	-	-	9	820		41	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		34%			17%			.40%			+16%							
'00		33%			03%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	4960	Dec:	3%				
											'00	5920		14%				
Gutierrezia sarothrae																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	97	15	-	-	-	-	-	-	-	-	15	-	-	-	300	8	8	15
	00	39	-	-	-	-	-	-	-	-	39	-	-	-	780	5	7	39
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+64%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	300	Dec:	-				
											'00	840		-				
Juniperus osteosperma																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	0	Dec:	-				
											'00	0		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Opuntia spp.																	
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	97	9	-	-	-	-	-	-	-	-	9	-	-	-	180	5 9	9
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160	3 9	8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'97		00%			00%			00%			+ 0%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	180	Dec:	-		
												'00	180		-		
Sclerocactus																	
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'97		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-		
												'00	20		-		

Trend Study 10R-14-00

Study site name: Lower McCook Ridge Total Exclosure .

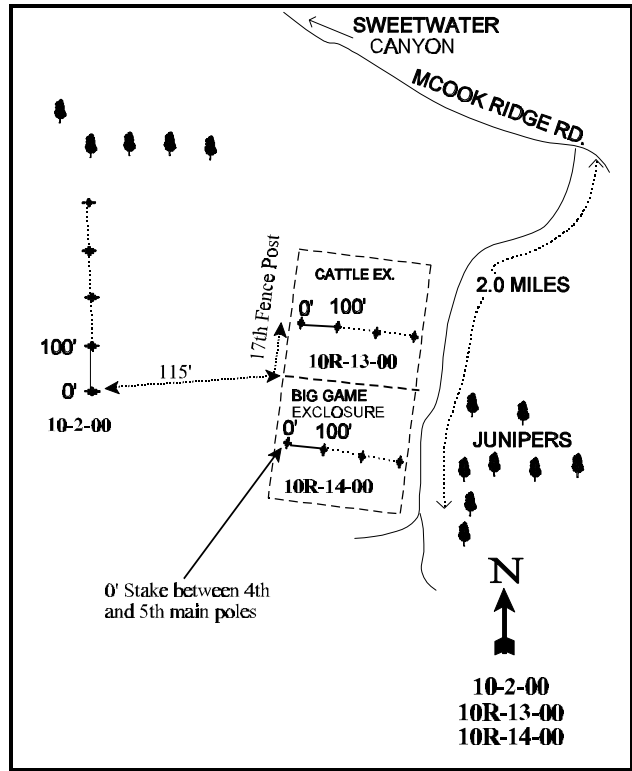
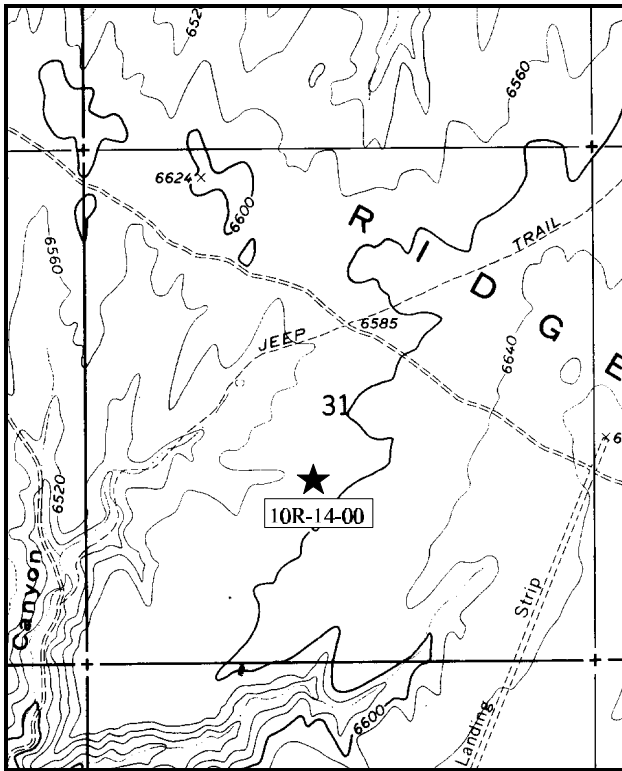
Range type: Desert Shrub .

Compass bearing: frequency baseline 83°M.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

LOCATION DESCRIPTION

From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles. A large exclosure can be seen off the south side of the road. Go inside the total exclosure. The 0-foot stake is on the west side between the 4th and 5th main poles of the fence. The 0-foot stake is marked with browse tag number 78. The frequency baseline is marked by green fenceposts, 12-18 inches tall.



Map Name: Cooper Canyon .

Diagrammatic Sketch

Township 13S, Range 24E, Section 31

UTM. 4389198 N, 647916 E

DISCUSSION

Trend Study No. 10R-14

The Lower McCook Ridge Total Exclosure study is located within the Lower McCook Ridge exclosure complex. The exclosure was constructed in 1964 and is approximately 300 feet by 125 feet. The trend study was established in 1997. It samples inside of the total exclosure which excludes grazing. The site has a slight southwest aspect with a 2-3% slope and an elevation of 6,600 feet.

Percent bare ground is relatively low on this site, estimated at 7% in 1997, and 10% in 2000. Past erosion is apparent with pedestaling around shrubs, yet there are no signs of recent erosion events. Most of the protective ground cover comes from vegetation and litter, with much of this coming from cheatgrass. Vegetation provided nearly 52% cover in 1997, this decreased somewhat in 2000 to about 39%. The decrease is due to the drastic decrease in cheatgrass cover in 2000 due to drought. Litter provided 61% cover in 1997, increasing to 76% in 2000. There is a soil gradient with deeper soils down slope (west) and more shallow soils up slope (east). Average effective rooting depth (see methods) down slope was 32 inches, while up slope average rooting depth was 15 inches. Coinciding with the average rooting depth is the amount of rock found within the soil profile. A stony profile was encountered at an average of 27 inches down slope and 11 inches up slope. It was observed that less cheatgrass and more young basin big sagebrush plants were associated with the more shallow soils, while the opposite was observed with the deeper soils. Average soil temperature over the whole site is 60°F at 20 inches in depth.

Winterfat has the highest browse density in the total exclosure with an estimated 8,020 plants/acre in 1997, and 9,060 plants/acre in 2000. These plants are relatively larger (17 inches x 19 inches) than the plants in the adjacent livestock exclosure (8 inches x 8 inches) and outside the exclosure (8 inches x 9 inches) sites. This population has a mostly mature age structure with low biotic potential (number of seedlings) and recruitment from young plants. Decadency was low in 1997 at 8%, but increased to 37% in 2000. With no use inside the total exclosure, this increase in decadency could be due to drought and/or old age in a mostly mature population. Vigor for these plants is good with only 2% of the population classified as dying in both 1997 and 2000.

Fourwing saltbush has an estimated density of 1,280 plant/acre in 1997 and 1,160 plants/acre in 2000. Percent decadency has been moderately high in 1997 and 2000 at 41% and 40% respectively. Poor vigor decreased from 14% in 1997 to 5% in 2000. Recruitment was very low at 2% in 1997, with no young plants sampled in 2000. These plants are quite large averaging 38 inches in height with a crown of 52 inches in 2000. Currently, the dead to live ratio is 1:15. Fringed sagebrush was also encountered and has an estimated density of 4,620 plants/acre in 2000. The population has a mostly mature age structure with good vigor and a high biotic potential of 2,060 seedlings/acre in 2000.

Sagebrush on the site has characteristics of basin big sagebrush (*Artemisia tridentata tridentata*) and Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). Identification was difficult due to the level of hybridization resulting in all sagebrush being classified as basin big sagebrush. Basin big sagebrush had an estimated density of 1,200 plants/acre in 2000. Inside the total exclosure, basin big sagebrush is found mainly along the fence line on the more shallow soils along the east fence where cheatgrass is less dense. Other basin big sagebrush plants were observed along the fence on deep and shallow soils with the deeper soils having a lower abundance of seedlings compared to the more shallow soils. In 1997, the seedlings (2,480 plants/acre) were encountered only under three mature shrubs. Seedlings were estimated at only 80 per acre in 2000, with recruitment from young plants being high at 81% in 1997 and 68% in 2000. The sagebrush population has good vigor and shows light use in both 1997 and 2000.

In 1997, cheatgrass provided nearly 29% average cover, had a nested frequency of 473 out of a possible 500, and was found in 99% of the quadrats. Due to drought in 2000, cheatgrass was much less abundant and decreased to only 2% cover, had a nested frequency of 178, and was sampled in only 61% of the quadrats. Perennial herbaceous species are found sporadically on this site with only three perennial grasses and four perennial forbs sampled in 1997 and 2000. Perennial grasses include: thickspike wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail. These species combine for just over 1% cover and a quadrat frequency of 15% in 2000. Perennial forbs increased in nested and quadrat frequencies in 2000 with prickly lettuce and yellow salsify being the most abundant. Grasses and forbs combined provide only 13% of the total vegetative cover at this site.

1997 APPARENT TREND ASSESSMENT

Soils are alluvially deposited, loamy in texture, with some rock and pavement on the surface (~2%). There are signs of past soil movement, but movement is not severe at this time. Vegetation and litter cover values are high enough to protect the soil from both wind and water erosion. This site exhibits the effects of a soil depth gradient. It was observed that areas with more shallow soil on the site did not support as dense a stand of cheatgrass as do the areas with deeper soils. It was also observed that basin big sagebrush was basically restricted to the edge of the enclosure with none found in the middle. The middle of the enclosure was dominated by fringed sagebrush, winterfat, and a few scattered fourwing saltbush plants. Winterfat accounts for 54% of the browse cover and has the highest estimated browse density with 8,020 plants/acre. The herbaceous understory is of extremely poor composition with cheatgrass dominating both nested and quadrat frequencies. With such a dense stand of cheatgrass, shrub recruitment will be suppressed and will be detrimental to the reproductive success of the shrub populations.

2000 TREND ASSESSMENT

Trend for soil is stable. Bare ground only slightly increased with drought, while vegetation and litter cover combined remain very high and adequate to prevent serious erosion. Trend for browse is stable overall. The main negative factor is the increased decadency in winterfat from 8% to 37%. Vigor remains generally good and very few of the decadent plants are classified as dying. With normal precipitation, decadency will most likely decrease. Fourwing saltbush shows a stable, but overly mature population with decadency staying nearly the same at 41%. No seedling or young plants were sampled in 2000. A hybrid of basin big sagebrush and Wyoming big sagebrush shows increased density and high recruitment. Vigor is good and no decadent plants were sampled in either 1997 or 2000. Trend for the herbaceous understory is slightly up with perennial species increasing in sum of nested frequency. Cheatgrass was also greatly reduced due to drought.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 14

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	5	*23	1	7	.15	.84
G	Bromus tectorum (a)	473	*178	99	61	28.89	2.16
G	Poa secunda	9	11	3	5	.36	.12
G	Sitanion hystrix	1	6	1	3	.03	.18
Total for Annual Grasses		473	178	99	61	28.89	2.16
Total for Perennial Grasses		15	40	5	15	0.54	1.14
Total for Grasses		488	218	104	76	29.44	3.30
F	Descurainia pinnata (a)	16	25	8	10	.23	.13
F	Draba spp. (a)	-	2	-	1	-	.00
F	Lappula occidentalis (a)	3	5	2	3	.01	.01
F	Lactuca serriola	-	*61	-	24	-	.88
F	Sisymbrium altissimum (a)	-	1	-	1	-	.00
F	Sphaeralcea coccinea	25	31	8	14	.31	.36
F	Taraxacum officinale	-	-	-	-	.00	-
F	Tragopogon dubius	9	*45	5	19	.07	.61
Total for Annual Forbs		19	33	10	15	0.24	0.15
Total for Perennial Forbs		34	137	13	57	0.38	1.85
Total for Forbs		53	170	23	72	0.63	2.01

* Indicates significant difference at % = 0.10

BROWSE TRENDS --
Herd unit 10R, Study no: 14

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'00	'97	'00
B	Artemisia frigida	41	58	2.42	5.33
B	Artemisia tridentata tridentata	7	6	1.33	2.62
B	Atriplex canescens	45	44	7.39	12.48
B	Ceratoides lanata	94	93	13.34	13.75
Total for Browse		187	201	24.50	34.18

BASIC COVER --

Herd unit 10R, Study no: 14

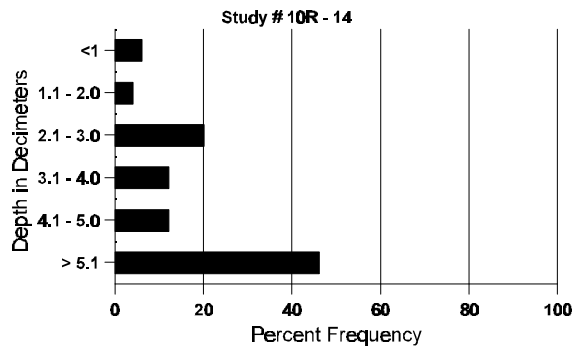
Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	484	331	51.66	38.90
Rock	39	6	.13	.01
Pavement	118	121	1.81	.74
Litter	497	492	61.01	76.09
Cryptogams	150	35	3.45	.23
Bare Ground	145	207	7.03	10.85

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 14

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
25.9	59.6 (20.0)	6.7	31.0	37.8	31.2	4.98	7.15	153.6	0.65

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 14

Type	Quadrat Frequency	
	'97	'00
Rabbit	2	6

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 14

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia frigida</i>																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	103	-	-	-	-	-	-	-	-	103	-	-	-	2060		103	
Y	97	8	-	-	3	-	-	-	-	-	11	-	-	-	220		11	
	00	31	-	-	-	-	-	-	-	-	31	-	-	-	620		31	
M	97	104	-	-	-	-	-	-	-	-	104	-	-	-	2080	15 16	104	
	00	183	-	-	-	-	-	2	-	-	185	-	-	-	3700	6 13	185	
D	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	15	-	-	-	-	-	-	-	-	15	-	-	-	300		15	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	2320	Dec:	1%				
											'00	4620		6%				
<i>Artemisia tridentata tridentata</i>																		
S	97	46	-	-	78	-	-	-	-	-	124	-	-	-	2480		124	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	97	16	-	-	10	-	-	-	-	-	26	-	-	-	520		26	
	00	41	-	-	-	-	-	-	-	-	41	-	-	-	820		41	
M	97	6	-	-	-	-	-	-	-	-	6	-	-	-	120	33 37	6	
	00	19	-	-	-	-	-	-	-	-	19	-	-	-	380	30 31	19	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%			+47%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	640	Dec:	-				
											'00	1200		-				
<i>Atriplex canescens</i>																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	97	37	-	-	-	-	-	-	-	-	37	-	-	-	740	35 42	37	
	00	27	-	-	8	-	-	-	-	-	35	-	-	-	700	38 52	35	
D	97	26	-	-	-	-	-	-	-	-	17	-	-	9	520		26	
	00	12	-	-	9	1	-	1	-	-	20	-	-	3	460		23	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			14%			- 9%							
'00		02%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'97	1280	Dec:	41%				
											'00	1160		40%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex confertifolia																		
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	33	33	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			
Ceratoides lanata																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	97	42	-	-	6	-	-	-	-	-	48	-	-	-	960		48	
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240		12	
M	97	299	-	-	22	-	-	-	-	-	321	-	-	-	6420	23	18	321
	00	253	-	-	20	-	-	-	-	1	274	-	-	-	5480	17	19	274
D	97	25	-	-	7	-	-	-	-	-	22	-	-	10	640		32	
	00	129	-	-	38	-	-	-	-	-	157	-	-	10	3340		167	
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			02%			+11%							
'00		00%			.22%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	8020	Dec:	8%			
												'00	9060		37%			
Juniperus osteosperma																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'97		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'97	0	Dec:	-			
												'00	0		-			

LOWER MCCOOK RIDGE EXCLOSURE COMPARISON SUMMARY

Trend Study No. 10-2 (outside), 10R-13 (livestock), and 10R-14 (total)

2000 Trend Data Comparisons

	<u>Outside Exclosure</u>	<u>Livestock Exclosure</u>	<u>Total Exclosure</u>
Big sagebrush			
Average Cover	12.0	21.7	2.6
Density (plants/acre)	3,980	6,900	1,200
% young	32 (1,274/acre)	14 (966/acre)	68 (816/acre)
% decadent	26 (331/acre)	31 (299/acre)	0
% decadent/ dying	35 (116/acre)	10 (30/acre)	0
% poor vigor	9	3	0
% heavy use	13	30	0
Winterfat			
Average Cover	2.2	2.5	13.8
Density (plants/acre)	7,020	5,920	9,060
% young	3 (211/acre)	2 (118/acre)	3 (271/acre)
% decadent	10 (702/acre)	14 (829/acre)	37 (3,352/acre)
% decadent/ dying	6 (42/acre)	22 (182/acre)	6 (201/acre)
% poor vigor	0.6	3	2
% heavy use	21	3	0
Fourwing saltbush			
Average Cover	2.6	5.6	12.5
Density (plants/acre)	700	1,100	1,160
% young	0	0	0
% decadent	40 (280/acre)	67 (737/acre)	40 (464/acre)
% decadent/ dying	0	19 (140/acre)	13 (60/acre)
% poor vigor	0	13	5
% heavy use	3	13	0

The Lower McCook Ridge area is important big game winter range. Several important key browse species are present in the area including: big sagebrush, winterfat, and fourwing saltbush. The table above compares some of the key browse parameters for these three species. Differences in densities for these species, especially

sagebrush, may be the result of several factors including: grazing regimes, interspecific and intraspecific competition, small sampled area, timing of precipitation, and a non-homogeneous landscape.

Big sagebrush was classified as basin big sagebrush, but is most likely a hybrid between basin big sagebrush and Wyoming big sagebrush. Density varies between the exclosures with the total exclosure having the least amount of sagebrush plants, the livestock exclosure having the most, and outside the exclosure being intermediate. Recruitment from the young age class is currently high in all treatments with 14% young in the livestock exclosure, 32% outside the exclosure, and 68% in the total exclosure. The rate of decadency is highest in the livestock exclosure, slightly lower outside the exclosure, with no decadency found in the total exclosure. Average cover is highest in the livestock exclosure, intermediate outside the exclosure, and lowest in the total exclosure. There are several possible explanations for the differences in population parameters for sagebrush between exclosures. The highest level of recruitment occurs in the total exclosure where the sagebrush density is lowest, but with no use, each plant has more seed from year to year which increases the probability of young plants becoming established from seed. Also, with a lower density of sagebrush, there is less intraspecific competition with young plants to become established. The lowest recruitment is found in the livestock exclosure which also has the highest sagebrush density and average cover. Competition is greatest here with high density and cover and it appears that this could be negatively affecting the establishment of younger plants. Extended drought adds to the problem with less resources being available and more stress being placed on individual plants.

Conversely, winterfat has the highest density inside the total exclosure, is intermediate outside the exclosure, and is lowest inside the livestock exclosure. Recruitment from young plants is very low on all three transects. Decadency is lowest outside the exclosure, intermediate in the livestock exclosure, and highest inside the total exclosure. Heavy use is highest outside the exclosure at 21%, decreasing to 3% in the livestock exclosure, with no heavy use in the total exclosure. These levels of heavy use are not extreme, and with no use on winterfat inside the total exclosure, and very little heavy use in the livestock exclosure, it appears that factors other than utilization are likely responsible, at least in part, for higher rates of decadency on winterfat. It is interesting to note that winterfat cover is about 6 times greater in the total exclosure than in both the livestock exclosure and outside the exclosure. Average height and crown measurements in 2000 show winterfat inside the total exclosure to be twice that of winterfat in either of the other two transects. With the highest density, highest cover, and largest individuals occurring inside the total exclosure, it is likely that competition is greater here and may be responsible for the highest rate of decadency inside the total exclosure. Precipitation, or the lack of in recent years, most likely plays a role as well, especially summer precipitation for a warm season species.

Fourwing saltbush has similar densities in the total and livestock exclosures, with a lower density outside the exclosure. Percent decadency is highest inside the livestock exclosure, and the same in the total exclosure and outside. Heavy use is low outside the exclosure (3%) and inside the livestock exclosure (13%). As with winterfat, the high decadency rate of fourwing saltbush is likely due more to drought and/or competition as much as anything.

Trend Study 10R-15-00

Study site name: Saddle Horse.

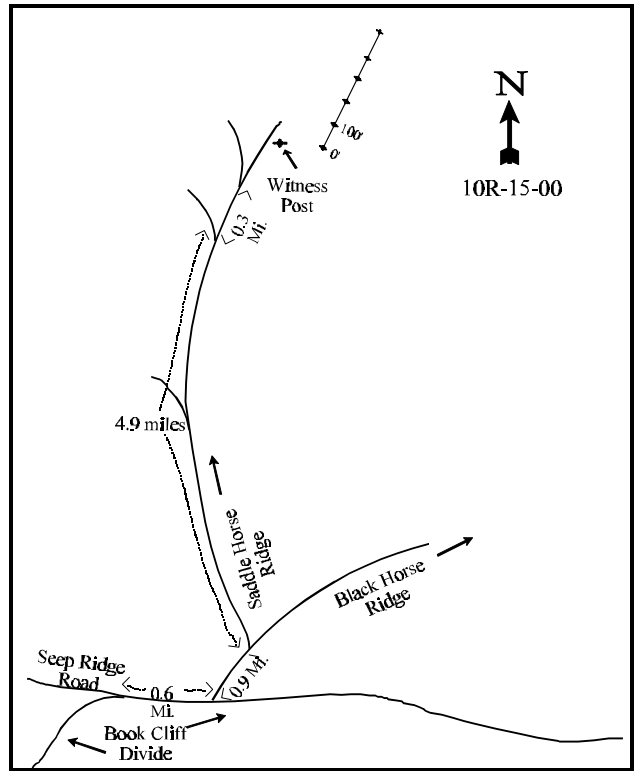
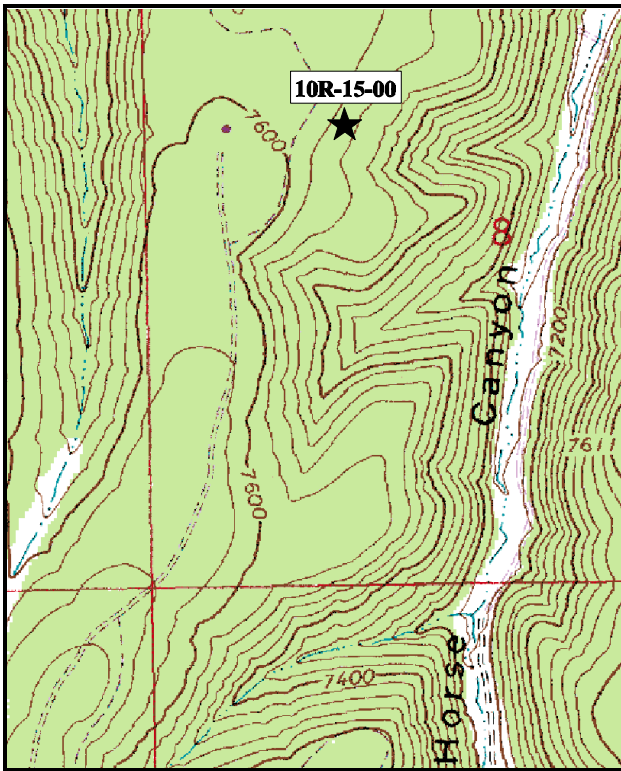
Range type: Mountain Brush.

Compass bearing: frequency baseline 40°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

LOCATION DESCRIPTION

From the intersection of Seep Ridge road and Book Cliffs Divide road, continue 0.6 miles to an intersection with the road to Black Horse Ridge. Turn left here and go 0.9 miles to the intersection with the road to Saddle Horse Ridge. Go left here and continue 5.2 miles to the third fork (staying right through two forks). From the third fork the witness post is approximately 200 feet on the right side of the road. From the witness post the 0' stake is 43 paces at 100°M.



Map name: Seep Canyon

Diagrammatic Sketch

Township 15 S, Range 24 E, Section 8.

UTM 4376915.643 N, 649791.738 E

DISCUSSION

Trend Study No. 10R-15

The Saddle Horse trend study was established in 1998. It samples a 1960's chaining on Saddle Horse Ridge which is between PR Canyon and Black Horse Canyon. The site now supports a mixed mountain brush community. It has a slope of 8% to 11%, a southeast aspect, and an elevation of about 7,540 feet. The area is used moderately heavy by elk, but there is little cattle use here since there is no available water on the ridge. There are plans to pipe water to a trough about 1/4 of a mile from the study site. Pellet group data from 1997 estimated 78 elk, 11 deer and 6 cow days use/acre (193 edu/ha, 27 ddu/ha and 15 cdu/ha). Use was lower in 2000 with 36 elk and 15 deer days use/acre estimated (89 edu/ha and 37 ddu/ha). Rabbit droppings were also common. Season of use for big game appears to be fall, spring and early summer.

Soil on the site is moderately deep with an effective rooting depth estimated at just over 16 inches. It has a sandy clay loam to sandy loam texture with a neutral pH. Phosphorus may be limiting at 8.4 ppm, as values less than 10 ppm may limit normal plant growth and development. Rock and pavement are not abundant on the surface, but widely variable sized rocks are found throughout the soil profile. Calcium carbonate deposits are common on rocks within the soil, some up to 1/4 inch thick. Erosion does not appear to be a problem. There is some minor soil pedestaling observed around shrubs but vegetation and litter cover are adequate to prevent significant erosion.

The site supports a variety of browse, with the key species being mountain big sagebrush, true mountain mahogany, and bitterbrush. Mountain big sagebrush is the most abundant shrub with a current ('00) density of 1,080 plants/acre. It is mostly lightly browsed, in good vigor, and has low percent decadence. Sagebrush is not the preferred shrub in this area due to the apparent season of use for big game (spring/fall). The key shrub with respect to abundance and preference is bitterbrush. It provides about 1/3 of the total shrub cover with a current ('00) density of 800 plants/acre. Bitterbrush has a prostrate spreading growth form with an average height of only 18 inches and a crown diameter of 4 to 5 feet. It displayed moderate to heavy use in 1997, increasing to mostly heavy use in 2000. Even at this level of use, vigor is normal on most plants, and percent decadence is low. During the 2000 reading, bitterbrush was producing abundant flowers and seed. However, leader growth appeared to be stunted, averaging only about one inch.

The second most preferred browse species is true mountain mahogany. They are large shrubs and even at a low density of 60 plants/acre in 2000, they still provide 12% of the total shrub cover. Average height of mature mahogany is about 4 ½ feet making them partly unavailable to browsing. Use was judged moderate to heavy in 1997 and just moderate in 2000.

Other shrubs encountered include rubber rabbitbrush, snowberry, and released pinyon and juniper trees. Point-center quarter data from 2000 estimated 99 pinyon, 128 Utah juniper, and six rocky mountain juniper trees/acre. Average basal diameter of pinyon is just under two inches, while that of the juniper is about 3 ½ inches. These trees currently ('00) provide 33% of the total shrub cover. Overhead canopy cover averages 5%.

The herbaceous understory provides nearly as much cover as the shrubs do. Several grass species are found on the site but only two are common. The dominant species is intermediate wheatgrass which provided 82% of the grass cover in 1997 and 90% in 2000. Carex is also common. Forbs are not abundant and do not provide much additional forage. The most common species are Watson penstemon and scarlet globemallow. Some of the grasses and forbs showed light utilization in 2000.

1997 APPARENT TREND ASSESSMENT

The soil is well protected with abundant vegetation and litter cover with no sign of significant erosion occurring. The key browse, mountain big sagebrush, mahogany and bitterbrush, appear to have stable populations. Use is heavy on mahogany and moderate to heavy on bitterbrush, but vigor is normal for both species and percent decadence is low. Mountain big sagebrush is only lightly browsed, in good vigor and has no decadent plants. Recruitment is also good with nearly half of the population consisting of young plants. The herbaceous understory is dominated by intermediate wheatgrass. Forbs are diverse but most species occur only occasionally.

2000 TREND ASSESSMENT

Trend for soil is down slightly. Percent cover of vegetation has declined and bare ground has increased. In addition, cover and frequency of perennial grasses and forbs has also declined. The proportion of bare soil to protective cover (vegetation, litter and cryptogams) has also decreased. However, there still appears to be adequate protective ground cover to prevent serious erosion. Trend for the key browse species, mountain big sagebrush, true mountain mahogany and bitterbrush is considered stable. Mahogany and bitterbrush show moderate to heavy use but normal vigor and low percent decadence. Mountain big sagebrush does not appear to be as preferred. It displays mostly light use, good vigor and low decadence. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of perennial grasses and forbs. Of the six perennial grasses sampled in 1998, four species declined significantly.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 15

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron cristatum	16	*-	5	-	.19	-
G	Agropyron intermedium	332	*321	90	92	16.06	12.37
G	Bromus tectorum (a)	29	*-	8	-	.23	-
G	Carex spp.	63	53	25	23	1.82	1.10
G	Oryzopsis hymenoides	14	*3	4	1	.48	.00
G	Poa fendleriana	29	18	11	6	.40	.30
G	Sitanion hystrix	18	*-	9	-	.38	-
Total for Annual Grasses		29	0	8	0	0.23	0
Total for Perennial Grasses		472	395	144	122	19.36	13.78
Total for Grasses		501	395	152	122	19.59	13.78
F	Antennaria rosea	6	*3	4	2	.19	.06
F	Arabis spp.	11	6	5	2	.02	.01

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
		F	<i>Astragalus convallarius</i>	4	-	3	-
F	<i>Astragalus</i> spp.	3	-	3	-	.07	-
F	<i>Erigeron</i> spp.	-	-	-	-	.00	-
F	<i>Lappula occidentalis</i> (a)	15	*3	7	1	.10	.00
F	<i>Machaeranthera grindelioides</i>	2	2	1	1	.03	.03
F	<i>Penstemon caespitosus</i>	3	-	1	-	.03	-
F	<i>Penstemon pachyphyllus</i>	-	*11	-	5	-	.08
F	<i>Penstemon watsonii</i>	39	*8	17	3	.56	.45
F	<i>Senecio multilobatus</i>	3	4	2	2	.04	.01
F	<i>Sphaeralcea coccinea</i>	35	28	15	13	.71	.14
F	<i>Tragopogon dubius</i>	2	-	1	-	.00	-
F	<i>Viguiera multiflora</i>	3	1	1	1	.03	.03
Total for Annual Forbs		15	3	7	1	0.10	0.00
Total for Perennial Forbs		111	63	53	29	1.73	0.81
Total for Forbs		126	66	60	30	1.84	0.81

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 15

T y p e	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
		B	<i>Amelanchier utahensis</i>	1	0
B	<i>Artemisia tridentata vaseyana</i>	36	24	4.28	3.15
B	<i>Cercocarpus montanus</i>	10	3	2.29	2.12
B	<i>Chrysothamnus nauseosus</i> <i>hololeucus</i>	2	2	.30	.06
B	<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	1	1	-	-
B	<i>Juniperus osteosperma</i>	6	5	4.44	3.50
B	<i>Opuntia fragilis</i>	2	3	.38	-
B	<i>Pinus edulis</i>	7	7	1.37	2.27
B	<i>Purshia tridentata</i>	26	28	6.08	5.57
B	<i>Symphoricarpos oreophilus</i>	2	1	.15	.66
Total for Browse		93	74	19.33	17.34

CANOPY COVER --

Herd unit 10R, Study no: 15

Species	Percent Cover	
	'98	'00
Cercocarpus montanus	-	.80
Juniperus osteosperma	3	2
Juniperus scopulorum	-	2
Pinus edulis	-	1

BASIC COVER --

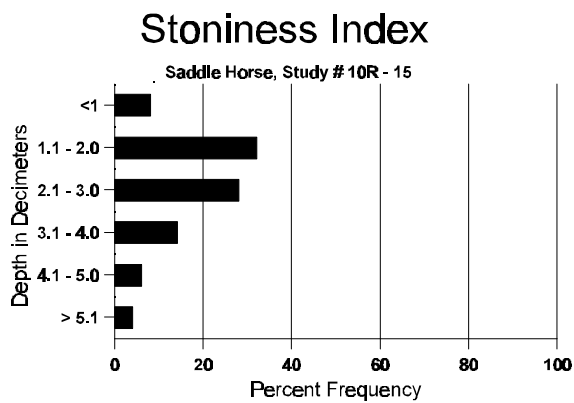
Herd unit 10R, Study no: 15

Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
Vegetation	384	352	41.13	34.22
Rock	102	117	3.09	4.38
Pavement	176	157	2.00	1.38
Litter	487	463	57.48	56.59
Cryptogams	21	42	.20	.83
Bare Ground	245	289	16.27	21.62

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 15, Study Name: Saddle Horse

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.5	61.0 (16.8)	7.0	52.7	26.7	20.6	4.5	8.4	70.4	.9



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 15

Type	Quadrat Frequency		Pellet Transect			
			Pellet Groups per Acre		Days Use per Acre (ha)	
	'98	'00	'98	'00	'98	'00
Rabbit	6	52	305	409	N/A	N/A
Elk	30	29	1018	470	78 (193)	36 (90)
Deer	14	15	148	200	11 (28)	15 (38)
Cattle	1	-	70	-	6 (14)	-

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 15

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
<i>Amelanchier utahensis</i>																	
Y	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'98		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'98	40	Dec:	-		
												'00	0		-		
<i>Artemisia tridentata vaseyana</i>																	
S	98	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	98	29	-	-	5	-	-	-	-	-	34	-	-	-	680		34
	00	19	-	-	2	-	-	-	-	-	21	-	-	-	420		21
M	98	35	5	-	-	-	-	-	-	-	40	-	-	-	800	30 43	40
	00	26	5	-	-	-	-	-	-	-	31	-	-	-	620	23 33	31
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'98		07%			00%			00%			-27%						
'00		09%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'98	1480	Dec:	0%		
												'00	1080		4%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
M	98	-	5	8	-	-	-	-	-	-	13	-	-	-	260	52	50	13
	00	-	1	-	-	2	-	-	-	-	3	-	-	-	60	54	54	3
X	98	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'98		38%			62%			00%			-77%							
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	260	Dec:	-			
												'00	60		-			
Chrysothamnus nauseosus hololeucus																		
Y	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	19	1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	19	1
D	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	1	-	-	-	-	-	-	-	-	-	-	1	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'98		00%			00%			00%			+ 0%							
'00		00%			00%			50%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	40	Dec:	0%			
												'00	40		50%			
Chrysothamnus viscidiflorus viscidiflorus																		
M	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	19	20	2
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20	11	14	1
D	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	-	-	-	-	1	-	-	-	-	1	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'98		00%			00%			00%			+ 0%							
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	40	Dec:	0%			
												'00	40		50%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	98	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
	00	5	-	-	-	-	-	1	-	-	6	-	-	-	120		6	
M	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	2	
D	98	-	-	1	-	-	-	-	-	-	-	-	1	-	20		1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			13%			13%			+11%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	160	Dec:	13%			
												'00	180		11%			
Opuntia fragilis																		
M	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	29	2
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	13	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			+33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	40	Dec:	-			
												'00	60		-			
Pinus edulis																		
Y	98	4	-	-	-	-	-	-	-	-	3	-	1	-	80		4	
	00	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6	
M	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	3	
	00	-	-	-	2	-	-	-	-	-	2	-	-	-	40	-	2	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			14%			+13%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	140	Dec:	-			
												'00	160		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Purshia tridentata</i>																		
S	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	98	8	3	-	2	-	-	-	-	-	13	-	-	-	260		13	
	00	-	2	1	-	-	2	1	-	-	6	-	-	-	120		6	
M	98	11	13	9	1	2	-	-	-	-	34	2	-	-	720	23	58	
	00	-	1	4	4	2	16	2	-	-	29	-	-	-	580	18	51	
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	1	2	-	-	1	4	-	-	1	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		37%			18%			00%			-18%							
'00		15%			65%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	980	Dec:	0%				
											'00	800		13%				
<i>Symphoricarpos oreophilus</i>																		
M	98	1	-	-	1	-	-	-	-	-	2	-	-	-	40	44	68	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	27	59	
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	1	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			-50%							
'00		00%			00%			100%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	40	Dec:	0%				
											'00	20		100%				

Trend Study 10R-17-00

Study site name: Railroad Canyon.

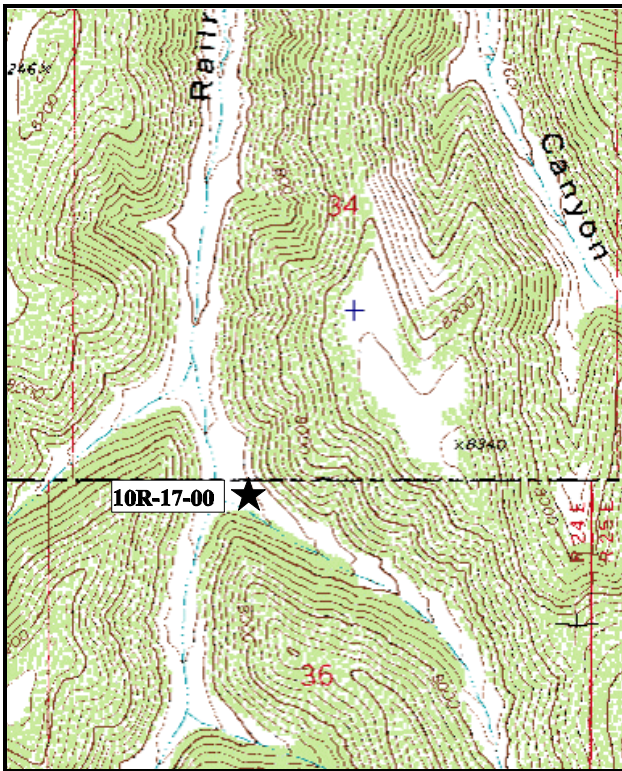
Range type: Big Sagebrush-Grass/Burn.

Compass bearing: frequency baseline 104°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

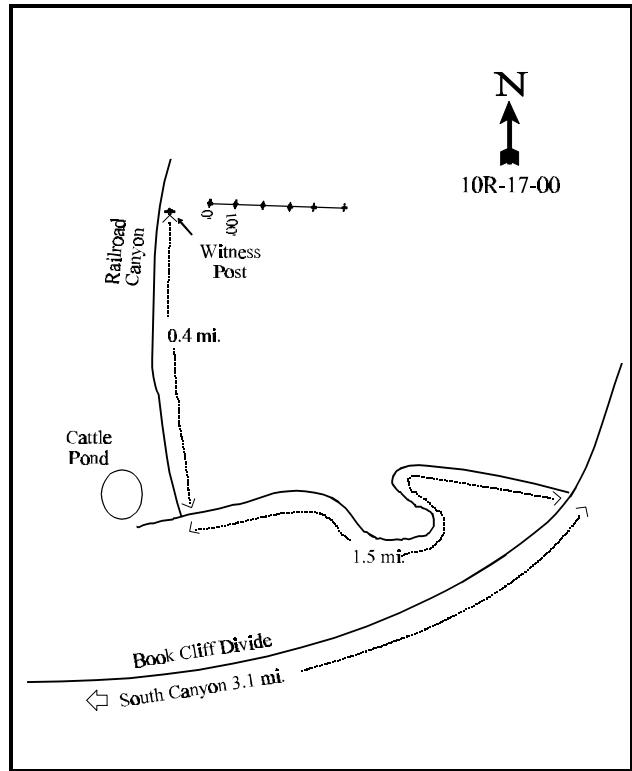
LOCATION DESCRIPTION

From the intersection of South Canyon Road and Book Cliff Divide Road follow Book Cliff Divide Road east 3.1 miles to where the road to Railroad Canyon breaks off to the left. Take this road and follow in down 1.5 miles almost to the cattle pond where a faint road breaks off to the right into railroad canyon . Take this road 0.4 miles to a witness post on the right side of the road. From the witness post the 0' stake is 85 paces at 64°M in the burn, the stake is marked by browse tag # 103.



Map name: Tom Patterson

Township 15 ½ S, Range 24 E, Section 36.



Diagrammatic Sketch

UTM 4369319.203 N, 653168.376 E

DISCUSSION

Trend Study No. 10R-17

The Railroad Canyon study was established in 1998 and samples a small narrow side canyon in Railroad Canyon. The site has an elevation of about 7,500 feet with a west aspect and a slight slope (7%). There is aspen growing on the steep slope to the south of the site. The study area was dominated by large basin and mountain big sagebrush in the summer of 1998 when the study site was established. The canyon was then burned by the BLM in the fall of 1998 and the trend study re-read during the summer of 2000. The area is used by elk and livestock. Pellet group data taken in 1998 estimated 27 elk and 14 cow days use/acre (67 edu/ha and 35 cdu/ha). Two elk were seen on the site and other could be heard nearby when the study was established on July 6th, 1998. After the burn, use by elk increased to an estimated 55 elk days use/acre (136 edu/ha). Deer use was estimated at 12 days use/acre (30 ddu/ha).

Soil at the site is deep with an estimated effective rooting depth of nearly 30 inches. There is some pavement on the surface but little rock within the soil profile. Soil texture is a sandy loam with a neutral soil reaction (6.7 pH). Prior to the burn, erosion was minimal due to the abundant vegetation and litter cover. After the burn, percent bare ground increased from 8% to 35% and some erosion was noted. This should discontinue as the herbaceous vegetation becomes reestablished.

The site was dominated by basin and mountain big sagebrush prior to the burn. All of the sagebrush sampled was combined because of the hybridization and called mountain big sagebrush. It had a density of 3,740 plants/acre in 1998 which accounted for 71% of the total browse cover. They were mostly lightly browsed. Vigor was poor on 21% of the sagebrush sampled and 24% were classified as decadent. Other browse included rubber rabbitbrush and snowberry. After the prescribed burn, nearly all of the sagebrush was eliminated. Density is now estimated at only 120 plants/acre. Snowberry is still abundant at 1,365 plants/acre. These show moderate to heavy use.

The key component of this site due to the elevation and season of use is the herbaceous understory. Grasses and forbs were abundant and diverse in 1998 when the site was established. Kentucky bluegrass was the dominant species. It provided 72% of the grass cover and 68% of the total herbaceous cover. Forbs, while diverse, provided little forage. After the burn, the plant composition changed little. Kentucky bluegrass continues to dominate the site. Intermediate wheatgrass and needle-and-thread are also fairly abundant. Several forbs are found on the site but only a few species are found more than occasionally. All forbs combined produce only about 4% cover. This was only the second growing season since the burn with the grasses and forbs not fully recovered yet. Herbaceous cover and frequency will continue to increase for the next few years.

1998 APPARENT TREND ASSESSMENT

Soil at the site appears stable with abundant protective ground cover and little bare ground. The gully in the canyon bottom has healed and no erosion is evident. The most abundant browse is big sagebrush. The population is overly mature with poor reproduction. Mature plants are tall averaging four feet in height. Vigor is poor on 21% of the plants sampled, percent decadence is 24%. The herbaceous understory is diverse and abundant, although it is probably somewhat suppressed by the sagebrush. It is dominated by Kentucky bluegrass which provides 72% of the grass cover and 68% of the total herbaceous cover. Forbs produce little total cover (2%) and only a few species are more than occasionally encountered.

2000 TREND ASSESSMENT

A prescribed burn was conducted on the site during the fall of 1998 to control sagebrush and enhance the herbaceous understory. The soil trend is considered down for the moment with increased bare ground, reduced protective ground cover, and apparent erosion occurring. The browse trend is also considered down due to the elimination of sagebrush. However, the browse is not the critical component on this site due to the elevation and season of use. Trend for the herbaceous understory is considered up slightly since sum of nested frequency for perennial grasses and forbs increased slightly. Kentucky bluegrass still dominates the site. It remained at a similar frequency, while nested frequency of intermediate wheatgrass increased significantly.

TREND ASSESSMENT

soil - down (1)

browse - down (1)

herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 17

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron intermedium	50	*143	21	46	.59	3.69
G	Bouteloua gracilis	24	17	8	6	.66	.08
G	Bromus tectorum (a)	7	1	2	1	.02	.00
G	Carex spp.	3	2	1	2	.15	.06
G	Elymus cinereus	9	8	2	2	1.00	1.61
G	Oryzopsis hymenoides	11	*4	6	3	.52	.33
G	Poa pratensis	410	394	89	88	25.38	18.96
G	Sitanion hystrix	15	6	5	2	.15	.06
G	Stipa comata	102	84	31	28	6.92	4.19
Total for Annual Grasses		7	1	2	1	0.01	0.00
Total for Perennial Grasses		624	658	163	177	35.38	29.00
Total for Grasses		631	659	165	178	35.40	29.00
F	Achillea millefolium	4	10	1	4	.15	.47
F	Agoseris glauca	-	3	-	1	-	.00
F	Androsace septentrionalis (a)	17	*4	9	2	.04	.01
F	Astragalus convallarius	7	6	3	3	.04	.09
F	Aster spp.	-	4	-	1	-	.00
F	Castilleja spp.	2	-	1	-	.03	-
F	Chaenactis douglasii	14	13	8	6	.09	.03
F	Corydalis aurea	-	5	-	1	-	.03
F	Cryptantha spp.	10	3	4	2	.12	.06
F	Descurainia pinnata (a)	-	3	-	1	-	.00

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
		F	Oenothera trichocalyx	3	*46	1	15
F	Penstemon spp.	19	22	7	11	.85	.84
F	Phlox longifolia	3	*77	1	34	.00	.62
F	Senecio multilobatus	38	*18	18	7	.23	.31
F	Sphaeralcea coccinea	2	3	1	1	.15	.03
F	Streptanthus cordatus	2	-	1	-	.03	-
F	Taraxacum officinale	12	13	6	7	.03	.33
F	Tragopogon dubius	10	10	6	3	.03	.01
Total for Annual Forbs		17	7	9	3	0.04	0.01
Total for Perennial Forbs		126	233	58	96	1.91	3.87
Total for Forbs		143	240	67	99	1.96	3.88

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 17

T y p e	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
		B	Artemisia tridentata vaseyana	79	5
B	Ceratoides lanata	0	2	-	-
B	Chrysothamnus nauseosus	15	2	.93	-
B	Chrysothamnus viscidiflorus	4	2	.06	-
B	Symphoricarpos oreophilus	57	23	7.75	1.47
Total for Browse		155	34	30.40	1.63

BASIC COVER --

Herd unit 10R, Study no: 17

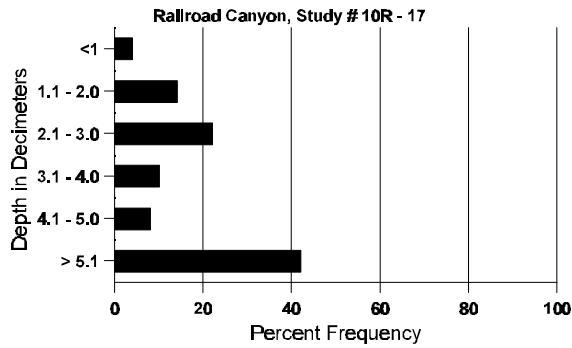
Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
	Vegetation	465	460	68.31
Rock	18	137	.09	1.21
Pavement	165	384	2.33	7.20
Litter	490	450	68.18	30.60
Cryptogams	16	1	1.03	.00
Bare Ground	204	429	8.18	35.35

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 17, Study Name: Railroad Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
29.6	64.0 (17.7)	6.7	72.7	14.7	12.6	2.4	13.6	92.8	.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 17

Type	Quadrat Frequency	
	'98	'00
Rabbit	-	1
Elk	3	27
Deer	-	1
Cattle	4	2

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'98	'00	'98	'00
-	-	-	-
357	713	27 (68)	55 (136)
9	157	1 (2)	12 (30)
165	-	14 (34)	-

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 17

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	98	15	-	-	-	-	-	-	-	-	13	-	2	-	300		15	
	00	3	-	-	-	-	-	-	-	-	3	-	-	60		3		
M	98	101	16	-	10	-	-	-	-	-	118	-	9	-	2540	40 45	127	
	00	3	-	-	-	-	-	-	-	-	3	-	-	60	5 8	3		
D	98	25	12	1	5	2	-	-	-	-	16	-	11	18	900		45	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1640		82	
	00	-	-	-	-	-	-	-	-	-	-	-	-	3540		177		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		16%			.53%			21%			-97%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	3740	Dec:	24%				
											'00	120		0%				
<i>Ceratoides lanata</i>																		
Y	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	1	-	-	-	-	-	-	-	1	-	-	20		1		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	00	-	2	-	-	-	-	-	-	-	2	-	-	40	-	-	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	0	Dec:	-				
											'00	60		-				
<i>Chrysothamnus nauseosus</i>																		
Y	98	3	-	-	1	-	-	-	-	-	4	-	-	-	80		4	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
M	98	24	-	-	-	-	-	-	-	-	24	-	-	-	480	33 35	24	
	00	1	-	-	-	-	-	-	-	-	1	-	-	40	21 24	2		
D	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			-93%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	580	Dec:	3%				
											'00	40		0%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus																		
Y	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	1	2	-	-	-	-	-	-	-	-	-	-	60			3	
M	98	2	-	-	2	-	-	-	-	-	-	-	-	80	20	16	4	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	5	5	0	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'98		00%			00%			00%			-25%							
'00		67%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	80	Dec:	-			
												'00	60		-			
Symphoricarpos oreophilus																		
S	98	-	-	-	2	-	-	-	-	-	-	-	-	40			2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	98	29	-	-	11	-	-	-	-	-	-	-	-	800			40	
	00	14	17	6	-	-	-	-	-	-	-	-	-	740			37	
M	98	35	15	10	20	-	-	-	-	-	-	-	-	1600	27	37	80	
	00	1	17	11	-	-	2	-	-	-	-	-	-	620	7	16	31	
D	98	3	3	3	-	-	-	-	-	-	-	-	-	180			9	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	100			5	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'98		14%			10%			07%			-47%							
'00		50%			28%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	2580	Dec:	7%			
												'00	1360		0%			

Trend Study 10R-19-00

Study site name: Lower South Canyon.

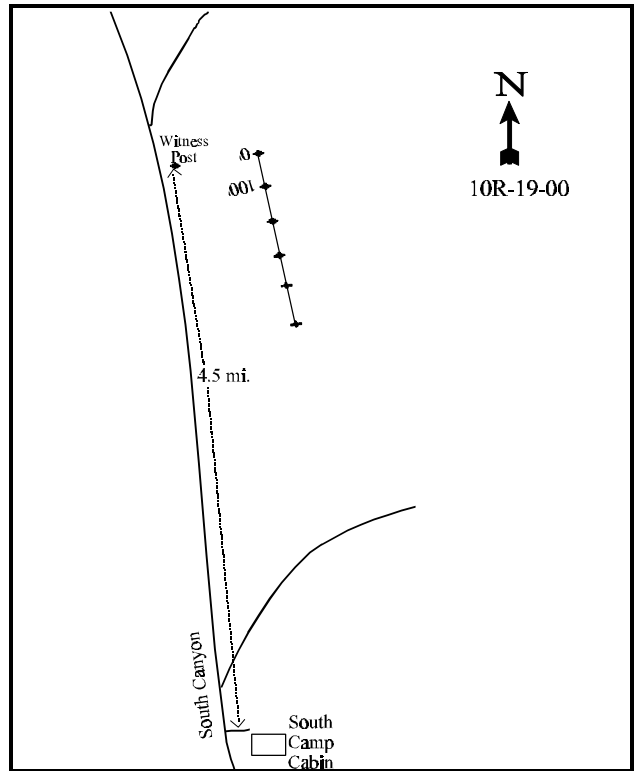
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 177°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

LOCATION DESCRIPTION

From Jarman's South Camp BLM cabin in South Canyon follow the road ,staying left the entire time, down the canyon 4.5 miles to a witness post on the right side of the road. From here the 0' stake is located 37 paces at 43°M.



Map name: Tom Patterson

Diagrammatic Sketch

Township 14 S, Range 24 E, Section 9.

UTM 4376021.087 N, 652442.025 E

DISCUSSION

Trend Study No. 10R-19

The Lower South Canyon trend study was established in 1998. It samples an old basin big sagebrush burn in the narrow South Canyon bottom. The site is nearly level with an elevation of about 6,800 feet. There is a small ephemeral creek that runs about 100 feet from the site and a larger perennial stream about ½ mile from the site. This area is used by elk in the spring and winter and by cattle during the summer. Pellet group data from 1998 estimated only 6 elk days use/acre (15 ddu/ha) and 13 cow days use/acre (32 cdu/ha). Data from 2000 estimate higher use of 26 elk days use/acre (64 edu/ha). About 80% of the elk pellet groups sampled appeared to be from the previous winter with the other 20% from spring. Some old cow pats were seen but no cattle grazing has occurred yet this year. This area is within the Sweetwater allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soil at the site is moderately deep but compacted. Effective rooting depth is estimated at 23 inches. It has a sandy loam texture with a neutral pH. There is no rock on the surface and little within the soil profile. There is abundant vegetation and litter cover and very little bare ground exposed. There is no apparent erosion and the small gully that runs through the site is not active.

Perennial grasses dominate the site but there is a small population of large basin big sagebrush. Density is currently ('00) estimated at 620 plants/acre. These shrubs are mostly unutilized, show normal vigor and low decadence. There are also a few moderately browsed white-stem rubber rabbitbrush on the site.

Perennial grasses are the key component on this site. They provide over 90% of the vegetative cover with a cover value for grasses of 66% in 1998 and 63% in 2000. The most abundant grass is smooth brome which provides two-thirds of the grass cover. Great basin wildrye and Kentucky bluegrass are also common. Some of the smooth brome observed in 2000 had been utilized. There are few forbs found on the site which provides little cover or forage of value.

1998 TREND ASSESSMENT

There is no significant erosion occurring on the site due to the abundant vegetation and litter cover. There is a small and apparently stable population of basin big sagebrush on the site. It is mostly unused and not an important species for this site. The herbaceous understory is abundant, vigorous and dominated by smooth brome, Great Basin wildrye and Kentucky bluegrass.

2000 TREND ASSESSMENT

The soil trend is stable with very little bare ground exposed on the site. There is no significant erosion occurring. Browse is not a key component on this site. The small population of basin big sagebrush appears to be stable and mostly unutilized. Trend for the herbaceous understory is stable with similar sum of nested frequency values for perennial grasses and forbs compared to 1998. The only significant change is the increase in the nested frequency of Kentucky bluegrass.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 19

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron dasystachyum	71	49	17	16	2.70	.80
G	Bromus inermis	397	443	89	98	41.70	43.21
G	Carex spp.	10	-	3	-	.21	-
G	Elymus cinereus	91	76	27	30	9.28	8.11
G	Hordeum jubatum	2	-	1	-	.03	-
G	Juncus balticus	3	-	1	-	.03	-
G	Muhlenbergia pungens	2	-	1	-	.00	-
G	Poa pratensis	276	*317	82	84	11.92	10.40
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		852	885	221	228	65.88	62.53
Total for Grasses		852	885	221	228	65.88	62.53
F	Agoseris glauca	2	-	1	-	.03	-
F	Descurainia spp. (a)	3	-	1	-	.00	-
F	Hackelia patens	2	-	1	-	.00	-
F	Lappula occidentalis (a)	3	1	1	1	.00	.00
F	Taraxacum officinale	19	18	9	7	.29	.11
F	Tragopogon dubius	3	3	2	1	.01	.03
Total for Annual Forbs		6	1	2	1	0.00	0.00
Total for Perennial Forbs		26	21	13	8	0.33	0.14
Total for Forbs		32	22	15	9	0.34	0.14

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --
Herd unit 10R, Study no: 19

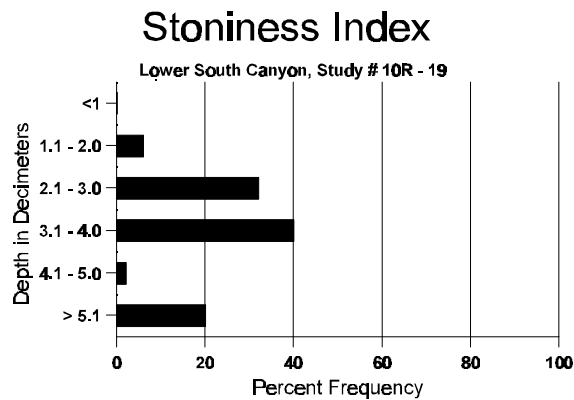
T y p e	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
B	Artemisia frigida	1	0	-	-
B	Artemisia tridentata tridentata	20	17	5.11	4.04
B	Chrysothamnus nauseosus hololeucus	6	3	.06	-
Total for Browse		27	20	5.17	4.04

BASIC COVER --
Herd unit 10R, Study no: 19

Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
Vegetation	496	488	74.54	67.80
Rock	2	-	.00	0
Pavement	15	-	.05	0
Litter	500	496	80.43	77.11
Bare Ground	69	60	3.41	1.89

SOIL ANALYSIS DATA --
Herd Unit 10R, Study # 19, Study Name: Lower South Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
23.3	57.8 (17.2)	6.8	60.4	25.1	14.6	3.2	18.7	108.8	.9



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 19

Type	Quadrat Frequency		Pellet Transect			
	'98	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'98	'00	'98	'00
Rabbit	1	-	-	26	-	N/A
Elk	1	8	78	313	6 (15)	26 (65)
Cattle	3	7	157	-	13 (32)	-

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 19

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia frigida</i>																		
M	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8	7	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	20	Dec:	-			
												'00	0		-			
<i>Artemisia tridentata tridentata</i>																		
S	98	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	98	7	-	-	3	-	-	-	-	-	10	-	-	-	200			10
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
M	98	25	-	-	-	-	-	-	-	-	25	-	-	-	500	66	63	25
	00	17	-	-	-	-	-	-	-	-	17	-	-	-	340	57	43	17
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	6	-	-	-	-	-	-	-	-	4	-	-	2	120			6
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	500			25
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	240			12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			-11%							
'00		00%			00%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	700	Dec:	0%			
												'00	620		19%			
<i>Chrysothamnus nauseosus hololeucus</i>																		
Y	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	98	6	-	-	-	-	-	-	-	-	6	-	-	-	120	26	29	6
	00	1	2	-	-	-	-	-	-	-	3	-	-	-	60	27	20	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			-63%							
'00		67%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	160	Dec:	-			
												'00	60		-			
<i>Symphoricarpos oreophilus</i>																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	58	64	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-			
												'00	0		-			

Trend Study 10R-20-00

Study site name: Dick Canyon.

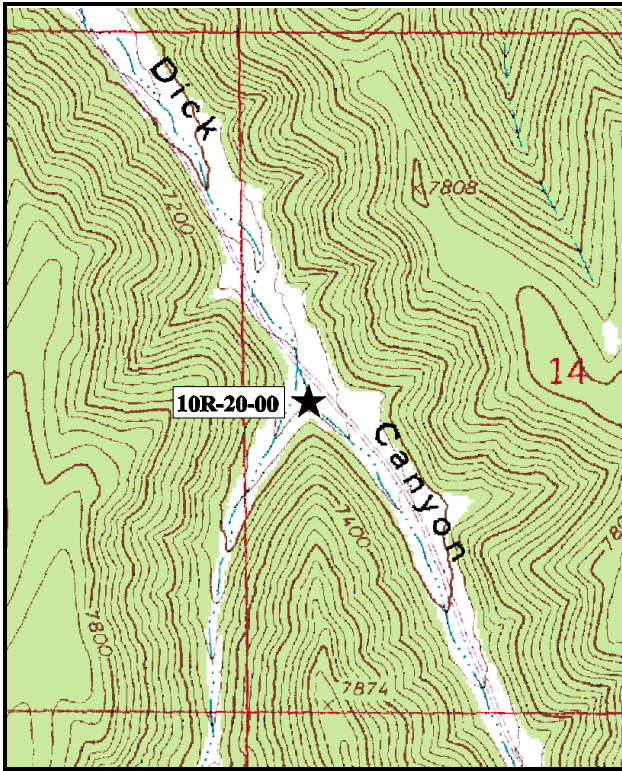
Range type: Perennial Grass.

Compass bearing: frequency baseline 196°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

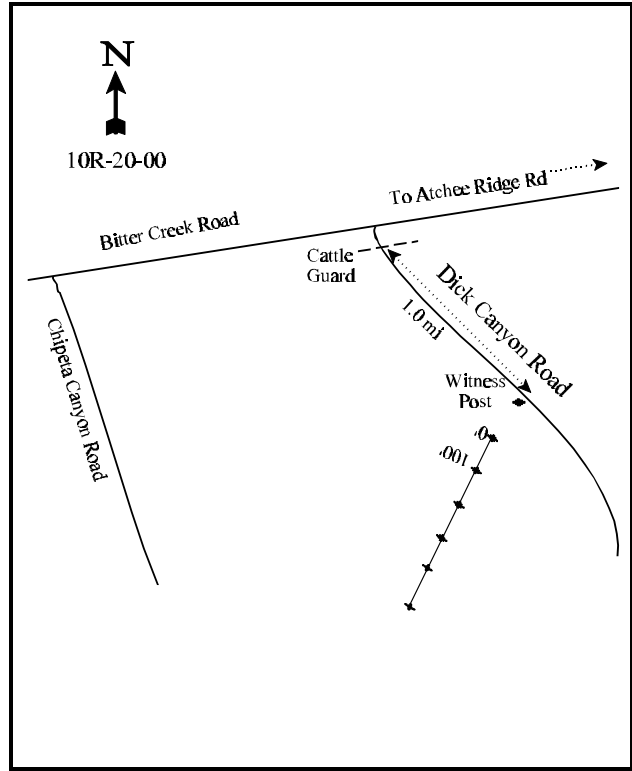
LOCATION DESCRIPTION

From the cattle guard at the mouth of Dick Canyon travel 1 mile to a witness post on the right side of the road. From the witness post the 0' stake is 60 paces at 186°M and is marked with browse tag # 104.



Map name: Rathole Ridge

Township 15 S, Range 25 E, Section 14.



Diagrammatic Sketch

UTM 4375128.746 N, 663954.545 E

DISCUSSION

Trend Study No. 10R-20

The Dick Canyon trend study was established in 1998 as a special studies site to address perceived conflicts over elk and livestock use in the North Book Cliffs. It samples a perennial grass canyon bottom in Dick Canyon. It has a northeast aspect with a 5% slope and an elevation of 7,000 feet. This area is classified as transitional range for deer and elk. Pellet group data from 1998 estimated 13 elk days use/acre (32 edu/ha) and 26 cow days use/acre (64 cdu/ha). Pellet group transect data in 2000 estimate 1 deer day use/acre (2 ddu/ha), 25 elk days use/acre (62 edu/ha) and 3 cow days use/acre (7 cdu/ha). This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soils on the site have a sandy loam texture with an average temperature of 64°F at nearly 18 inches. Soils are neutral (pH of 6.8). The soil is moderately deep with an estimated effective rooting depth of over 18 inches. There is very little rock or pavement on the surface or within the profile. The estimated stoniness index profile is more a measure of compaction than actual presence of rock on this site. Bare ground provides less than 1% cover in 2000, with most of this being the result of rodent activity. Vegetation and litter cover is high which keeps erosion at minimal levels.

Browse on this site is minimal. Basin big sagebrush and white-stemmed rubber rabbitbrush are present in the canyon bottom with a few young aspen being found near the canyon walls. A few elderberry and snowberry were measured for height and crown but not sampled within the shrub density strips in 2000. Basin big sagebrush is estimated at 120 plants/acre in 2000, with half of the population coming from young plants. Decadency is moderately high at 33%, but vigor is good and use is light. White-stemmed rubber rabbitbrush was estimated at only 20 plant/acre in 1998, increasing to 260 plants/acre in 2000. This increase in density is due to a large number of young plants sampled in the population in 2000 (200 plants/acre) which gives this species a 77% recruitment level. Use is currently light and vigor good with a low rate of decadency.

By far, the dominant vegetation at the Dick Canyon transect is perennial grass. Six perennial grasses were sampled in 1998 and five species in 2000. Together, perennial grasses provide at least 80% of the total vegetative cover in both 1998 and 2000. The most abundant species are Kentucky bluegrass and Great Basin wildrye. Kentucky bluegrass provided 34% average cover in 1998, and over 25% average cover in 2000. Basin wildrye provided 17% cover in 1998 and 15% cover in 2000. Other perennial grasses include: thickspike wheatgrass, subalpine needlegrass, and needle-and-thread. Perennial grasses as a group slightly increased in sum of nested frequency in 2000. Forbs are also fairly abundant and provide nearly 10% average cover in 2000, representing 16% of the total vegetative cover at this site. The most abundant species are pale agoseris, dandelion, and yarrow. Perennial forbs also increased in sum of nested frequency in 2000. Utilization was not apparent on any herbaceous species in 2000.

1998 APPARENT TREND ASSESSMENT

Soils appear to be stable and in good condition with high vegetation and litter cover from perennial herbaceous species and very low bare ground. Browse at this site is sparse and of less importance than at other sites. Basin big sagebrush and white-stemmed rubber rabbitbrush are the main species, but these occur at very low densities. The herbaceous understory is dominant and very abundant and is the key component in this community. Perennial species dominate and provide good forage and cover.

2000 TREND ASSESSMENT

Trend for soil is stable with vegetation and litter cover remaining very high with little bare ground present. Trend for browse is slightly up with good recruitment from basin big sagebrush and white-stemmed rubber rabbitbrush. Both of these species have increased densities from the influx of young plants. Trend for the herbaceous understory is slightly up with the increase in sum of nested frequencies for perennial grasses and forbs.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 20

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron dasystachyum	179	166	55	56	5.12	2.30
G	Aristida purpurea	3	-	1	-	.03	-
G	Elymus cinereus	140	157	41	46	17.52	15.36
G	Poa pratensis	459	450	100	99	34.06	25.43
G	Stipa columbiana	1	*17	1	6	.00	.75
G	Stipa comata	47	47	16	18	1.59	3.01
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		829	837	214	225	58.33	46.88
Total for Grasses		829	837	214	225	58.33	46.88
F	Achillea millefolium	32	59	14	24	.46	.68
F	Agoseris glauca	222	*262	82	90	7.82	6.64
F	Androsace septentrionalis (a)	-	5	-	1	-	.00
F	Artemisia dracunculus	13	7	5	5	.22	.20
F	Cirsium spp.	3	3	1	1	.03	.00
F	Lathyrus brachycalyx	2	-	1	-	.03	.00
F	Lappula occidentalis (a)	1	-	1	-	.00	-
F	Oenothera spp.	9	11	5	6	.19	.03
F	Penstemon spp.	-	1	-	1	-	.03
F	Phlox longifolia	-	*6	-	6	-	.03
F	Potentilla spp.	2	*9	1	3	.15	.18
F	Taraxacum officinale	63	*104	24	41	1.05	1.55
F	Tragopogon dubius	31	*9	15	4	.46	.07
F	Unknown forb-perennial	42	*-	16	-	.62	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
	Total for Annual Forbs	1	5	1	1	0.00	0.00
	Total for Perennial Forbs	419	471	164	181	11.05	9.44
	Total for Forbs	420	476	165	182	11.06	9.45

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 20

Type	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
B	Artemisia tridentata tridentata	4	6	.18	1.14
B	Chrysothamnus nauseosus hololeucus	1	7	1.00	1.25
B	Populus tremuloides	1	0	.15	.00
	Total for Browse	6	13	1.33	2.40

BASIC COVER --

Herd unit 10R, Study no: 20

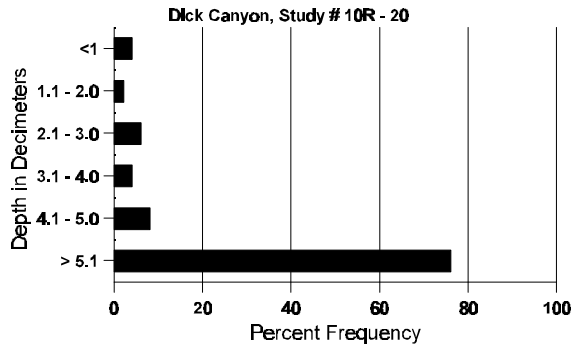
Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
Vegetation	490	490	67.69	65.13
Rock	12	-	.12	0
Pavement	40	9	.49	.04
Litter	498	497	80.58	89.56
Cryptogams	2	-	.03	0
Bare Ground	57	29	2.04	.56

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 20, Study Name: Dick Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.3	64.4 (17.7)	6.8	56.0	31.4	12.6	3.8	12.6	214.4	.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 20

Type	Quadrat Frequency		Pellet Transect			
			Pellet Groups per Acre		Days Use per Acre (ha)	
	'98	'00	'98	'00	'98	'00
Elk	2	4	165	322	13 (31)	25 (62)
Deer	-	-	-	9	-	1 (2)
Cattle	3	2	313	35	26 (64)	3 (12)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 20

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata tridentata</i>																		
Y	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	98	2	-	-	-	-	-	-	-	2	-	-	-	40	43	37	2	
	00	1	-	-	-	-	-	-	-	1	-	-	-	20	47	43	1	
D	98	1	-	-	-	-	-	-	-	-	-	-	1	20		1		
	00	1	-	-	1	-	-	-	-	2	-	-	-	40		2		
X	98	-	-	-	-	-	-	-	-	-	-	-	-	80		4		
	00	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'98		00%			00%			25%			+33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	80	Dec:	25%			
												'00	120		33%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus nauseosus hololeucus																		
Y	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	9	-	-	1	-	-	-	-	-	10	-	-	-	200		10	
M	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	36	56	1
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	47	55	2
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			+92%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	20	Dec:	0%				
											'00	260		8%				
Populus tremuloides																		
S	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	20	Dec:	-				
											'00	0		-				
Sambucus racemosa																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	45	10	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	0	Dec:	-				
											'00	0		-				
Symphoricarpos oreophilus																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	23	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	0	Dec:	-				
											'00	0		-				

Trend Study 10R-22-00

Study site name: Rathole Ridge.

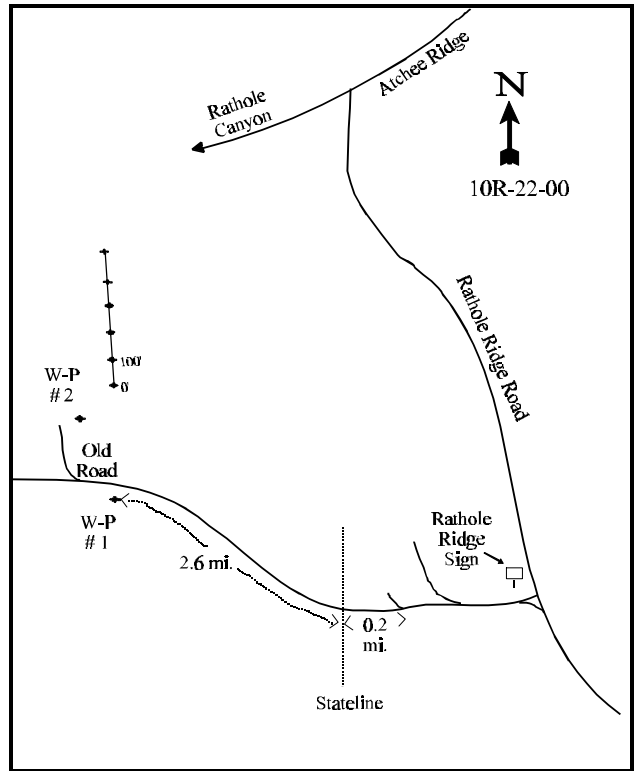
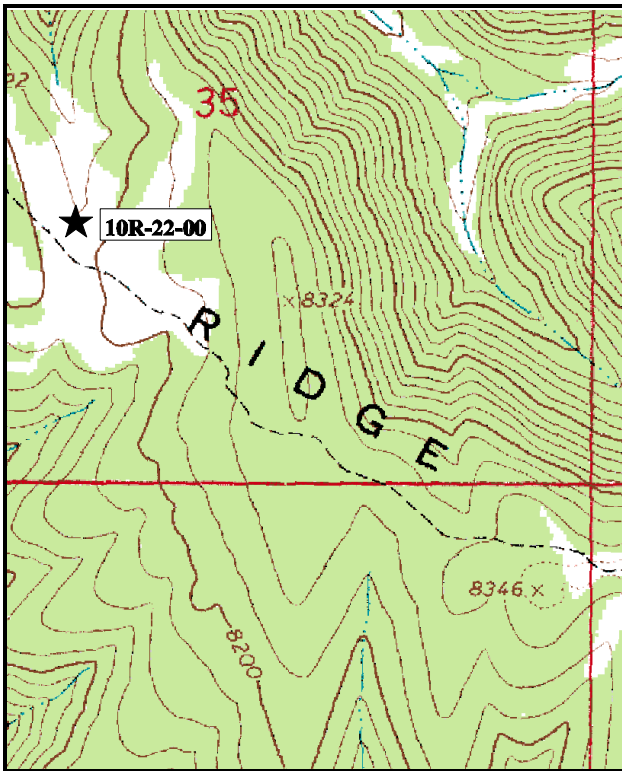
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 336°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

LOCATION DESCRIPTION

From the Junction of Atchee Ridge Road, Rathole Canyon and Rathole Ridge Road follow Rathole Ridge Road up to the a sign pointing to Rathole Ridge. Take this road to the first fork. Take a left at the fork and continue down the canyon 0.2 miles to the state line. Continue 2.6 miles down (staying left) to a witness post on the left side of the road. Just past the witness post an old road breaks off to the right follow it about 500' to another witness post on the right side of the road. From this second witness post the 0' stake is 15 paces at 55°M and is marked with browse tag #111.



Map name: Rathole Ridge

Diagrammatic Sketch

Township 14 S, Range 25 E, Section 35.

UTM 4379807.985 N, 664253.380 E

DISCUSSION

Trend Study No. 10R-22

The Rathole Ridge study was established in 1998 to monitor perceived conflicts over elk and livestock use in the North Bookcliffs. This site has a west aspect with a slope of 3-5% at 7,900 feet in elevation. Pellet group transect data in 1998 estimated one deer days use/acre (2 ddu/ha), 27 elk days use/acre (67 edu/ha), and eight cow days use/acre (20 cdu/ha). A prescribed burn was completed in the fall of 1998 to reduce sagebrush cover and increase herbaceous vegetation. Pellet group transect data in 2000 estimated similar levels of use with two deer days/acre (5 ddu/ha), 33 elk days use/acre (82 edu/ha), and one cow days use/acre (2 cdu/ha). This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soils are loamy in texture with an average temperature of 61°F at nearly 14 inches in depth. Soil reaction is slightly acidic (pH of 6.3). With very little rock actually being sampled within the profile, the stoniness index is more a measure of compaction than rockiness. Soil depth is moderately shallow with an estimated effective rooting depth of just over 12 inches. Vegetation and litter were abundant in 1998 contributing 62% and 58% average cover. In 2000, vegetation and litter cover both decreased, mainly due to the decrease in browse following the prescribed burn. As a result, percent cover from bare ground doubled in 2000. However, 87% of the vegetative cover in 2000 comes from herbaceous species keeping erosion at a minimal level.

In 1998, browse was abundant contributing over 25% average cover. Mountain big sagebrush was the dominant species providing 86% of the browse cover. However as this is summer range, browse is not the key vegetative component and the dense stand of mountain big sagebrush needed to be reduced to improve the understory and favor other more preferred browse species such as bitterbrush and serviceberry. The prescribed burn completed in the fall of 1998 did this. Browse cover was reduced to only 5% in 2000. Mountain big sagebrush was greatly reduced as it provided 21% cover before the treatment and only 2% when the site was read in 2000 following the burn. Mountain big sagebrush density was estimated at 4,060 plants/acre in 1998, decreasing to 540 plants/acre following the treatment. In 2000, recruitment from young plants was high at 30% with mature plants comprising 48% of the population. Percent decadency is 22% with most of these being burned plants that were not killed in the burn treatment. The prescribed burn was not very hot as many of the burned sagebrush skeletons were still standing when the site was reread in 2000. However, this was advantageous for other browse such as bitterbrush which are usually not very fire tolerant and were resprouting. Bitterbrush increased in density following the prescribed burn due to young plants, increasing from 40 plants/acre in 1998 to 120 plants/acre in 2000. Snowberry increased in density following the prescribed burn from 1,200 to 1,640 plants/acre. This increase is also due to the young age class which increased from 620 to 1,400 plants/acre in 2000, a recruitment rate of 85%. Serviceberry, a fire tolerant species, increased in 2000 with the young age class doubling from 80 to 160 plants/acre. All of the browse species show good vigor and light use in 2000.

Herbaceous vegetation is the dominant and key component at the Rathole Ridge transect. Currently, average cover from grasses and forbs is nearly the same in 1998, however they did increase in abundance (sum of nested frequency). Grasses are diverse and abundant with 11 perennial species being sampled between the 1998 and 2000 readings. Needle-and-thread, Kentucky bluegrass, and thickspike wheatgrass are the most abundant. Other moderately abundant species include: *Carex spp.*, subalpine needlegrass, mutton bluegrass, prairie junegrass, and mountain brome. Grasses had increased sum of nested frequency values in 2000. They had good stature and vigor as Kentucky bluegrass, needle-and-thread, and subalpine needlegrass had heights of more than one foot. Most grasses have moderate seed production and did not appear to be utilized when the site was read in June 2000. Forbs are very diverse with a good composition. Increasers are present but not dominant, with many abundant preferred forage species. The forb component is key on this site as they provide important

forage for deer and elk in the spring and summer. Some of the *Penstemon* species were noted as having been utilized in 2000. Perennial forbs increased in sum of nested frequency by nearly 20% in 2000.

1998 APPARENT TREND ASSESSMENT

Soils appear stable. There is no apparent erosion due to the gentle slope and the abundance of protective ground cover from vegetation and litter. Browse is abundant, especially mountain big sagebrush. As this is transitional/summer range, browse is not the critical component and a prescribed burn is planned to reduce sagebrush density and cover and increase herbaceous species. Herbaceous trend appears stable with a diverse understory of both perennial grasses and forbs. With the planned prescribed burn, herbaceous vegetation should increase and would become a more important key component for this site.

2000 TREND ASSESSMENT

Soil trend is still considered stable even though vegetation and litter cover decreased and bare ground increased. This is because there is still abundant protective ground cover and most of the decrease in vegetation and litter cover is due to the reduction of mountain big sagebrush cover. Herbaceous vegetation provides nearly as much cover as before the burn and it has increased in sum of nested frequency following the burn. Trend for browse is slightly up overall as mountain big sagebrush no longer dominates the site and the more preferred species such as serviceberry and bitterbrush are resprouting and have high recruitment from young plants. Trend for the herbaceous understory is up as perennial species, especially forbs, increased in sum of nested frequency in 2000. Composition of the understory is good with many good forage species present.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - up (5)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 22

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	<i>Agropyron dasystachyum</i>	184	222	57	74	1.97	3.22
G	<i>Bouteloua gracilis</i>	-	1	-	1	-	.03
G	<i>Bromus carinatus</i>	29	*5	11	2	.35	.06
G	<i>Bromus tectorum</i> (a)	2	-	1	-	.03	-
G	<i>Carex</i> spp.	3	*54	1	20	.03	.73
G	<i>Koeleria cristata</i>	42	36	15	15	.52	.37
G	<i>Poa fendleriana</i>	69	43	25	17	1.45	.95
G	<i>Poa nevadensis</i>	-	*14	-	7	-	.19
G	<i>Poa pratensis</i>	156	162	40	44	6.88	3.09
G	<i>Sitanion hystrix</i>	13	*-	4	-	.10	-
G	<i>Stipa columbiana</i>	15	*76	7	32	.30	1.12
G	<i>Stipa comata</i>	183	*137	57	41	6.68	5.70

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
		Total for Annual Grasses	2	0	1	0	0.03
Total for Perennial Grasses	694	750	217	253	18.30	15.47	
Total for Grasses	696	750	218	253	18.34	15.47	
F	<i>Achillea millefolium</i>	18	25	7	9	.19	.55
F	<i>Agoseris glauca</i>	-	*41	-	21	-	.22
F	<i>Alyssum alyssoides</i> (a)	-	1	-	1	-	.00
F	<i>Antennaria rosea</i>	27	21	10	8	.73	.55
F	<i>Androsace septentrionalis</i> (a)	11	*-	4	-	.07	-
F	<i>Arabis</i> spp.	8	-	3	-	.04	-
F	<i>Arenaria congesta</i>	227	209	74	66	3.19	4.18
F	<i>Astragalus convallarius</i>	13	33	7	14	.22	.27
F	<i>Astragalus miser</i>	155	168	59	65	6.25	5.81
F	<i>Aster</i> spp.	-	*45	-	16	-	.59
F	<i>Castilleja flava</i>	97	82	38	34	2.02	1.60
F	<i>Calochortus nuttallii</i>	3	-	1	-	.03	-
F	<i>Crepis acuminata</i>	100	125	45	50	1.42	1.70
F	<i>Delphinium bicolor</i>	4	-	2	-	.01	-
F	<i>Draba</i> spp. (a)	1	1	1	1	.03	.00
F	<i>Erigeron</i> spp.	12	*39	6	17	.05	.18
F	<i>Eriogonum</i> spp.	2	-	1	-	.00	-
F	<i>Eriogonum umbellatum</i>	25	*8	12	4	.55	.12
F	<i>Gayophytum ramosissimum</i> (a)	-	1	-	1	-	.00
F	<i>Geranium richardsonii</i>	36	52	18	23	1.82	1.22
F	<i>Hackelia patens</i>	1	*21	1	9	.00	.09
F	<i>Lupinus argenteus</i>	28	29	12	14	1.16	1.00
F	<i>Penstemon caespitosus</i>	18	27	7	10	.37	.34
F	<i>Penstemon watsonii</i>	64	58	28	28	1.56	.98
F	<i>Phlox longifolia</i>	15	*46	5	20	.05	.14
F	<i>Polygonum douglasii</i> (a)	44	2	14	1	.36	.00
F	<i>Potentilla gracilis</i>	-	14	-	5	-	.97
F	<i>Potentilla pennsylvanica</i>	19	27	10	9	.87	.76
F	<i>Senecio multilobatus</i>	5	*-	4	-	.04	-
F	<i>Taraxacum officinale</i>	15	29	7	11	.19	.21
F	<i>Thalictrum fendleri</i>	-	1	-	1	-	.00
F	<i>Tragopogon dubius</i>	2	3	1	1	.00	.00
F	<i>Viguiera multiflora</i>	9	-	3	-	.33	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
	Total for Annual Forbs	56	5	19	4	0.46	0.01
	Total for Perennial Forbs	903	1103	361	435	21.16	21.56
	Total for Forbs	959	1108	380	439	21.62	21.58

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 22

Type	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
B	Amelanchier utahensis	6	8	.78	.56
B	Artemisia tridentata vaseyana	88	10	21.83	2.33
B	Chrysothamnus viscidiflorus viscidiflorus	19	17	.70	.19
B	Juniperus osteosperma	1	1	-	-
B	Purshia tridentata	2	3	.03	.06
B	Quercus gambelii	0	1	-	.15
B	Symphoricarpos oreophilus	23	23	1.93	2.03
B	Tetradymia canescens	4	5	.06	.03
	Total for Browse	143	68	25.34	5.37

BASIC COVER --

Herd unit 10R, Study no: 22

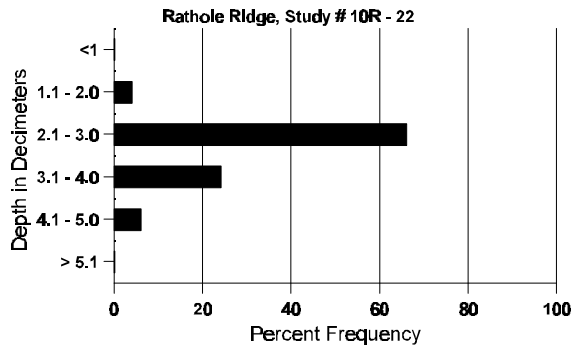
Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
Vegetation	465	460	62.92	46.29
Rock	24	25	.14	.24
Pavement	31	77	.33	.34
Litter	491	454	58.79	50.99
Cryptogams	45	8	.98	.07
Bare Ground	213	356	14.93	28.55

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 22, Study Name: Rathole Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.4	61.4 (13.7)	6.3	40.0	37.4	22.6	3.6	12.0	124.8	.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 22

Type	Quadrat Frequency	
	'98	'00
Rabbit	-	2
Elk	14	34
Deer	-	8
Cattle	8	-

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'98	'00	'98	'00
-	35	-	N/A
357	426	27 (68)	33 (81)
17	26	1 (3)	2 (5)
96	9	8 (20)	1 (2)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 22

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Amelanchier utahensis</i>																		
Y	98	2	-	-	2	-	-	-	-	-	4	-	-	-	80		4	
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	98	-	5	-	-	-	-	-	-	4	1	-	-	100	66	50	5	
	00	1	-	-	-	-	-	2	-	3	-	-	-	60	63	55	3	
D	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	-	-	-	-	1	-	-	-	1	-	-	-	20			1	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	60			3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		56%			00%			00%			+25%							
'00		08%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	180	Dec:	0%				
											'00	240		8%				
<i>Artemisia tridentata vaseyana</i>																		
S	98	26	-	-	-	-	-	-	-	26	-	-	-	520			26	
	00	4	-	-	-	-	-	-	-	4	-	-	-	80			4	
Y	98	39	1	-	-	-	-	-	-	40	-	-	-	800			40	
	00	8	-	-	-	-	-	-	-	8	-	-	-	160			8	
M	98	132	2	3	3	-	-	-	-	140	-	-	-	2800	35	45	140	
	00	12	1	-	-	-	-	-	-	13	-	-	-	260	27	27	13	
D	98	21	-	2	-	-	-	-	-	10	-	-	13	460			23	
	00	4	2	-	-	-	-	-	-	6	-	-	-	120			6	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	680			34	
	00	-	-	-	-	-	-	-	-	-	-	-	-	3760			188	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		01%			02%			06%			-87%							
'00		11%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	4060	Dec:	11%				
											'00	540		22%				
<i>Atriplex canescens</i>																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	0	14	-	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'98	0	Dec:	-				
											'00	0		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus depressus																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	2	10	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-			
												'00	0		-			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	98	9	-	-	2	-	-	-	-	-	11	-	-	-	220		11	
	00	11	-	-	-	-	2	-	-	-	13	-	-	-	260		13	
M	98	28	-	-	7	-	-	-	-	-	35	-	-	-	700	13	16	
	00	27	-	-	1	-	-	-	-	-	28	-	-	-	560	9	10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			-11%							
'00		00%			05%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	920	Dec:	-			
												'00	820		-			
Juniperus osteosperma																		
D	98	1	-	-	-	-	-	-	-	-	-	-	1	20			1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			100%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	20	Dec:	100%			
												'00	20		100%			
Purshia tridentata																		
Y	98	-	-	-	1	1	-	-	-	-	2	-	-	-	40		2	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	22	62	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	26	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	100			5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		33%			00%			00%			+57%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	60	Dec:	-			
												'00	140		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
<i>Quercus gambelii</i>																	
Y	98	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	3	-	-	-	-	-	-	-	3	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'98		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-		
												'00	60		-		
<i>Symphoricarpos oreophilus</i>																	
S	98	2	-	-	3	-	-	-	-	-	-	-	5	100		5	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	98	18	1	-	12	-	-	-	-	-	-	-	31	620		31	
	00	70	-	-	-	-	-	-	-	-	-	-	70	1400		70	
M	98	10	11	-	8	-	-	-	-	-	-	-	29	580	19 32	29	
	00	3	-	-	9	-	-	-	-	-	-	-	12	240	13 18	12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'98		20%			00%			00%			+27%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'98	1200	Dec:	-		
												'00	1640		-		
<i>Tetradymia canescens</i>																	
Y	98	5	-	-	-	-	-	-	-	-	-	-	5	100		5	
	00	8	-	-	-	-	-	-	-	-	-	-	8	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'98		00%			00%			00%			+38%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'98	100	Dec:	-		
												'00	160		-		

Trend Study 10R-23-00

Study site name: South Rathole.

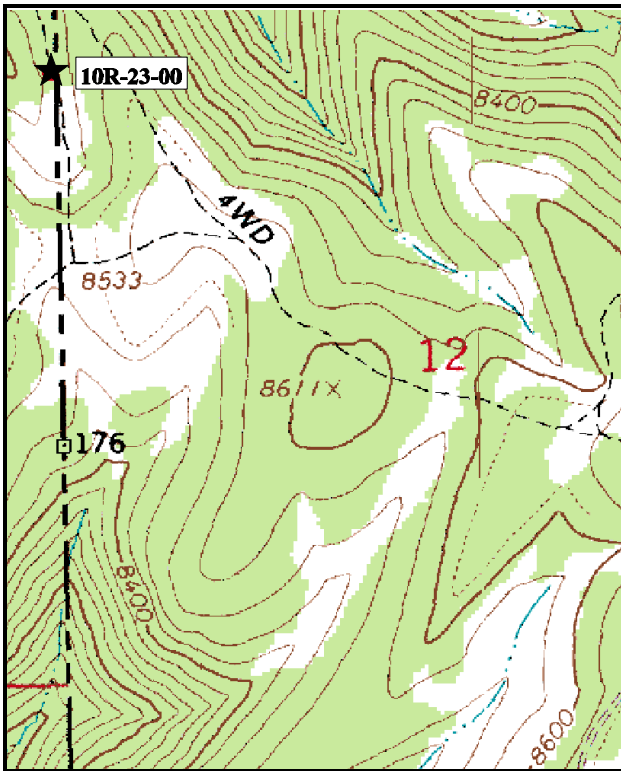
Range type: Aspen-Grass.

Compass bearing: frequency baseline 310°M.

Footmark (first frame placement) 5 feet, No frequency cross-belts, Quadrats were read along baseline starting on the left at 5' then alternating sides every 5' ending on 100'. Quadrats bases are in line with each foot mark so that the quadrat is parallel to the baseline.

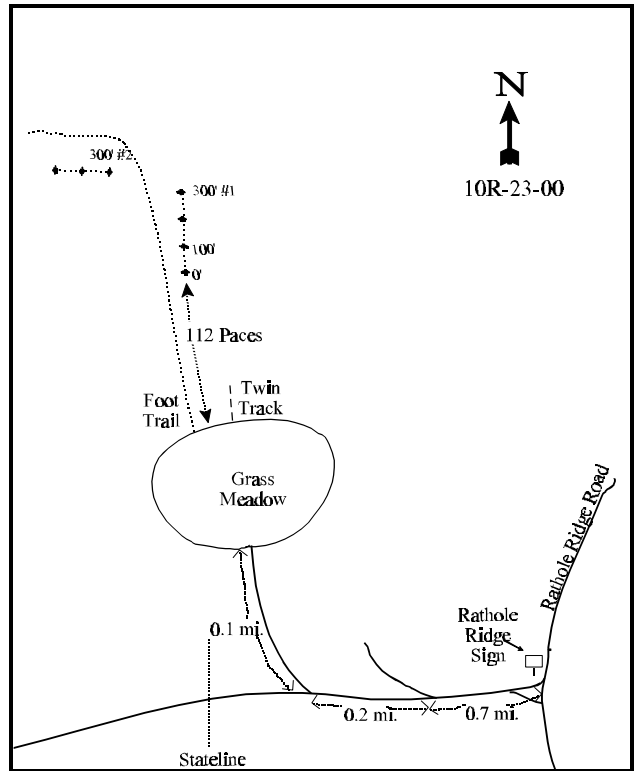
LOCATION DESCRIPTION

From the Junction of Atchee Ridge Road, Rathole Canyon and Rathole Ridge Road follow Rathole Ridge Road up to the a sign pointing to Rathole Ridge. Take this road 0.7 miles to the first fork. Stay left 0.2 miles to another fork, take a right here follow this road 0.1 miles to a grassy meadow, park here. A small trail (not the twin track) starts at the north east corner of the meadow, follow this trail for about 0.25 miles through the thin aspen stand to the 0' stake on the right of the trail. The first 100' is at a bearing of 310°M with the 200' and 300' at 315°M and 291°M respectively. The beginning of the 400' belt is located about 150' from the end of the 300' belt at 240°M. The 400' and 500' belts are at 256°M and 254°M respectively.



Map name: Rathole Ridge

Township 6 S, Range 105 W, Section 12.



Diagrammatic Sketch

UTM 4380457.989 N, 667394.466 E

DISCUSSION

Trend Study No. 10R-23

The South Rathole transect was established in 1998 as a special studies site to monitor the perceived conflicts over elk and livestock use in the North Bookcliffs. The transect was placed in a small narrow meadow surrounded by aspen and large scattered serviceberry. Elevation is 8,200 feet with a northwest aspect and a moderate slope of 10-12%. Pellet group transect data in 1998 estimated 10 elk days use/acre (25 edu/ha) and 7 cow days use/acre (17 cdu/ha). Pellet group transect data in 2000 estimates moderate use by elk at 66 elk days use/acre (163 edu/ha). No deer pellets were sampled in the pellet transect and were found in only 1 quadrat. Use by livestock is estimated at 2 cow days use/acre (5 cdu/ha) in 2000. This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soils on the site are loamy in texture with an average temperature of nearly 61°F at nearly 18 inches in depth. The soil is relatively deep with an estimated effective rooting depth of just over 29 inches. The stoniness index profile estimated from penetrometer readings shows most readings to be over 24 inches in depth. However, there is very little rock in the profile and these penetrometer readings are more a measure of compaction than rockiness. The soil reaction is slightly acidic (pH of 6.3). Organic matter is moderately high at nearly 5%. Vegetation and litter cover are abundant in 2000, at 56% and 67% respectively. Erosion is minimal due to this abundant protective ground cover.

The immediate area where the transect was placed is dominated by herbaceous vegetation with scattered browse. However, the narrow meadow is surrounded by aspen, serviceberry, and snowberry along the meadow's edge. Browse species combine to contribute only 8% of the total vegetation cover. Snowberry provides over half of the browse cover and is estimated at 740 plants/acre in 2000. Most of the population consists of mature plants (73%), but recruitment is high at 22%. Use is light and vigor good for the snowberry population. Mountain big sagebrush was estimated at 1,340 plants/acre in 1998, slightly decreasing to 1,200 plants/acre in 2000. This decrease in density is due to fewer young plants in population in 2000. Even with the decrease in the young age class, recruitment has been high in both sampling years, 79% in 1998 and 42% in 2000. Percent decadency is low at 7% in 2000, use is mostly light, and vigor generally good. Serviceberry is scattered throughout the area with an estimated population of 40 plants/acre in 2000. Serviceberry is more dense on the slopes to the north of the transect with many large individuals being partly unavailable to use due to their height. Use is light and vigor good on the few plants that were sampled along the transect, with percent decadency being high at 50% with a high amount of dead stems within each serviceberry. Aspen is sparse on the meadow itself, but is abundant on the surrounding area. In 2000, aspen was estimated at 100 plants/acre in the meadow with all of these being young sprouts. Use is light and vigor good on the young plants that were sampled.

Currently, both the grasses and forbs provide nearly the same amount of plant cover at around 21%. Grasses consist of eight perennial species with Kentucky bluegrass being the most dominant. Kentucky bluegrass provided over 80% of the grass cover in both 1998 and 2000. Over one-third of the total vegetative cover in both years sampled. Other moderately abundant grasses include thickspike wheatgrass and subalpine needlegrass. Grasses increased in sum of nested frequency in 2000. Forbs are abundant consisting mostly of increasers such as dandelion, yarrow, and Eaton fleabane. Dandelion provides 56% of the forb cover in both 1998 and 2000, nearly one-fourth of the total vegetative cover in both years. Perennial forbs increased in sum of nested frequency in 2000, with annual species slightly decreasing in nested frequency and remaining widely scattered.

1998 APPARENT TREND ASSESSMENT

Soils appear stable with abundant protective ground cover from vegetation and litter. Erosion is minimal and should remain so in the future. Browse is not particularly abundant in the meadow itself, but as this is summer range, the browse component is not as important as at lower elevation transitional and winter ranges. The surrounding area does consist of some dense aspen clones and large serviceberry which provides good cover for wildlife. Herbaceous vegetation is abundant. Grasses are fairly diverse with eight species being sampled. These species combine to provide over 29% cover. Forbs are abundant and diverse and contribute to nearly 22% average cover. The main negative factor with the forb component is that increasers are dominant, especially dandelion.

2000 TREND ASSESSMENT

Trend for soils is stable. Vegetation and litter cover remain abundant and provide adequate protective ground cover to minimize erosion. Trend for browse is stable. Mountain big sagebrush continues to have high recruitment, light use, and good vigor. This would be typical for summer range. Young aspen plants are slowly moving into the meadow and show light use and good vigor. Trend for the herbaceous understory is slightly up, but remains in poor condition as increaser species are dominant. Perennial sum of nested frequency for both grasses and forbs increased in 2000.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 23

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron dasystachyum	65	*122	27	49	1.01	.96
G	Agropyron trachycaulum	-	*13	-	6	-	.13
G	Bromus carinatus	21	6	5	3	.66	.07
G	Carex spp.	9	14	5	7	.46	.37
G	Poa fendleriana	9	*1	6	1	.05	.00
G	Poa pratensis	470	462	98	97	25.20	17.49
G	Stipa columbiana	68	*105	26	38	2.05	2.28
G	Stipa comata	1	1	1	1	.03	.00
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		643	724	168	202	29.47	21.32
Total for Grasses		643	724	168	202	29.47	21.32
F	Achillea millefolium	157	175	60	63	2.39	1.64
F	Agoseris glauca	-	*32	-	16	-	.13
F	Antennaria rosea	1	-	1	-	.03	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
		F	<i>Androsace septentrionalis</i> (a)	27	*11	12	6
F	<i>Arabis</i> spp.	-	*7	-	4	-	.02
F	<i>Astragalus convallarius</i>	5	-	2	-	.06	-
F	<i>Aster</i> spp.	30	39	10	13	.34	.71
F	<i>Astragalus</i> spp.	15	38	5	12	.51	.72
F	<i>Castilleja</i> spp.	1	-	1	-	.00	-
F	<i>Chenopodium album</i> (a)	2	2	1	1	.03	.00
F	<i>Collinsia parviflora</i> (a)	2	-	1	-	.03	-
F	<i>Crepis acuminata</i>	7	12	3	4	.06	.07
F	<i>Delphinium nuttallianum</i>	-	1	-	1	-	.00
F	<i>Erigeron eatonii</i>	26	64	11	21	.25	1.65
F	<i>Eriogonum</i> spp.	4	12	2	5	.01	.06
F	<i>Ipomopsis aggregata</i>	3	4	2	2	.03	.01
F	<i>Lupinus argenteus</i>	60	*36	28	16	1.51	.36
F	<i>Penstemon caespitosus</i>	1	42	1	18	.00	.72
F	<i>Penstemon</i> spp.	30	1	11	1	.43	.03
F	<i>Phlox longifolia</i>	20	46	11	20	.42	.26
F	<i>Polygonum douglasii</i> (a)	-	3	-	1	-	.03
F	<i>Potentilla gracilis</i>	10	12	4	5	.07	.05
F	<i>Ranunculus inamoenus</i>	-	5	-	2	-	.03
F	<i>Silene menziesii</i>	-	3	-	1	-	.03
F	<i>Taraxacum officinale</i>	320	*338	94	92	12.14	11.67
F	<i>Thalictrum fendleri</i>	-	5	-	1	-	.03
F	<i>Tragopogon dubius</i>	12	18	5	9	.19	.07
F	<i>Vicia americana</i>	154	148	52	54	3.19	2.35
F	<i>Viola</i> spp.	-	3	-	1	-	.03
Total for Annual Forbs		31	16	14	8	0.19	0.09
Total for Perennial Forbs		856	1041	303	361	21.68	20.71
Total for Forbs		887	1057	317	369	21.87	20.80

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 10R, Study no: 23

Type	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
B	Amelanchier utahensis	1	2	.41	.63
B	Artemisia tridentata vaseyana	31	24	.84	.78
B	Populus tremuloides	0	5	-	.16
B	Symphoricarpos oreophilus	22	19	3.32	2.27
Total for Browse		54	50	4.57	3.86

CANOPY COVER --

Herd unit 10R, Study no: 23

Species	Percent Cover	
	'98	'00
Populus tremuloides	-	9

BASIC COVER --

Herd unit 10R, Study no: 23

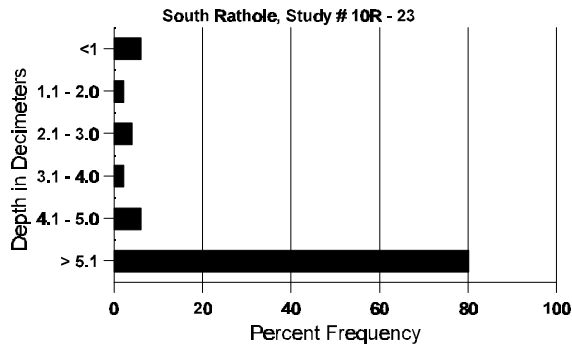
Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
Vegetation	492	491	62.93	56.22
Rock	28	32	.29	.18
Pavement	63	84	.74	.50
Litter	499	482	61.59	67.47
Cryptogams	76	49	1.25	.90
Bare Ground	208	234	12.44	10.97

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 23, Study Name: South Rathole

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
29.1	60.8 (17.7)	6.3	50.0	31.4	18.6	4.7	14.3	156.8	.8

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 23

Type	Quadrat Frequency		Pellet Transect			
	'98	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'98	'00	'98	'00
Elk	9	22	131	861	10 (25)	66 (164)
Deer	-	1	-	-	-	-
Cattle	4	-	78	17	7 (16)	2 (4)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 23

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total							
		1	2	3	4										
Amelanchier utahensis															
S	98	-	-	-	-	-	-	-	0		0				
	00	-	-	-	1	-	-	-	-	1	-	20	1		
M	98	-	-	-	-	-	-	-	-	-	-	0	53	48	0
	00	1	-	-	-	-	-	-	-	1	-	20	25	21	1
D	98	-	-	1	-	-	-	-	-	1	-	20			1
	00	1	-	-	-	-	-	-	-	1	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>% Change</u>					
'98		00%			100%			00%		+50%					
'00		00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)						'98	20	Dec:	100%						
						'00	40		50%						

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	98	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	00	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
Y	98	53	-	-	-	-	-	-	-	-	53	-	-	-	1060		53	
	00	24	1	-	-	-	-	-	-	-	25	-	-	-	500		25	
M	98	10	1	-	-	-	-	-	-	-	10	1	-	-	220	24	25	
	00	25	6	-	-	-	-	-	-	-	31	-	-	-	620	20	20	
D	98	1	2	-	-	-	-	-	-	-	2	-	-	1	60		3	
	00	4	-	-	-	-	-	-	-	-	3	-	-	1	80		4	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		04%			00%			01%			-10%							
'00		12%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	1340	Dec:	4%			
												'00	1200		7%			
<i>Populus tremuloides</i>																		
Y	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-			
												'00	100		-			
<i>Symphoricarpos oreophilus</i>																		
Y	98	20	-	-	1	-	-	-	-	-	21	-	-	-	420		21	
	00	6	-	-	2	-	-	-	-	-	8	-	-	-	160		8	
M	98	24	1	1	-	-	-	-	-	-	26	-	-	-	520	26	41	
	00	22	-	-	5	-	-	-	-	-	27	-	-	-	540	26	41	
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		02%			02%			00%			-21%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	940	Dec:	0%			
												'00	740		5%			

Trend Study 10R-24-00

Study site name: Upper Tent Canyon.

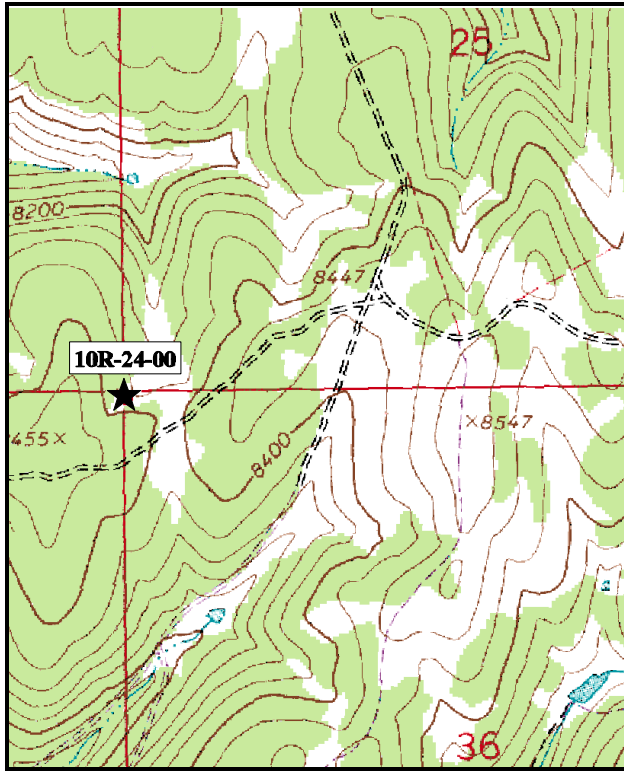
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 43°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11 and 95 ft), line 2(34 ft), line 3(59 ft), line 4(71 ft).

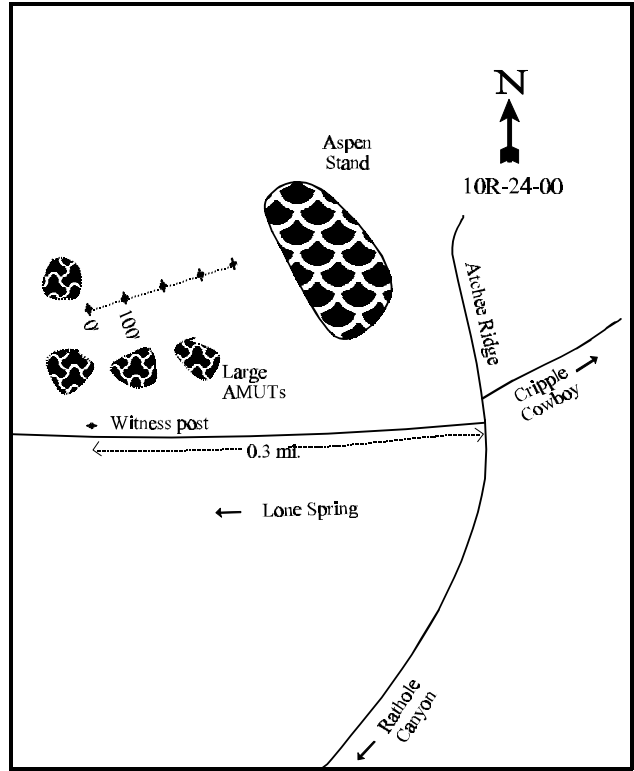
LOCATION DESCRIPTION

From Atchee Ridge Road take the road to Lone Spring 0.3 miles to a witness post on the right side of the road. The site is located in a small bowl with aspen on the northeast side and serviceberry all around. The 0' stake is 72 paces from the witness post at 305°M and is marked with browse tag #112.



Map name: Rathole Ridge

Township 5 S, Range 104 W, Section 36 (CO).



Diagrammatic Sketch

UTM 4383684.444 N, 669299.662 E

DISCUSSION

Trend Study No. 10R-24

The Upper Tent Canyon study was established in 1998 as a special studies site to address perceived conflicts over elk and livestock use in the North Bookcliffs. This site lies in a sagebrush-grass bowl surrounded by aspen on the northeast. Thick pockets of large serviceberry surround the bowl on the south and west. The site has a variable slope from 5-15%, aspect is northerly at an elevation of about 8,000 feet. Animal use has been light in both 1998 and 2000. Pellet group transect data from 1998 estimated one deer days/acre (2 ddu/ha), 31 elk days use/acre (77 edu/ha), and 21 cow days/acre (52 cdu/ha). In the summer of 2000, pellet group data estimated one deer days use/acre (2 ddu/ha), 27 elk days use/acre (67 edu/ha), and 11 cow days use/acre (27 cdu/ha). This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soils are loamy in texture with an average temperature of 62°F at nearly 18 inches in depth. The soil is relatively deep with an estimated effective rooting depth of over 27 inches. There is very little rock within the profile or on the soil surface. Phosphorus (7 ppm) is slightly lower than the 10 ppm that is necessary for normal plant growth and development. Organic matter is moderately high at 4.1% with the soil reaction being moderately acidic (pH of 5.5). Due to abundant vegetation and litter cover and very little bare soil, erosion is minimal. The major source of soil disturbance comes from rodent burrows. Minor slumping is occurring on the steeper, upward edges of the slope above the transect.

As this site is transitional/summer range, browse is not the key component of this site. Nonetheless, browse is moderately abundant providing about 9% average cover in both 1998 and 2000, with mountain big sagebrush providing over 95% of this. Mountain big sagebrush has an estimated density of 5,760 plants/acre in 2000 with high levels of recruitment (55%) and reproductive potential (62%). Percent decadency is low at 3%, use is mostly light, and vigor good. Average leader growth for big sagebrush is seven inches in 2000. Other species sampled include: serviceberry, snowberry, and currant. These species are infrequent in the large depression where the transect was placed. Serviceberry is very large and abundant on the slopes surrounding the transect providing abundant cover for wildlife species. A large aspen clone also provides good cover to the east of the site.

The herbaceous understory is abundant with grasses providing nearly 31% average cover and forbs providing nearly 29% average cover in 2000. However, composition is poor as four species, Kentucky bluegrass, dandelion, aster, and yarrow, all increasers, contribute 93% of the total herbaceous cover in 2000. These species will increase under heavy grazing pressure. Grasses other than Kentucky bluegrass, although infrequent, were noted as being large statured in 2000. All forbs, including the increaser species listed above are low statured and unutilized in 2000.

1998 APPARENT TREND ASSESSMENT

Soils appear stable with abundant protective ground cover from vegetation and litter, and a low cover value for bare soil. Erosion appears to be minimal as a result, with the main source of soil disturbance coming from rodent burrows. Browse is dominated by mountain big sagebrush which is moderately dense and provides over 8% average cover. Browse trend appears to be stable to slightly up with low decadency, light use, good vigor, and high recruitment. However, browse is not the key component on this summer/transitional range. The herbaceous understory is abundant, but dominated by increaser species.

2000 TREND ASSESSMENT

Soils are stable with vegetation and litter cover remaining high and percent cover from bare ground decreasing. Browse trend is stable with mountain big sagebrush being dominant. Recruitment and reproductive potential remain high and percent decadency is low. Use remains light and vigor is good on sagebrush. Trend for the herbaceous understory is slightly up overall, but remains in a less than ideal condition as several increasers dominate. Although perennial grasses slightly decreased in sum of nested frequency, perennial forbs increased in sum of nested frequency. Combined, all perennial herbaceous species increased in nested frequency in 2000.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly up, but dominated by increasers (4)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 24

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron dasystachyum	26	11	9	5	.36	.12
G	Agropyron trachycaulum	-	6	-	3	-	.06
G	Carex spp.	6	3	2	1	.06	.15
G	Muhlenbergia pungens	5	-	1	-	.38	-
G	Poa fendleriana	9	1	3	1	.21	.00
G	Poa pratensis	485	487	99	100	32.15	30.10
G	Stipa columbiana	26	27	12	13	.85	.53
G	Stipa comata	-	-	-	-	-	.00
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		557	535	126	123	34.02	30.98
Total for Grasses		557	535	126	123	34.02	30.98
F	Achillea millefolium	178	181	66	65	1.94	3.07
F	Antennaria rosea	1	*29	1	11	.03	.45
F	Androsace septentrionalis (a)	57	*25	22	12	.53	.30
F	Arabis spp.	3	*16	2	9	.01	.05
F	Arenaria spp.	1	5	1	2	.03	.06
F	Aster spp.	98	*152	31	47	1.40	4.42
F	Astragalus spp.	-	7	-	2	-	.03
F	Crepis acuminata	10	*-	6	-	.13	-
F	Delphinium nuttallianum	1	-	1	-	.00	.00
F	Erigeron eatonii	50	56	20	24	.69	.92
F	Lupinus argenteus	13	8	7	4	.29	.07

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
		F	Penstemon watsonii	4	3	2	2
F	Phlox longifolia	7	*29	3	13	.09	.21
F	Polygonum douglasii (a)	6	-	2	-	.18	-
F	Potentilla gracilis	1	*7	1	3	.03	.18
F	Ranunculus spp.	9	23	7	10	.06	.06
F	Taraxacum officinale	318	*347	90	96	11.86	18.14
F	Thlaspi montanum	-	*10	-	5	-	.03
F	Tragopogon dubius	1	7	1	3	.00	.18
F	Vicia americana	43	52	14	23	.88	.53
F	Viola spp.	3	-	1	-	.03	-
Total for Annual Forbs		63	25	24	12	0.71	0.30
Total for Perennial Forbs		741	932	254	319	17.56	28.61
Total for Forbs		804	957	278	331	18.27	28.92

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 24

Type	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
		B	Amelanchier utahensis	0	0
B	Artemisia tridentata vaseyana	74	81	8.06	9.34
B	Symphoricarpos oreophilus	6	11	.24	.39
Total for Browse		80	92	8.31	9.73

BASIC COVER --

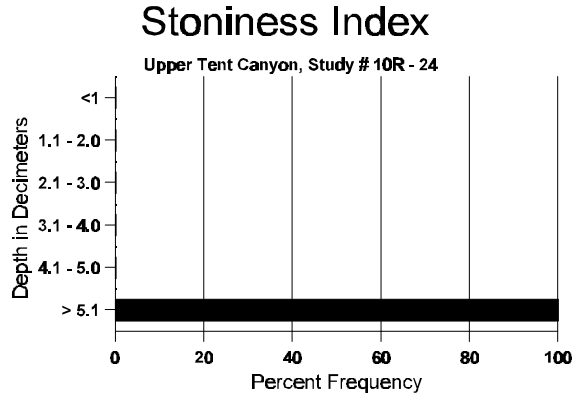
Herd unit 10R, Study no: 24

Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
	Vegetation	497	497	61.51
Rock	2	2	.01	.01
Pavement	44	32	.22	.15
Litter	496	486	60.89	77.77
Cryptogams	18	14	.30	.42
Bare Ground	243	183	14.17	4.70

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 24, Study Name: Upper Tent Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
27.5	62.2 (17.7)	5.5	40.0	33.4	18.6	4.1	7.0	172.8	0.6



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 24

Type	Quadrat Frequency		Pellet Transect			
	'98	'00	Pellet Groups per Acre		Days Use per Acre (ha)	
			'98	'00	'98	'00
Rabbit	1	2	-	-	-	-
Elk	18	18	409	357	31 (78)	27 (67)
Deer	1	-	9	9	1 (2)	1 (2)
Cattle	11	1	235	131	21 (52)	11 (27)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 24

A Y G R E	S	98	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
			1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																			
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
		'00	2	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing			<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98			00%			00%			00%										
'00			00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-				
												'00	0		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	98	54	-	-	11	-	-	-	-	-	65	-	-	-	1300		65	
	00	179	-	-	-	-	-	-	-	-	179	-	-	-	3580		179	
Y	98	119	-	-	-	-	-	-	-	-	119	-	-	-	2380		119	
	00	158	-	-	-	-	-	-	-	-	158	-	-	-	3160		158	
M	98	76	-	-	-	-	-	-	-	-	76	-	-	-	1520	32 36	76	
	00	115	7	-	-	-	-	-	-	-	112	10	-	-	2440	27 31	122	
D	98	4	2	-	-	-	-	-	-	-	2	-	-	4	120		6	
	00	7	1	-	-	-	-	-	-	-	7	-	-	1	160		8	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	740		37	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	500		25	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		.99%			00%			02%			+30%							
'00		03%			00%			.34%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	4020	Dec:	3%			
												'00	5760		3%			
<i>Ribes spp.</i>																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	34 37		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-			
												'00	0		-			
<i>Symphoricarpos oreophilus</i>																		
S	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	98	2	-	-	4	-	-	-	-	-	6	-	-	-	120		6	
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240		12	
M	98	3	-	-	1	-	-	-	-	-	4	-	-	-	80	22 25	4	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	24 37	1	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			+23%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	200	Dec:	-			
												'00	260		-			

Trend Study 10R-28-99

Study site name: Indian Ridge #2.

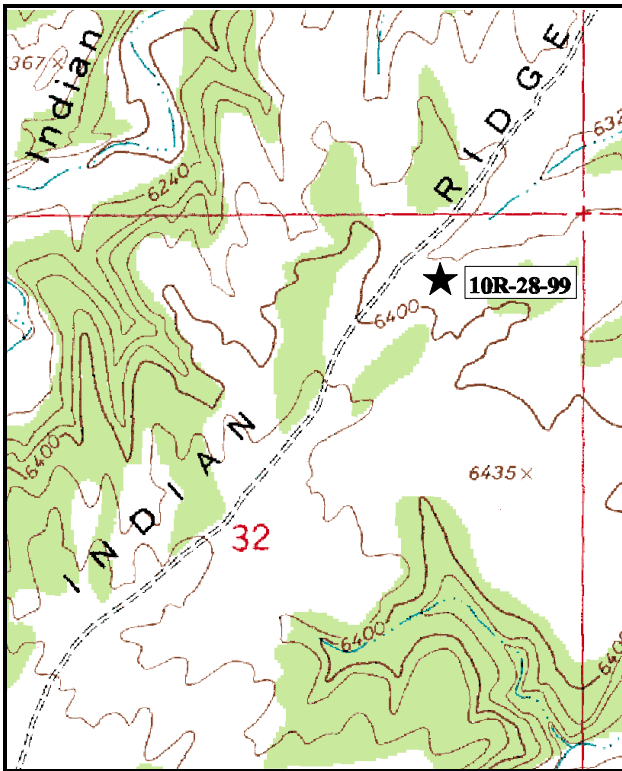
Range type: Salt Desert.

Compass bearing: frequency baseline 31°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

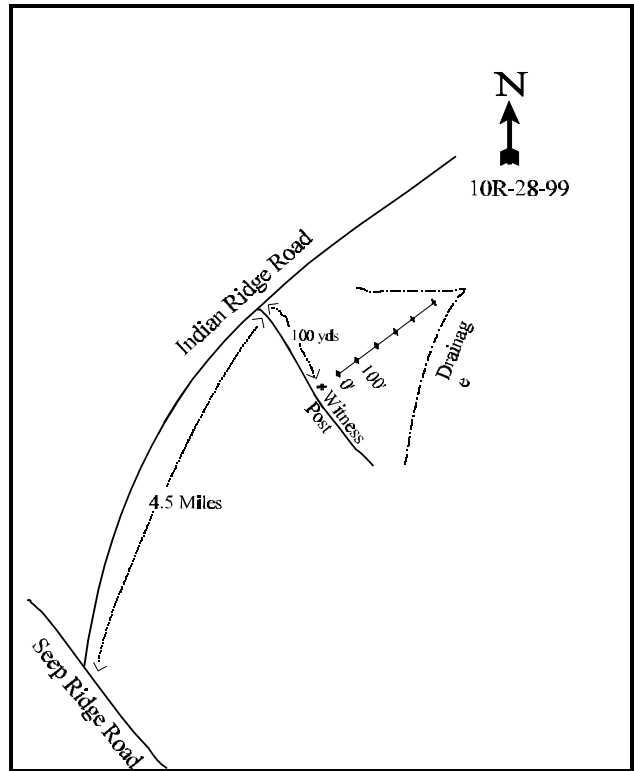
LOCATION DESCRIPTION

From the intersection of Seep Ridge Road and Indian Ridge Road, Follow Indian Ridge Road 4.5 miles to where a road breaks off to the right. Take this road for 100 yards to a witness post on the left side of the road. From the witness post the 0' stake is 6 paces at 31M and is marked with browse tag # 402. Line 2 is only 75' long.



Map name: Cooper Canyon

Township 13 S, Range 23 E, Section 32.



Diagrammatic Sketch

UTM 4389906.581 N, 640677.406 E

DISCUSSION

Trend Study No. 10R-28

The Indian Ridge #2 trend study was established in 1999. It is about two miles northeast of the original Indian Ridge trend study (10-1) which was established in 1986. It samples a salt desert shrub type at an elevation of 6,500 feet. The site is nearly level with a slight north aspect. The area appears to have burned 10 to 20 years ago and is now dominated by cheatgrass. Remnant unburned areas nearby have little herbaceous vegetation and support stands of black sagebrush. Indian Ridge is used by deer and elk in the winter and grazed by cattle in the spring and winter. Pellet group data estimates 13 deer and 11 elk days use/acre (32 ddu/ha and 27 edu/ha). Cattle use was estimated at 74 days use/acre (183 cdu/ha). Cattle pats encountered appear to be mostly from last fall ('98).

Soil at the site is relatively deep but compacted with an estimated effective rooting depth of nearly 17 inches. It is a clay loam with a soil reaction that is slightly alkaline (pH of 7.8). There is very little rock or pavement on the surface or within the soil profile. There is no significant erosion occurring due to the levelness of the site combined with the abundant vegetation and litter cover.

The site supports a variety of preferred browse species including: fourwing saltbush, winterfat, bud sage, and black sagebrush. Fourwing saltbush provides 68% of the shrub cover with an estimated density of 1,240 plants/acre. Mature plants make up 68% of the population. They average nearly three feet in height with a crown diameter of nearly four feet. These shrubs show moderate to heavy use, but have normal vigor and low decadence. The most common shrub is winterfat. It has an estimated density of 10,260 plants/acre which provides 28% of the total browse cover. Ninety percent of the population consist of small mature plants measuring only nine inches in height with a crown of eight inches. Utilization is also judged moderate to heavy with vigor normal on nearly all plants and percent decadence is low at only 1%. The small population of bud sage found on the site shows heavy use. Mature plants average only four inches in height, probably due to continued browsing pressure. The few black sagebrush sampled on the site are also heavily browsed. The only other shrubs sampled on the site include some broom snakeweed and a few prickly pear cactus.

Annual and perennial grasses dominate the site. They provide 77% of the total vegetation cover. The most common grass is cheatgrass which accounts for 70% of the total grass cover. The only common perennial grass is thickspike wheatgrass that grows in large patches. Forbs are rare and produce less than 1% cover. Scarlet globemallow is the most common species.

1999 APPARENT TREND ASSESSMENT

The soil appears to be well protected with no significant erosion occurring at this time. Preferred browse show moderate to heavy use, but appear to have stable age class distributions. The low stature of winterfat and bud sage appear to be due to continual use during the late spring and summer. The herbaceous understory is abundant, however the composition is poor with cheatgrass providing the bulk of the cover (70%).

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 28

T y p e	Species	Nested Frequency	Quadrat Frequency	Average Cover %
		'99	'99	'99
G	Agropyron dasystachyum	201	49	10.38
G	Bouteloua gracilis	11	4	.07
G	Bromus tectorum (a)	387	91	24.73
G	Hilaria jamesii	4	1	.03
G	Poa secunda	5	2	.03
G	Sporobolus cryptandrus	21	7	.28
Total for Annual Grasses		387	91	24.73
Total for Perennial Grasses		242	63	10.79
Total for Grasses		629	154	35.52
F	Descurainia pinnata (a)	7	4	.04
F	Lactuca serriola	3	1	.00
F	Sphaeralcea coccinea	55	20	.62
Total for Annual Forbs		7	4	0.04
Total for Perennial Forbs		58	21	0.62
Total for Forbs		65	25	0.67

BROWSE TRENDS --

Herd unit 10R, Study no: 28

T y p e	Species	Strip Frequency	Average Cover %
		'99	'99
B	Artemisia nova	2	.15
B	Artemisia spinescens	13	.07
B	Atriplex canescens	37	6.63
B	Ceratoides lanata	93	2.78
B	Gutierrezia sarothrae	6	.18
B	Opuntia spp.	1	.00
Total for Browse		152	9.82

BASIC COVER --

Herd unit 10R, Study no: 28

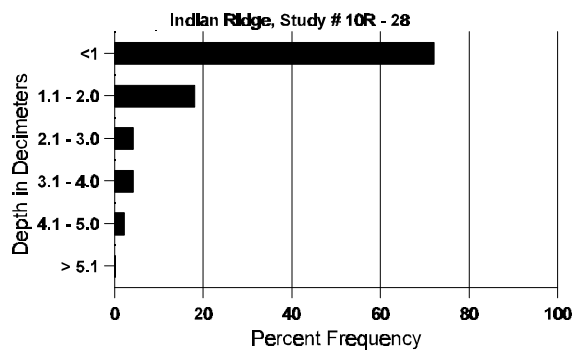
Cover Type	Nested Frequency	Average Cover %
	'99	'99
Vegetation	474	48.66
Rock	14	.03
Pavement	138	1.44
Litter	499	63.68
Cryptogams	6	.01
Bare Ground	231	9.13

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 28, Study Name: Indian Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.7	72.8 (18.7)	7.9	34.9	26.6	28.6	2.7	12.0	256.0	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 28

Type	Quadrat Frequency	Pellet Transect	
		Pellet Groups per Acre	Days Use per Acre (ha)
	'99	'99	'99
Rabbit	4	165	N/A
Elk	13	147	11(27)
Deer	2	174	13(32)
Cattle	9	887	74(183)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 28

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia nova</i>																		
M	'99	-	-	1	-	-	1	-	-	-	2	-	-	-	40	14	27	2
X	'99	-	-	-	-	-	-	-	-	-	-	-	-	40				2
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 100%			<u>Poor Vigor</u> 00%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)															'99	40	Dec:	-
<i>Artemisia spinescens</i>																		
M	'99	2	7	17	-	-	1	-	-	-	27	-	-	-	540	4	4	27
D	'99	1	5	-	-	-	-	-	-	-	-	-	-	6	120			6
X	'99	-	-	-	-	-	-	-	-	-	-	-	-	20				1
% Plants Showing '99		<u>Moderate Use</u> 36%			<u>Heavy Use</u> 55%			<u>Poor Vigor</u> 18%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)															'99	660	Dec:	18%
<i>Atriplex canescens</i>																		
Y	'99	14	1	2	-	-	-	-	-	-	17	-	-	-	340			17
M	'99	15	22	5	-	-	-	-	-	-	41	1	-	-	840	31	44	42
D	'99	1	2	-	-	-	-	-	-	-	2	-	-	1	60			3
X	'99	-	-	-	-	-	-	-	-	-	-	-	-	60				3
% Plants Showing '99		<u>Moderate Use</u> 40%			<u>Heavy Use</u> 11%			<u>Poor Vigor</u> 02%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)															'99	1240	Dec:	5%
<i>Ceratoides lanata</i>																		
Y	'99	41	4	2	1	-	-	-	-	-	48	-	-	-	960			48
M	'99	175	178	88	10	-	11	-	-	-	461	-	1	-	9240	9	8	462
D	'99	1	-	2	-	-	-	-	-	-	1	-	-	2	60			3
X	'99	-	-	-	-	-	-	-	-	-	-	-	-	40				2
% Plants Showing '99		<u>Moderate Use</u> 35%			<u>Heavy Use</u> 20%			<u>Poor Vigor</u> .58%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)															'99	10260	Dec:	1%
<i>Gutierrezia sarothrae</i>																		
M	'99	23	-	-	-	-	-	-	-	-	17	-	1	-	460	8	10	23
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 04%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)															'99	460	Dec:	-

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	3	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'99	20	Dec:	-			

Trend Study 10R-29-99

Study site name: Massey Junction .

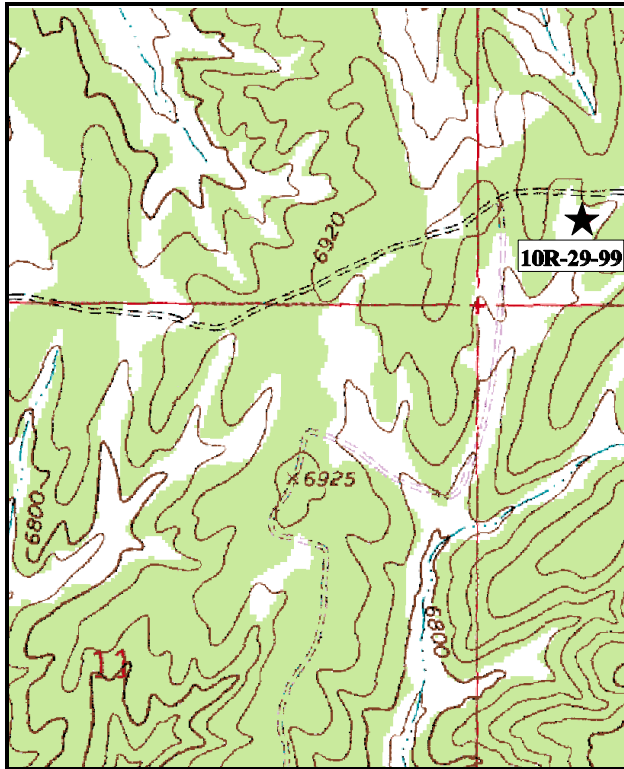
Range type: Big Sagebrush.

Compass bearing: frequency baseline 175°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

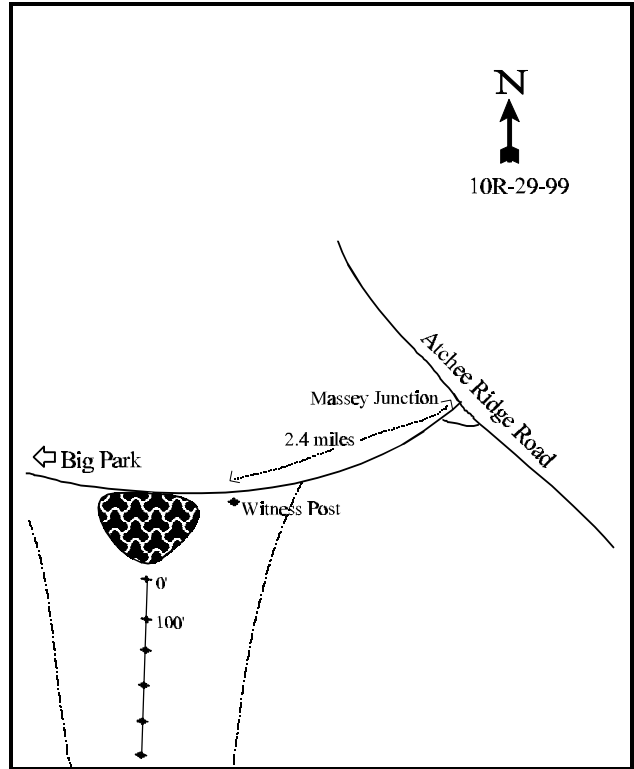
LOCATION DESCRIPTION

From Massey Junction off Atchee Ridge Road. Follow the road east towards Big Park 2.4 miles to a witness post on the left side of the road. From the witness post the 0' post is located down the canyon near the tip of the P-J Island separating the two drainages. The baseline continues down the draw.



Map name: Burnt Timber Canyon

Township 13 S, Range 24 E, Section 1.



Diagrammatic Sketch

UTM 4396959.412 N, 655569.419 E

DISCUSSION

Trend Study No. 10R-29

The Massey Junction trend study was established in 1999. It samples a narrow draw surrounded by a pinyon-juniper woodland. The draw was burned 10 to 15 years ago and now supports a salt desert shrub type. The site has a slight slope (3%) to the south and an elevation of approximately 7,000 feet. This area is used as winter range for deer and elk and grazed by cattle in the fall and spring. Pellet group data estimated 24 deer and 145 elk days use/acre (59 ddu/ha and 358 edu/ha). Cattle use was estimated at 36 days use/acre (89 cdu/ha). About one-half of the big game pellet groups and cattle pats were over one-year old. Rabbit pellets are also very common. This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soil at the site is moderately deep but compacted. Effective rooting depth is estimated at nearly 17 inches. There is little rock or pavement on the surface or within the soil profile. Soil texture is a clay loam with a soil reaction that is slightly alkaline (pH of 7.5). Organic matter is relatively high at 5.4%. Due to the abundant vegetation and litter cover, erosion is not significant at this time.

The site supports three preferred browse species: bud sage, fourwing saltbush, and winterfat. The largest shrub is fourwing saltbush which provides 60% of the browse cover. It numbers 2,100 plants/acre, 71% of which are large mature plants. Use is moderate to heavy yet vigor is normal on most plants and percent decadence is relatively low at 22%. The dead to live plant ratio is low (15 : 1). Winterfat is the most abundant shrub at a density of 10,780 plants/acre. These shrubs are short, averaging only 10 inches in height with a crown of only eight inches. Use is currently classified as light but may have been heavy in the past which kept these plants from growing taller. Most of the plants sampled are mature (93%) with young plants being fairly numerous. Bud sagebrush is abundant at 7,000 mostly mature plants/acre. Use is moderate to heavy with normal vigor. These shrubs are also short with mature plants averaging only seven inches in height with a crown diameter of seven inches. Continual use is likely the reason for this short height.

The herbaceous understory is abundant and dominated by thickspike wheatgrass which provides 78% of the grass cover and 76% of the total herbaceous cover. The only other common grass is cheatgrass. It is scattered throughout the site and accounts for 21% of the total grass cover. Forbs are rare with only two species being sampled, combined they produce only 1% cover.

1999 APPARENT TREND ASSESSMENT

There is little bare ground with abundant vegetation and litter cover to protect the soil. The key browse populations appear stable with good vigor, low percent decadence and adequate reproduction. The herbaceous understory is abundant and dominated by thickspike wheatgrass. There is some cheatgrass on the site, where it accounts for 21% of the grass cover. Forbs are rare on this site.

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 29

T y p e	Species	Nested Frequency	Quadrat Frequency	Average Cover %
		'99	'99	'99
G	<i>Agropyron dasystachyum</i>	428	97	26.81
G	<i>Bouteloua gracilis</i>	15	5	.36
G	<i>Bromus tectorum</i> (a)	335	90	7.25
G	<i>Sitanion hystrix</i>	1	1	.03
Total for Annual Grasses		335	90	7.25
Total for Perennial Grasses		444	103	27.20
Total for Grasses		779	193	34.46
F	<i>Descurainia pinnata</i> (a)	12	6	.03
F	<i>Sphaeralcea coccinea</i>	85	33	.97
Total for Annual Forbs		12	6	0.03
Total for Perennial Forbs		85	33	0.97
Total for Forbs		97	39	1.00

BROWSE TRENDS --
Herd unit 10R, Study no: 29

T y p e	Species	Strip Frequency	Average Cover %
		'99	'99
B	<i>Artemisia spinescens</i>	50	2.03
B	<i>Artemisia tridentata</i> <i>wyomingensis</i>	1	-
B	<i>Atriplex canescens</i>	63	8.95
B	<i>Ceratoides lanata</i>	95	4.01
B	<i>Gutierrezia sarothrae</i>	3	-
Total for Browse		212	15.00

BASIC COVER --

Herd unit 10R, Study no: 29

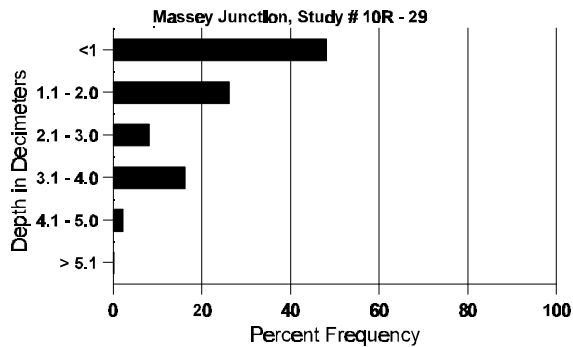
Cover Type	Nested Frequency '99	Average Cover % '99
Vegetation	484	52.90
Rock	28	.11
Pavement	191	3.76
Litter	484	49.88
Cryptogams	4	.03
Bare Ground	267	12.93

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 29, Study Name: Massey Junction

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.9	67.8 (18.0)	7.5	28.9	34.6	36.6	5.4	17.1	336.0	0.8

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 29

Type	Quadrat Frequency '99	Pellet Transect	
		Pellet Groups per Acre '99	Days Use per Acre (ha) '99
Rabbit	16	992	N/A
Elk	25	1174	90(222)
Deer	19	208	16(40)
Cattle	6	313	26(64)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 29

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia spinescens</i>																		
S	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	99	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
M	99	202	84	44	6	1	-	-	-	-	337	-	-	-	6740	7	7	337
% Plants Showing '99		<u>Moderate Use</u> 24%			<u>Heavy Use</u> 13%			<u>Poor Vigor</u> 00%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)													'99	7000	Dec:	-		
<i>Artemisia tridentata tridentata</i>																		
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	400			20
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 00%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)													'99	0	Dec:	-		
<i>Artemisia tridentata wyomingensis</i>																		
M	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	34	31	1
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 00%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)													'99	20	Dec:	-		
<i>Atriplex canescens</i>																		
Y	99	3	3	-	1	-	-	-	-	-	7	-	-	-	140			7
M	99	21	24	11	1	8	10	-	-	-	75	-	-	-	1500	33	41	75
D	99	4	9	4	-	1	5	-	-	-	16	-	-	7	460			23
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7
% Plants Showing '99		<u>Moderate Use</u> 43%			<u>Heavy Use</u> 29%			<u>Poor Vigor</u> 07%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)													'99	2100	Dec:	22%		
<i>Ceratoides lanata</i>																		
Y	99	35	-	-	-	-	-	-	-	-	35	-	-	-	700			35
M	99	401	28	-	53	6	14	-	-	-	502	-	-	-	10040	10	8	502
D	99	-	-	-	-	1	1	-	-	-	1	-	-	1	40			2
% Plants Showing '99		<u>Moderate Use</u> 06%			<u>Heavy Use</u> 03%			<u>Poor Vigor</u> .18%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)													'99	10780	Dec:	0%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
Y	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	6	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'99	100	Dec:	-			

SUMMARY

WILDLIFE MANAGEMENT UNIT - 10 (16A & 16B) BOOK CLIFFS

The Book Cliffs unit has 42 trend study sites. Of these sites, 25 monitor the winter range, nine are on transitional range, and eight are on summer range. Some apparent unit wide trends noted in 2000 are listed below.

Twenty-three of the 25 winter range trend studies sampled at least two times show the following:

Herbaceous trends

- < 83% contain some cheatgrass
- < 70% show a substantial decline in cheatgrass cover and nested frequency
- < 70% of the sites show a substantial decline in the sum of nested frequency for forbs

Sagebrush trends

- < 74% of sites show increased percent decadence for sagebrush
- < 70% of sites show more plants with poor vigor
- < 48% of sites have few or no seedlings
- < 30% have few or no young
- < 30% of winter range sites displayed reduced use of sagebrush compared to 1995
- < 26% of the winter range sites which showed reduced use since 1995 also had increased percent decadence, increased poor vigor and/or poor biotic potential (# of seedlings), and poor young recruitment

All of these trends appear to be due to a very dry fall-winter of 1999 followed by an extremely dry spring and summer in 2000. The dry conditions also affected some of the transitional and summer range trends, but to a lesser degree. Of the 17 transitional and summer range trend studies, 41% showed increased percent decadence for sagebrush, and 24% showed increased number of plants with poor vigor. Forbs also had decreased sum of nested frequency values on 41% of these sites. Trends for each site can be found in the following table:

TREND SUMMARY

	Category	1982	1988	1995	1997	2000
10-1 Indian Ridge	soil	est	4	3	NR	3
	browse	est	3	5	NR	2
	herbaceous understory	est	4	1	NR	1
10-2 McCook Ridge Exclosure	soil	est	4	4	3	3
	browse	est	5	3	2	3
	herbaceous understory	est	4	4	3	4
10-3 McCook Ridge Chaining	soil	est	5	3	NR	3
	browse	est	2	5	NR	2
	herbaceous understory	est	5	5	NR	2
10-4 Wirefence Point	soil	est	4	3	3	2
	browse	est	5	3	2	3
	herbaceous understory	est	5	3	3	2
10-5 Willow Flat	soil	est	4	3	NR	2
	browse	est	5	5	NR	3
	herbaceous understory	est	5	3	NR	2
	Category		1988	1995	1997	2000
10-6 Little Jim Canyon	soil		est	3	NR	3
	browse		est	2	NR	3
	herbaceous understory		est	1	NR	2
10-7 Cherry Mesa	soil		est	3	3	2
	browse		est	4	3	3
	herbaceous understory		est	2	2	2
10-8 Black Horse	soil		est	4	NR	3
	browse		est	4	NR	3
	herbaceous understory		est	3	NR	3
10-9 Agency Draw	soil		est	4	NR	3
	browse		est	4	NR	2
	herbaceous understory		est	4	NR	3

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up, (5) = up
 est = site established, NR = site not read

	Category		1988	1995	1997	2000
10-10 Sunday School	soil		est	3	NR	2
	browse		est	3	NR	3
	herbaceous understory		est	1	NR	5
10-11 Park Ridge	soil		est	3	NR	2
	browse		est	3	NR	2
	herbaceous understory		est	2	NR	3
10-12 Wolf Den	soil		est	3	NR	3
	browse		est	3	NR	3
	herbaceous understory		est	3	NR	3
10-13 Moon Ridge Burn	soil			est	4	5
	browse			est	3	1
	herbaceous understory			est	3	1
	Category	1986		1995		2000
10-14 East Floy Bench	soil	est		3		2
	browse	est		3		2
	herbaceous understory	est		1		3
10-15 East Thompson Bench	soil	est		3		2
	browse	est		4		3
	herbaceous understory	est		3		3
10-16 West Horse Pasture	soil	est		3		2
	browse	est		3		3
	herbaceous understory	est		4		3
10-17 East Calf Canyon	soil	est		3		2
	browse	est		4		3
	herbaceous understory	est		3		2
10-18 East Horse Pasture	soil	est		3		2
	browse	est		4		3
	herbaceous understory	est		4		3

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up, (5) = up
est = site established, NR = site not read

	Category	1986		1995		2000
10-19 Lower Cottonwood	soil	est		3		NR
	browse	est		1		NR
	herbaceous understory	est		4		NR
10-20 Upper Cottonwood	soil	est		3		2
	browse	est		3		2
	herbaceous understory	est		4		4
10-21 East Sulfur Bench	soil	est		3		NR
	browse	est		1		NR
	herbaceous understory	est		4		NR
10-22 Bryson Draw	soil	est		3		NR
	browse	est		4		NR
	herbaceous understory	est		3		NR
10-23 Bogar-She	soil			est		NR
	browse			est		NR
	herbaceous understory			est		NR
	Category		1990	1995		2000
10-24 Turner Canyon	soil		est	5		3
	browse		est	3		3
	herbaceous understory		est	3		2
10-25 Little Ridge	soil			est		NR
	browse			est		NR
	herbaceous understory			est		NR
10-26 Bitter Creek	soil					est
	browse					est
	herbaceous understory					est

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up, (5) = up
est = site established, NR = site not read

	Category	1997		2000
10R-2 Lone Spring	soil	est		3
	browse	est		5
	herbaceous understory	est		3
10R-3 Burnt Timber	soil	est		3
	browse	est		1
	herbaceous understory	est		3
10R-4 Two Water WMA	soil	est		2
	browse	est		5
	herbaceous understory	est		3
10R-5 Lower Tom Patterson Point	soil	est		3
	browse	est		2
	herbaceous understory	est		3
10R-6 Sweet Water Canyon	soil	est		3
	browse	est		3
	herbaceous understory	est		3
10R-7 Monument Ridge	soil	est		3
	browse	est		3
	herbaceous understory	est		2
10R-8 Upper Tom Patterson Point	soil	est		1
	browse	est		1
	herbaceous understory	est		1
10R-9 Winter Ridge Exclosure Out	soil	est		3
	browse	est		2
	herbaceous understory	est		4
10R-10 Winter Ridge Livestock Exclosure	soil	est		3
	browse	est		3
	herbaceous understory	est		2

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up, (5) = up
est = site established, NR = site not read

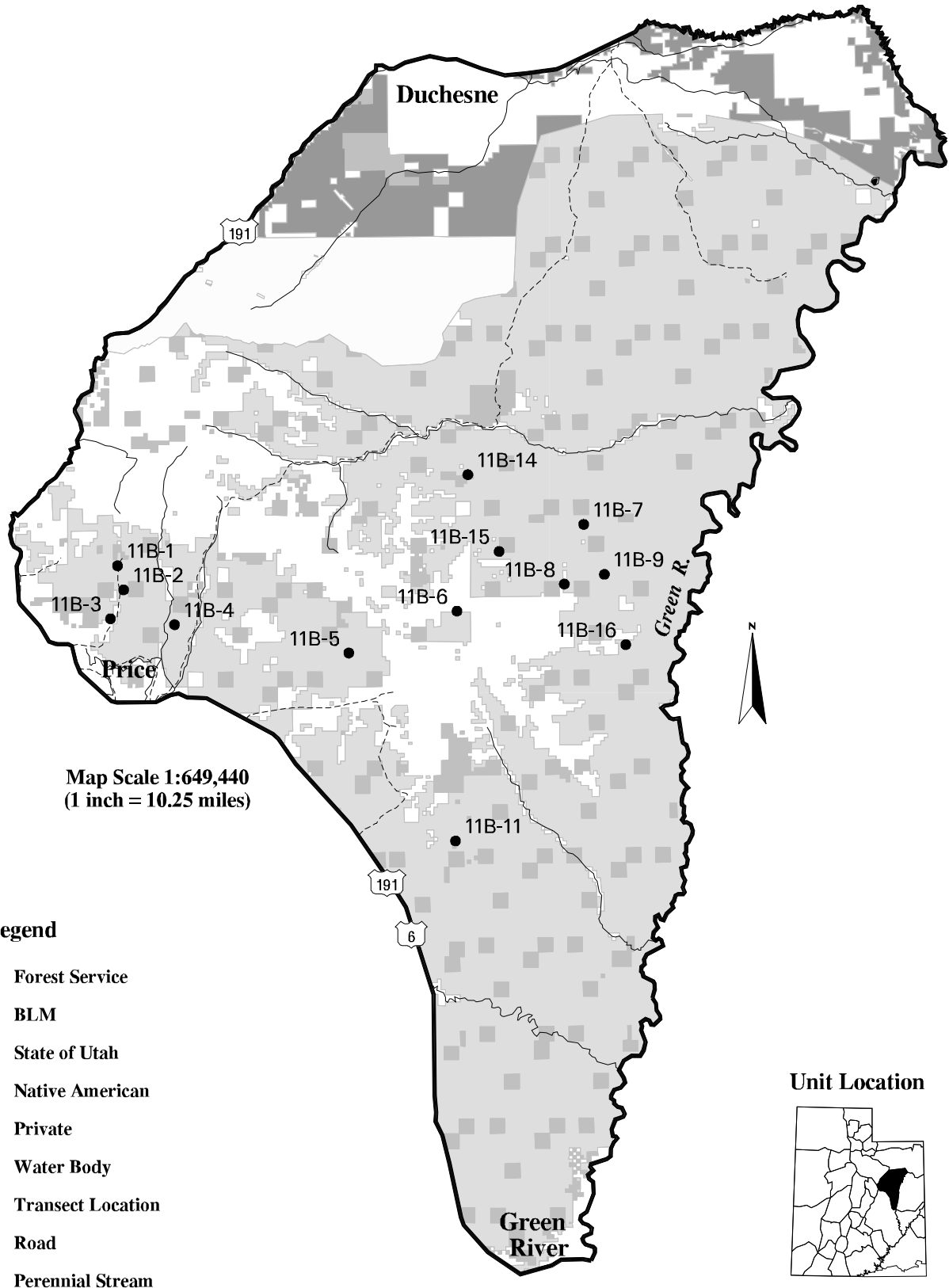
	Category	1997		2000
10R-11 Winter Ridge Total Exclosure	soil	est		4
	browse	est		3
	herbaceous understory	est		4
10R-12 Horse Ridge	soil	est		3
	browse	est		3
	herbaceous understory	est		3
10R-13 McCook Ridge Livestock Exclosure	soil	est		3
	browse	est		3
	herbaceous understory	est		4
10R-14 McCook Ridge Total Exclosure	soil	est		3
	browse	est		3
	herbaceous understory	est		4
	Category		1998	2000
10R-15 Saddle Horse	soil		est	2
	browse		est	3
	herbaceous understory		est	2
10R-17 Railroad Canyon	soil		est	1
	browse		est	1
	herbaceous understory		est	4
10R-19 Lower South Canyon	soil		est	3
	browse		est	3
	herbaceous understory		est	3
10R-20 Dick Canyon	soil		est	3
	browse		est	4
	herbaceous understory		est	4
10R-22 Rathole Ridge	soil		est	3
	browse		est	4
	herbaceous understory		est	5

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up, (5) = up
est = site established, NR = site not read

	Category		1998	2000
10R-23 South Rathole	soil		est	3
	browse		est	3
	herbaceous understory		est	4
10R-24 Upper Tent Canyon	soil		est	3
	browse		est	3
	herbaceous understory		est	4
	Category		1999	2000
10R-28 Indian Ridge #2	soil		est	NR
	browse		est	NR
	herbaceous understory		est	NR
10R-29 Massey Junction	soil		est	NR
	browse		est	NR
	herbaceous understory		est	NR

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up, (5) = up
est = site established, NR = site not read

Management Unit 11B



WILDLIFE MANAGEMENT UNIT 11B (32) - ANTHRO/RANGE CREEK, RANGE CREEK

Boundary Description

Carbon, Utah, Duchesne, and Emery counties - Boundary begins in Green River and Interstate 70; then west on I-70 to highway US-6; northwest on US-6 to Highway US-191; northeast on US-191 to the Argyle Canyon road; southeast on the Argyle Canyon road to the Nine-mile Canyon road; east on the Nine-Mile Canyon road to its end near Bull Canyon; then continuing along Nine-Mile Creek to the Green River; south along the Green River to I-70 and beginning point.

Herd Unit Description

Unit 11B (32) contains the eastern portion of Carbon County, the northeastern part of Emery County, a southern piece of Duchesne County and small portions of Utah county. This triangular unit encompasses the West Tavaputs Plateau, bounded by the Book Cliffs and Soldier Canyon on the west, the Price River-Duchesne River drainage divide on the north and Green River on the east. Topography is steep and rough. The major drainages are: Nine-Mile Creek, which drains Minnie Maude, Dry, Argyle, Cow, and Harmon Canyons into the Green River; Range Creek, which drains the east side; and Pace, Whitmore and Horse Canyons. Elevation ranges from 4,064 feet at Green River to 10,285 feet on Bruin Point. Communities bordering the west side of the unit are Helper, Price, Wellington, Sunnyside, East Carbon, and Green River.

Normal winter range below the 8,500 foot elevation completely encompasses the summer range. Severe winter range is limited to areas below 7,000 feet. On the east side of the unit, steep bare slopes limit use to the ridge tops and canyon bottoms along lower Nine-Mile Creek and the Green River. During severe winters, all deer wintering in these areas are forced into the canyon bottoms, usually causing heavy winter losses. Along the west side of the unit, from Soldier Creek Canyon east to Horse Canyon, access to the winter range is good. However, from Horse Canyon south, the Roan and Book Cliffs drop off sharply presenting major obstacles to deer migration and preventing use of much of the lower elevation range. Winter concentration areas include: Nine-Mile Creek, Rock House Cow Camp area, Cedar Ridge, Argyle Canyon, and Little Park.

During the summer of 1966, Coles and Pederson (1967) inventoried the deer winter range on the Range Creek unit. The overstory types identified were: pinyon-juniper, covering 89% of the winter range, sagebrush (3%), greasewood (3%), seedings (2%), and agricultural land (2%). Although the most extensive, the pinyon-juniper type is the least productive. This type averages 327 lbs/forage/acre and has been heavily grazed historically. The sagebrush-rabbitbrush and sagebrush-grass associations have also been intensely grazed, but with production of respectively 942 lbs/acre and 381 lbs/acre, these can be very important vegetation types on the winter range. With an estimated 1,498 lbs/acre, the greasewood-grass type is the most productive on the unit. However, this type is restricted to only canyon bottoms and the valley floors, and receives greatest use only during severe winters. Coles and Pederson concluded that overall forage production on the unit (winter range) was low due to the nature of the land, soils and native vegetation, and also past grazing abuses.

The unit presents several challenges to public land and wildlife managers. Since 75% of the summer range is private land, hunting access is limited and may become more restricted unless hunters are willing to pay trespass fees. Some of the ranches are privately managed for trophy hunting.

Grazing Summary

All of the study sites on the Range Creek deer herd unit occur on lands administered by the BLM. The 16 study sites on the unit occur in 8 different allotments. Sites at Deadman (#1) and Airport Bench (#2) occur in the Coal Creek allotment which is grazed by 612 cows from April 15 to May 31 in a three pasture rest rotation

system. Some fall grazing also occurs as the cattle drift off the mountain. The Airport (#3) site occurs on the Hayes Wash allotment, a winter allotment, which is grazed by 61 cows for short periods between October 15 and May 31. Trend study #4, Coal Creek, is in the Soldier Canyon allotment which is also a winter allotment. Grazing occurs from November 1 to February 28 with 117 cows. Grazing is also permitted from March 1 to May 31. The study in B Canyon (#5) occurs within the Mud Springs allotment which utilizes a four pasture deferred rotation schedule to graze 338 cows from October 15 to June 15.

Study sites Upper Cottonwood (#6), Cottonwood (#7), Cedar Corral (#8), Cedar Ridge (#9), Twin Hollow (#15) and Steer Ridge (#16) occur in the large Green River allotment. It consists of 8 pastures in which grazing takes place on some pastures in the spring and other pastures in the summer. Site #10, Upper Cottonwood, is used in the summer from June 1 to October 31 by 900 cattle. The other study sites are used in the spring with grazing occurring from April 15 to May 31 by 500 cattle. This allotment has been closed to grazing since 1994. A large herd of wild horses also use this allotment.

Study sites at Upper Little Park Wash (#14), Little Park Exlosure (#15) and Williams Draw (#16) occur within the Little Park allotment which is grazed by 49 head of cattle from June 1 to October 31. Study site number 20, Prickly Pear, is in the Stone Cabin allotment which utilizes a four pasture deferred rotation schedule to graze 315 cows from May 1 to September 30. Grazing on the study area usually occurs in the spring.

Big Game Trends

The management objectives for the Range Creek portion of unit 11 are to maintain a wintering population of 6,000 deer with a herb composition of 15 bucks to 100 does. Thirty percent of these bucks are to be 3 point or better. Harvests have continually increased since the harsh winters of the mid 1980's when less than 400 bucks were harvested. Buck harvests ranged between 830 and 756 between 1988 and 1991 then dropped dramatically to 581 in 1992 and only 282 in 1993. This decline is due to the extremely harsh winter of 1992-93. The fawn/doe ratio has also declined from a high of 67 fawns/100 does in 1988-89 to only 34 in 1992-93. Numbers rebounded somewhat to 47 fawns/100 does in 1994-95, then dropped to only 25 in 1995-96. Wildlife management units Anthro and Range Creek were combined in 1998 into the Nine Mile management unit with the Anthro portion being subunit 11A and Range Creek subunit 11B. Fawn/doe ratios for the entire unit are currently moderately high at 74 fawns/100 does in 1997-98 and 69 in 1998-99.

Elk are present in the area in small but increasing numbers. Current management objectives are to maintain a winter herd size of 1,000 elk on the Range Creek sub unit with a herd composition of 8 bull to 100 cows. At least 4 of those bulls being 2 ½ years of age or older. Aerial counts in 1999 estimate 1,200 elk which is above the management objective (BLM 00).

There is a portion of what used to be the Icelander Wash antelope unit between the Book Cliffs and US Highway 6 which is now part of the Range Creek Wildlife Management unit. In 1972, 150 antelope were introduced to the area and then 165 more in 1982. Aerial counts have increased from 174 in 1977 to 1,022 in 1989 and 703 in 1995. Hunting was allowed in 1974 and permits have increased from 10 that year to 33 in 1994. In 1990, 49 buck permits and 76 doe-fawn permits were sold. Although only a small percentage of the herd is found east of Highway 6, that number is increasing with the rest of the herd. These increasing numbers of elk and antelope will necessitate continued monitoring of vegetative trend on the Range Creek unit.

Trend Study Site Establishment

Interagency Range Trend Studies were established on 16 sites within the Range Creek unit in June 1986. Of these, three were located on summer range and the remainder were placed on winter range. In 1994, three new winter range sites were added and four dropped after meetings with the BLM and Division managers. During the 2000 season, 13 of the remaining 15 sites were reread.

Trend Study 11B-1-00

Study site name: Deadman .

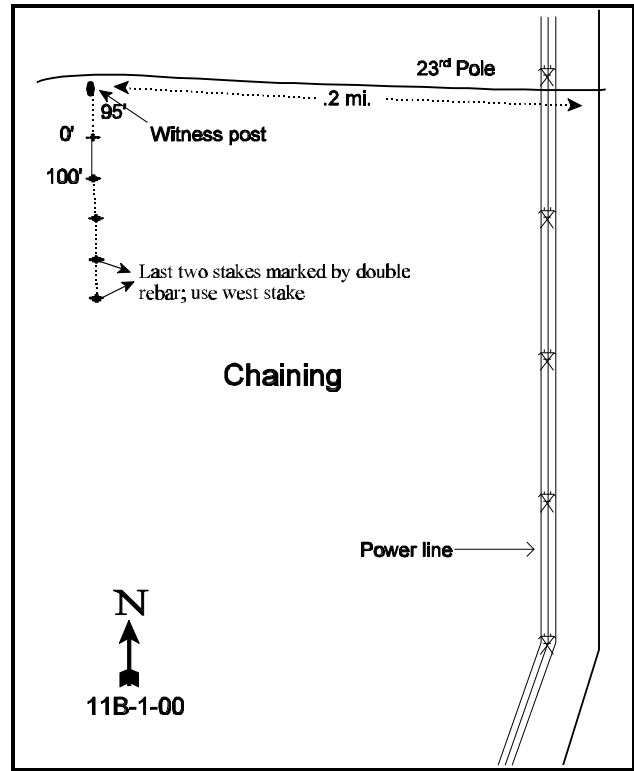
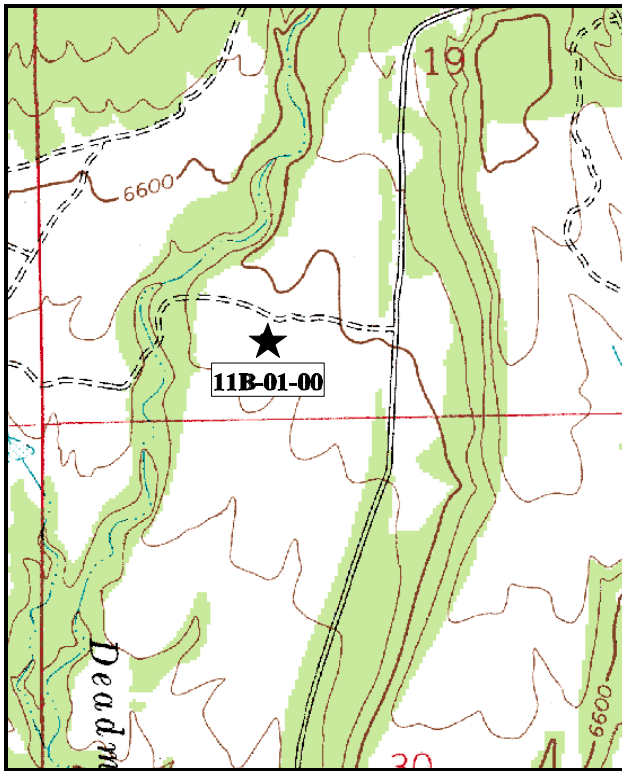
Range type: Chained, Cabled, Seeded P-J

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 1 rebar @ 1ft and belt 3 rebar @ 10 ft.

LOCATION DESCRIPTION

From the southeast end of Price, take the Airport Road east 3.1 miles to the airport. Continue 0.9 miles to a power line (and a left turn to the Airport transect). Proceed 0.45 miles to an intersection. Stay left on the main road for 1.15 miles to a corral and a fork to the right which leads to the Airport Bench transect. There is a bend in the power line on the left. Stay left and proceed up the main road another 1.7 miles (to the 23rd pole from the bend in the power line) and turn left. Proceed 0.2 miles, passing power pole #365, to a witness post (a green fence post with browse tag #7854) on the left side of the road in a chaining. The transect starts 95 feet south of the witness post. The transect is marked by rebar stakes, 1 to 2 ½ feet in height.



Map Name: Deadman Canyon

Diagrammatic Sketch

Township 13S , Range 11E , Section 19

UTM. 4391636.481 N, 522922.385 E

DISCUSSION

Trend Study No. 11B-1 (32-1)

Located near the mouth of Deadman Canyon, the Deadman trend study samples winter range on the bench lands northeast of Price and south of the Book Cliffs. Much of the area (managed by the BLM Price River Resource Area) was chained and seeded in 1965-66. Since the treatment, young surviving pinyon and juniper trees have resumed dominance of the area. Wood cutting (chained wood only) and Christmas tree cutting is allowed on the chained area. Human pressure is high with numerous roads making it very accessible. There is also activity associated with the coal mines located further up the canyon. This area lies within the Coal Creek allotment which is grazed by cattle from mid-April to the end of May and again during the month of October. Wildlife use appears to have declined since 1994. Quadrat frequency of deer and rabbit pellet groups was high in 1994 at 44% and 42% respectively, but numbers dropped dramatically in 2000 to 23% for rabbit and 15% for deer. A pellet group transect read on site in 2000 estimates only 19 deer use days/acre (47 ddu/ha).

The site elevation is 6,600 feet with a slope of 3% or less on a southern exposure. The study is near Deadman Creek, which only contains water seasonally. It drains south into the Price River. There is a fair amount of litter protecting the soil surface, much of it large persistent litter from the chaining. However, there are large areas of bare soil in the shrub and tree interspaces. Erosion does not appear to be a problem, even with large amounts of bare soil. Soil texture is a sandy loam with a mildly alkaline pH of 7.5. The soil appears moderately deep overall with an effective rooting depth estimated at almost 15 inches. Rock and pavement is common on the surface and within the profile with most of the rock concentrated in the upper 8 inches. Much of the rock contains a calcium carbonate coating and some areas have developed a weak hardpan at a depth of about 12 inches. There is also some exposed sandstone bed rock in the area. Phosphorus could be a limiting factor at only 4.3 ppm, as values less than 10 ppm may limit normal plant growth and development.

The most abundant key browse species is true mountain mahogany. It made up only 15% of the browse cover in 1994 and 12% in 2000 with an estimated density of 100 plants/acre in both 1994 and 2000. These plants have spread naturally into the area. The majority of the mountain mahogany encountered were vigorous mature plants that showed only light to moderate use in 1986 and 1994. However, use was heavy on 60% of the plants sampled in 2000. The tallest portions of these plants are growing out of reach of browsing animals, but their bushy growth habit provides good amounts of available forage. Important browse species that were seeded when the area was chained, include fourwing saltbush and bitterbrush. Individuals of these species are widely scattered and are mostly older plants. They don't appear to be reproducing as well as the mountain mahogany although the plants are vigorous and putting on good growth. A few Mountain big sagebrush occur in the area but no plants were sampled in the shrub density strips. Green ephedra is vigorous with an estimated density of 160 plants/acre in 2000. Use was very heavy in 2000 with 75% of the plants sampled showing heavy use. Vigor was also reduced on 13% of the population.

Broom snakeweed is the most abundant shrub on the site with a density that has increased from zero in 1984 to 760 plants/acre in 1994 and 9,380 plants/acre by 2000. Most of the population (87%) is mature, but young plants are common and the population may increase in the future. Pinyon and juniper dominate the overstory by providing 77% and 74% of the total browse cover in 1994 and 2000 respectively. There is evidence of light browsing on the juniper. Both the juniper and pinyon appear to be resuming their dominance of the site. Point-quarter data from 2000 estimate 104 pinyon and 183 juniper trees/acre with an average diameter of 3.6 and 2.1 inches respectively. Nearly all of the pinyon and juniper appear to have been released by the chaining. This area needs to be retreated to reduce the pinyon-juniper competition. Pinyon and juniper trees are still small enough to be treated by a roller-chop.

The seeding of crested wheatgrass established a fair stand. However plants are scattered in small patches, are small in stature, and only provided 5% cover in 1994 and 4% in 2000. The grass has been grazed heavily in the past but current ('00) use appears light.

A wide variety of forbs are found, although none provide significant forage. All forbs combined, on average provide less than 2% cover. Seeded alfalfa was encountered in 8 quadrats in 1986 but significantly declined in nested frequency by 1994. It was not sampled in 2000 and appears to be dying out due to the extended drought.

1986 APPARENT TREND ASSESSMENT

In terms of providing important winter forage for deer, this area appears to have an overall downward trend as pinyon and juniper increase in size. Much of the mountain mahogany has become unavailable due to height. Browse reproduction and variety are encouraging signs for this site to become good winter range. Management should strive to maintain the mountain mahogany and other browse species. Continued removal of the increasing pinyon-juniper with firewood and Christmas tree harvest is desirable. The soil is in good condition and trend appears stable.

1994 TREND ASSESSMENT

With the continuing drought, trend for soil is down with the increase in percent bare ground, a decrease in litter cover, and a significant decrease in crested wheatgrass. Key browse species are in low numbers, with the increaser broom snakeweed the most numerous shrub. However, the browse trend is stable to slightly improving. Trend for the herbaceous understory is slightly downward as the majority of the cover is contributed by crested wheatgrass which has decreased significantly in nested frequency since 1986.

TREND ASSESSMENT

soil - down (1)

browse - stable to slightly improving (4)

herbaceous understory - slightly downward (2)

2000 TREND ASSESSMENT

Trend for soil appears stable. Percent cover of bare ground increased slightly, but the ratio of bare soil to protective cover is almost unchanged. Relative cover of vegetation, litter and bare ground have remained similar between readings. There is some erosion occurring but it is minimized by the gentle terrain. Herbaceous vegetation is not abundant but sum of nested frequency of perennial grasses has remained similar to 1994. Trend for browse is down. Use of the preferred browse species, mountain mahogany, rubber rabbitbrush, and green ephedra is extremely high. In addition, percent decadency and plants with poor vigor has increased for rubber rabbitbrush and green ephedra, and density of the increaser broom snakeweed has exploded from 760 plants/acre in 1994 to 9,380 in 2000. Pinyon and juniper trees are also increasing in size and density. Point-quarter data from 2000 estimate 104 pinyon and 183 juniper trees/acre with an average diameter of 3.6 and 2.1 inches respectively. Nearly all of the pinyon and juniper trees appear to have been released by the chaining since only 5% of the trees sampled were surviving chained trees. These trees currently account for 55% of the total vegetative cover and produce 12% overhead canopy cover. Key browse species are low in number and without some sort of retreatment of the site to control pinyon and juniper, this area will no longer contain enough useful browse forage to be considered an important winter range. Trend for perennial grasses appears stable with similar sum of nested frequency values compared to 1994. Sum of nested frequency of perennial forbs has declined slightly but forbs were never very abundant. Overall, the herbaceous trend is considered stable but in poor condition. Herbaceous forage is limited with grasses and forbs combining to produce only 6% cover.

TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - stable (3), but in poor condition

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 1

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	_b 292	_a 223	_a 237	97	85	89	5.12	4.13
G	Aristida purpurea	-	4	1	-	2	1	.03	.15
G	Oryzopsis hymenoides	8	8	10	5	5	5	.08	.08
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		300	235	248	102	92	95	5.24	4.36
Total for Grasses		300	235	248	102	92	95	5.24	4.36
F	Arabis perennans	_b 16	_a -	_a -	7	-	-	-	-
F	Astragalus convallarius	5	-	1	2	-	1	.00	.00
F	Chenopodium fremontii (a)	-	2	-	-	1	-	.00	-
F	Cryptantha fulvocanescens	43	44	51	21	21	25	.58	1.02
F	Descurainia pinnata (a)	-	_b 5	_a -	-	3	-	.01	-
F	Eriogonum alatum	-	-	4	-	-	2	-	.01
F	Eriogonum umbellatum	19	16	15	8	8	7	.09	.13
F	Euphorbia spp.	_b 80	_a 24	_a 30	35	10	17	.07	.11
F	Hedysarum boreale	5	-	-	3	-	-	-	-
F	Ipomopsis aggregata	_b 3	_b 8	_a -	3	3	-	.01	-
F	Lesquerella ludoviciana	_a -	_b 21	_a 2	-	11	1	.10	.00
F	Lithospermum multiflorum	2	2	-	1	1	-	.01	-
F	Machaeranthera canescens	_a -	_b 20	_a 1	-	10	1	.12	.00
F	Machaeranthera grindelioides	_{ab} 4	_b 5	_a -	2	3	-	.01	-
F	Medicago sativa	_b 18	_b 5	_a -	8	3	-	.04	-
F	Penstemon caespitosus	_a -	_b 3	_a -	-	3	-	.01	-
F	Penstemon cyanocaulis	31	27	14	15	12	7	.16	.09
F	Salsola iberica (a)	-	_b 77	_a -	-	26	-	.82	-
F	Sphaeralcea coccinea	_a 5	_b 20	_{ab} 15	2	7	6	.11	.22
F	Townsendia incana	14	7	12	7	2	6	.01	.03
Total for Annual Forbs		0	84	0	0	30	0	0.84	0
Total for Perennial Forbs		245	202	145	114	94	73	1.36	1.64
Total for Forbs		245	286	145	114	124	73	2.21	1.64

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 1

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Cercocarpus montanus	5	5	1.46	2.04
B	Chrysothamnus nauseosus albicaulis	0	7	-	.38
B	Chrysothamnus nauseosus hololeucus	5	0	.00	-
B	Ephedra viridis	4	6	.03	.18
B	Gutierrezia sarothrae	14	57	.45	1.75
B	Juniperus osteosperma	0	12	3.27	5.59
B	Opuntia spp.	5	5	.00	.03
B	Pinus edulis	0	8	4.42	7.23
B	Purshia tridentata	2	1	.38	.03
Total for Browse		35	101	10.03	17.25

CANOPY COVER --

Herd unit 11B, Study no: 1

Species	Percent Cover '00
Juniperus osteosperma	5
Pinus edulis	7

BASIC COVER --

Herd unit 11B, Study no: 1

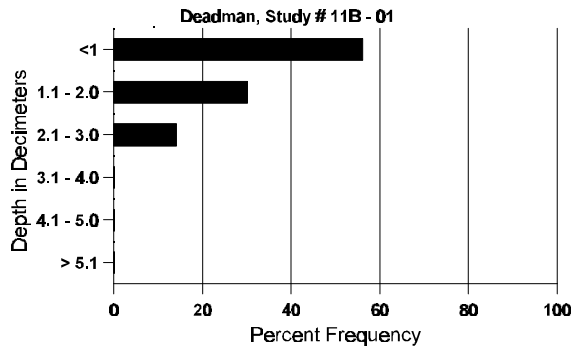
Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	285	271	6.25	17.24	25.72
Rock	282	186	2.25	8.81	9.61
Pavement	292	317	10.00	4.03	9.95
Litter	388	360	58.25	30.11	34.09
Cryptogams	6	13	0	.18	.13
Bare Ground	310	312	23.25	29.17	37.48

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 1, Study Name: Deadman

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.88	52.4 (14.09)	7.5	57.3	24.7	18.0	2.6	4.3	70.4	0.8

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 1

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre	Days Use per Acre (ha)
			00	00
Sheep	-	1	18	N/A
Rabbit	44	23	26	N/A
Elk	5	-	-	-
Deer	42	15	244	19 (47)
Cattle	-	2	35	3 (7)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 1

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches)		Total			
		1	2	3	4		Ht.	Cr.				
Artemisia tridentata vaseyana												
M	'86	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	0	6	5	0
	'00	-	-	-	-	-	-	-	0	29	62	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>				
'86		00%		00%		00%						
'94		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'94	0		-			
						'00	0		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	1	-	-	3	2	-	-	-	-	4	2	-	-	200	83	29	6
	94	2	2	-	1	-	-	-	-	-	5	-	-	-	100	59	78	5
	00	-	-	1	1	1	2	-	-	-	5	-	-	-	100	56	65	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		29%			00%			00%			-57%							
'94		40%			00%			00%			+ 0%							
'00		20%			60%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	233	Dec:	-			
												'94	100		-			
												'00	100		-			
Chrysothamnus nauseosus hololeucus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	21	21	5
	00	-	1	2	-	-	-	-	-	-	3	-	-	-	60	24	12	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	1	-	-	-	1	-	-	1	-	-	2	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			+29%							
'00		14%			57%			29%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	100		0%			
												'00	140		43%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
	00	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	24	30	
	00	-	-	2	1	1	1	-	-	-	5	-	-	-	100	31	35	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	1	-	-	1	-	-	-	1	-	1	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			-11%							
'00		13%			75%			13%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	180		0%			
												'00	160		25%			
<i>Gutierrezia sarothrae</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	43	-	-	-	-	-	-	-	-	43	-	-	-	860		43	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	37	-	-	-	-	-	-	-	-	37	-	-	-	740	8	8	
	00	409	-	-	-	-	-	-	-	-	409	-	-	-	8180	6	5	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	17	-	-	-	-	-	-	-	-	12	-	-	5	340		17	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			+92%							
'00		00%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	760		0%			
												'00	9380		4%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	86	-	-	-	-	2	1	-	-	-	3	-	-	-	100	122	67	3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		33%			17%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	200	Dec:	-			
												'94	0		-			
												'00	260		-			
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	3	13	6
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	14	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			+22%							
'00		00%			00%			22%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	140		14%			
												'00	180		22%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Pinus edulis																		
Y	'86	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	'86	3	-	-	-	-	-	-	-	3	-	-	-	100	59	48	3	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'00	2	-	-	6	-	-	-	-	8	-	-	-	160	-	-	8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	166	Dec:	-				
											'94	0		-				
											'00	180		-				
Purshia tridentata																		
Y	'86	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'00	-	-	-	1	-	-	-	-	-	1	-	-	20		1		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'94	-	2	-	1	-	-	-	-	3	-	-	-	60	6	12	3	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	0	33	72	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		67%			00%			00%			-67%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'94	60		-				
											'00	20		-				

Trend Study 11B-2-00

Study site name: Airport Bench.

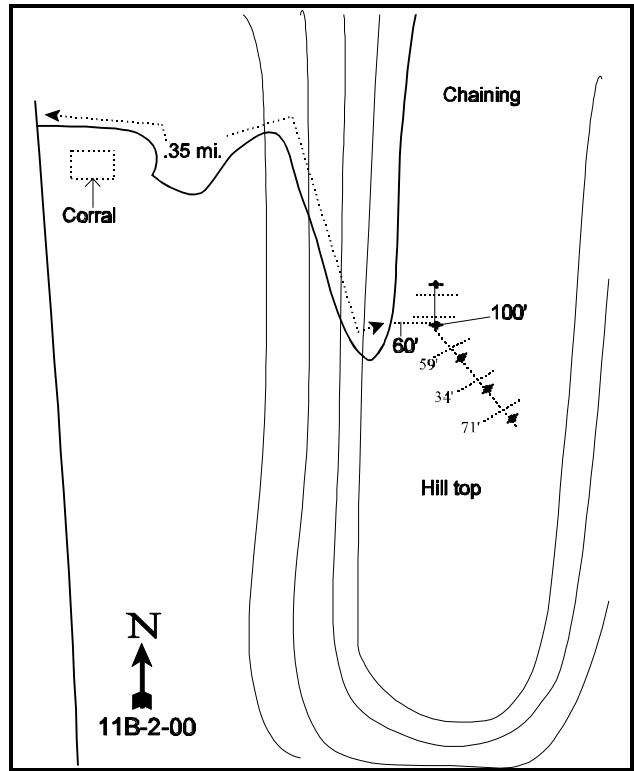
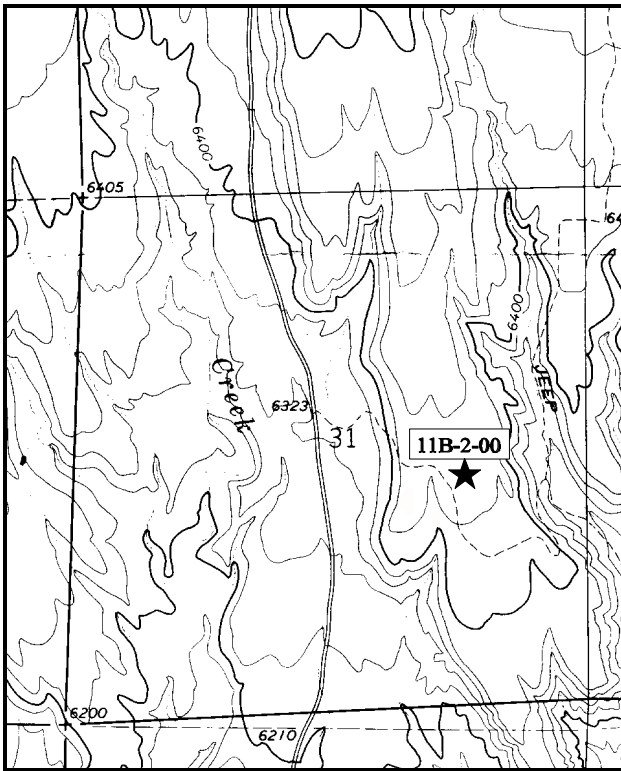
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 170°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft). Belt 2 line 3 rebar @ 1ft.

LOCATION DESCRIPTION

Turn east on the Airport Road at the southeast end of Price and go 3.15 miles to the airport. After another 0.9 miles on the main road, you cross under a power line. Continue 0.45 miles to an intersection. Stay left. Go another 1.9 miles and turn right onto a dirt road just beyond a corral. Drive up this rocky road 0.35 miles to a fork on top of the bench. Bear left and go approximately 100 feet. The transect is in the chaining on the right side of the road. The 100-foot end of the baseline is 60 feet east of the road. All transect stakes are 1- to 2-foot tall fence posts.



Map Name: Deadman Canyon

Diagrammatic Sketch

Township 13S, Range 11E, Section 31

UTM. 4389026.585 N, 523587.116 E

DISCUSSION

Trend Study No. 11B-2 (32-2)

The Airport Bench transect is located approximately two miles south of Deadman (11B-1) and shares many similarities. This bench was also part of the 1965 chaining and seeding project. As part of the same grazing allotment, management is similar except cattle use this area at a different time each year. Vegetative composition and condition parallels that of the Deadman study site except for the much higher cover value for pinyon-juniper on Deadman, 13% vs 9%. The site is slightly lower in elevation (6,400 feet). It is nearly level, although the bench top does slope slightly southward. As with site 11B-1, human pressure is high because of its proximity and easy access to Price. Evidence of human activity includes wood cutting, ORV tracks, abundant trashy litter, and shotgun shells were found. Deer pellet groups are common, but no antler drops or winter-killed deer were found during any reading. Quadrat frequency of deer pellet groups was high in 1994 at 60%, declining to 42% by 2000. Pellet group transect data taken parallel to the study site baseline in 2000 estimated 54 deer use days/acre (133 ddu/ha).

The soil is compacted, but appears to be fairly deep with an effective rooting depth estimated at 15 inches. It has a sandy clay loam texture with rock-pavement cover that has ranged from 13% to 15%. Rocks are also common throughout the soil profile. Soil phosphorous could be limiting at 6.3 ppm, where values less than 10 ppm may limit normal plant growth and development. Vegetative cover from crested wheatgrass combined with level terrain tends to limit erosion.

As previously mentioned, vegetative composition is quite similar to study 11B-1 but desirable browse forage is more limited here. Utah Juniper currently ('00) provides 82% of the total browse cover. Trees average 8-10 feet in height. Point-quarter data from 2000 estimate 211 juniper and 97 pinyon trees/acre with an average diameter of 3.2 and 3.6 inches respectively. These trees also appear to have been released by the chaining since only 10% of the junipers sampled were tipped over surviving chained trees.

True mountain mahogany appeared fairly abundant in 1986 at an estimated 199 plants/acre. These were moderately hedged but vigorous. With the much larger sample size now used this clumped population was estimated at only 40 plants/acre in 1994 and no plants were encountered along the density strips in 2000. There are some tall mahogany plants scattered throughout the site which appear to be heavily hedged, but much of the forage is unavailable due to height. Bitterbrush (seeded) and green Ephedra are uncommon. Most of the bitterbrush seen in the surrounding area were heavily hedged in 2000. Use of ephedra is mostly light to moderate. The only abundant shrub on the site is broom snakeweed which has increased from 160 plants/acre in 1994 to 3,320 in 2000.

Crested wheatgrass dominates the herbaceous understory by providing 90% of the total grass cover in 1994, increasing to 99% by 2000. Cover of crested wheatgrass also increased from 6% in 1994 to 16% in 2000. There is also some Indian ricegrass and mutton bluegrass scattered throughout the understory. Perennial forbs are not very common and do not produce significant forage. However, the seeded alfalfa is still found on the site and it appears to be utilized where available. Most of the surviving plants are now growing under the protective cover of shrubs.

1986 APPARENT TREND ASSESSMENT

Although the site in many ways is similar to the Deadman transect, overall this area appears to be in a slightly worse condition with a downward trend. There are fewer desirable shrubs, mainly true mountain mahogany. Juniper and pinyon appear to be rapidly increasing. The lack of shrub reproduction may indicate a declining population due to increased competition with the pinyon and juniper. Mean annual precipitation would be less

at this lower site, as a result, the trees would have a greater competitive influence on understory composition. The soil trend appears stable.

1994 TREND ASSESSMENT

Comparing the data with 1986, the soil trend is down, as litter cover has declined and percent bare ground has increased substantially. This basic trend has been noted throughout the state because of the prolonged drought. The browse trend is stable to declining and in poor condition because of the low numbers of useful shrubs present. When the young pinyon and juniper trees become more mature they will have a strong negative effect on the understory browse. A treatment with a roller chopper would be timely and cost effective at this time. The herbaceous understory trend is down with significant decreases in crested wheatgrass nested frequency and a very high occurrence of annual Russian thistle throughout the understory. Together they make up 85% of the total herbaceous understory cover.

TREND ASSESSMENT

soil - down (1)

browse - stable to declining with little useful browse present (2)

herbaceous understory - down (1)

2000 TREND ASSESSMENT

Trend for soil appears to be slightly improved. Relative percent cover of bare ground has declined slightly while cover of litter and vegetation have increased. In addition, the dominant crested wheatgrass has increased significantly in nested frequency and its cover has more than doubled. Erosion is minimal due to the level terrain combined with the abundant herbaceous cover. Trend for browse is down. The browse composition is poor with few useful shrubs present. Juniper currently provides 82% of the total browse cover and juniper and pinyon have increased in size and density since 1994. Cover has increased from 2% in 1994 to 9% in 2000. Overhead canopy cover is currently 4%. Broom snakeweed has increased in density from 160 plants/acre in 1994 to 3,320 by 2000. Trend for the herbaceous understory is up slightly due to an increase in the nested frequency of crested wheatgrass which currently provides 98% of the herbaceous cover. Sum of nested frequency of perennial forbs has declined. However, perennial forbs are limited and produce little useful forage.

TREND ASSESSMENT

soil - up slightly (4)

browse - down and in poor condition (1)

herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 2

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	b302	a240	b298	98	88	98	6.41	16.37
G	Oryzopsis hymenoides	a16	b42	ab28	7	16	12	.72	.11
G	Poa fendleriana	b6	a-	a-	3	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		324	282	326	108	104	110	7.13	16.48
Total for Grasses		324	282	326	108	104	110	7.13	16.48
F	Cryptantha fulvocanescens	8	17	9	5	9	5	.21	.07
F	Descurainia pinnata (a)	-	b11	a-	-	6	-	.03	-
F	Eriogonum cernuum (a)	-	-	1	-	-	1	-	.00
F	Eriogonum ovalifolium	a-	b8	a1	-	4	1	.07	.00
F	Eriogonum umbellatum	b19	b17	a-	12	6	-	.03	-
F	Euphorbia spp.	a10	b24	a9	5	13	4	.26	.04
F	Ipomopsis aggregata	-	1	-	-	1	-	.00	-
F	Lesquerella spp.	a-	ab6	b14	-	2	6	.03	.03
F	Lithospermum incisum	2	7	4	1	5	2	.08	.03
F	Machaeranthera canescens	-	4	3	-	2	1	.04	.00
F	Medicago sativa	b11	ab9	a2	4	4	1	.02	.03
F	Penstemon cyanocaulis	a2	b50	a2	1	23	2	.34	.01
F	Salsola iberica (a)	a-	b263	a4	-	84	1	5.12	.00
Total for Annual Forbs		0	274	5	0	90	2	5.15	0.00
Total for Perennial Forbs		52	143	44	28	69	22	1.10	0.23
Total for Forbs		52	417	49	28	159	24	6.26	0.24

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 2

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Atriplex canescens	0	1	-	.15
B	Cercocarpus montanus	2	0	.18	-
B	Chrysothamnus nauseosus	0	1	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	-	-
B	Ephedra viridis	2	2	-	.00
B	Gutierrezia sarothrae	2	31	-	.73
B	Juniperus osteosperma	0	11	1.77	8.03

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Opuntia spp	1	1	-	-
B	Pinus edulis	0	1	-	.88
Total for Browse		7	49	1.95	9.80

CANOPY COVER --

Herd unit 11B, Study no: 2

Species	Percent Cover
	'00
Juniperus osteosperma	4

BASIC COVER --

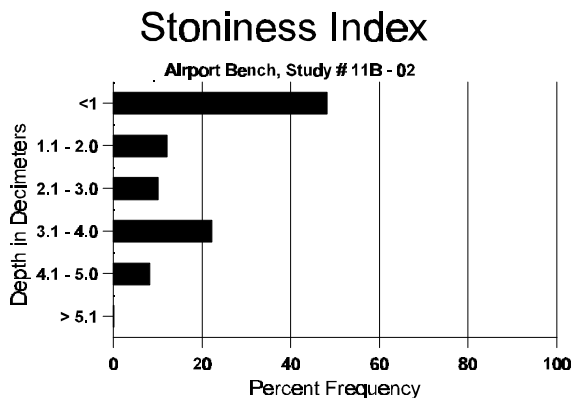
Herd unit 11B, Study no: 2

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	338	310	14.00	14.85	26.38
Rock	308	131	5.25	7.11	3.84
Pavement	355	320	10.25	5.91	11.58
Litter	394	371	51.25	28.81	45.04
Cryptogams	-	8	0	0	.04
Bare Ground	347	298	19.25	24.90	23.78

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 2, Study Name: Airport Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
15.01	52.4 (16.22)	7.5	54.0	22.0	24.0	3.9	6.3	147.2	0.7



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 2

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	00	00
Rabbit	58	30	218	N/A
Elk	3	-	-	-
Deer	60	42	705	55 (134)
Cattle	6	5	9	1 (2)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 2

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20	22	46	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	20		-			
<i>Cercocarpus montanus</i>																		
Y	86	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	2	-	-	-	-	-	-	-	2	-	-	-	133	63	39	2
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	46	45	2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	60	71	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		100%			00%			00%			-80%							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	199	Dec:	-			
												'94	40		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus nauseosus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	22	21	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'94	0		-				
											'00	80		-				
Chrysothamnus viscidiflorus viscidiflorus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'94	0		-				
											'00	20		-				
Echinocereus spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	18	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'94	0		-				
											'00	0		-				

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	39	59	3
	00	-	1	-	3	-	-	-	-	-	4	-	-	-	80	32	48	4
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			-20%							
'00		25%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	100		20%			
												'00	80		0%			
<i>Gutierrezia sarothrae</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	9	10	4
	00	158	-	-	-	-	-	-	-	-	158	-	-	-	3160	5	6	158
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	00	7	-	-	-	-	-	-	-	-	2	-	-	5	140		7	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	300		15	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			+95%							
'00		00%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	160		50%			
												'00	3320		4%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	2	-	-	-	-	-	4	-	1	-	100			5
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	31	30	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	1	-	-	2	-	-	6	-	-	-	120	-	-	6
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	199	Dec:	0%			
												'94	0		0%			
												'00	240		8%			
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	13	1
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	18	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			+50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	20		-			
												'00	40		-			
Pinus edulis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	87	70	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'94	0		-			
												'00	20		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total						
		1	2	3	4		1	2							
Purshia tridentata															
M	86	2	1	-	-	-	-	-	3	-	-	200	31	45	3
	94	-	-	-	-	-	-	-	-	-	-	0	26	47	0
	00	-	-	-	-	-	-	-	-	-	-	0	24	69	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>				
'86		33%			00%			00%							
'94		00%			00%			00%							
'00		00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)										'86	200	Dec:	-		
										'94	0		-		
										'00	0		-		

Trend Study 11B-3-00

Study site name: Airport

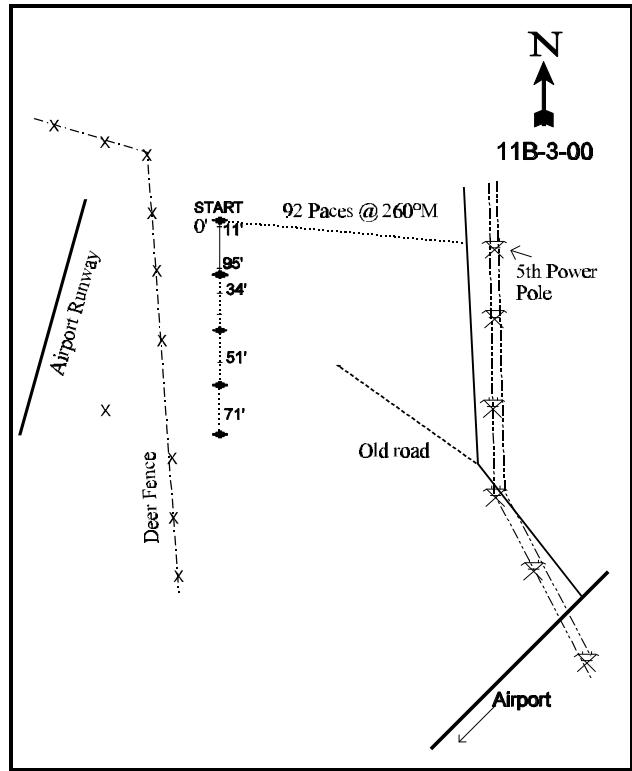
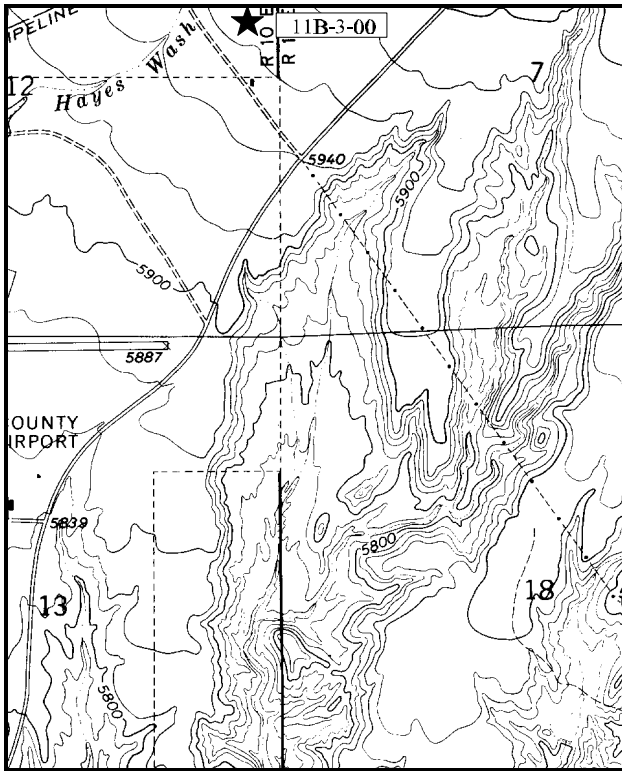
Range type: Chained, Seeded P-J

Compass bearing: frequency baseline 165°M

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (51ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of Main Street and the Airport Road in Price, go 3.15 miles to the airport. Continue on the paved road 0.9 miles past the Carbon County Airport to a point where two power lines cross the road and there is a dirt road turning off to the left. Turn on this road and follow the power line 0.35 miles to the fifth wooden pole. Stop here. Walk west 92 paces @ 260°M to the start of the baseline, a rebar tagged #7891.



Map Name: Wellington

Diagrammatic Sketch

Township 14S , Range 10E , Section 12

UTM. 4385891.538 N, 522163.377 E

DISCUSSION

Trend Study No. 11B-3 (32-3)

The Airport transect is located on a sagebrush flat one mile north and slightly east of the Carbon County Airport. The large flat extends several miles north to the higher benches and mesas of the Book Cliffs. Elevation on the flat is 5,960 feet. Mature juniper stands border the east side. Originally a Wyoming big sagebrush flat with scattered Juniper, the area was chained and drill seeded with crested wheatgrass in 1965-66 by the BLM. Now the area supports a moderately low density of Wyoming big sagebrush with a crested wheatgrass understory. Sometime after the 1994 reading, the Carbon County Airport was expanded with a longer runway. A large deer fence now encloses the airport and is only about 300 feet west of the study site which may concentrate more deer use on the site. Quadrat frequency of deer pellet groups was quite low in 1994 at only 8%. In 2000, frequency increased to 22% which is still moderately low. A pellet group transect read along the baseline in 2000 estimated 23 deer days use/acre (57 ddu/ha). All of the deer pellet groups appear to be from winter use. As part of the Hayes Wash allotment, this area is grazed by 61 cattle from mid-October to the end of May. Utilization of the crested wheatgrass appeared to be moderate to heavy in 1986, but light in 2000 with only a few old cattle pats encountered.

The soil is moderately deep with an effective rooting depth of just over 14 inches. Depth is limited in some areas by a hardpan at about 7 inches in depth which could restrict the density of adult Wyoming sagebrush. The soil has a sandy clay loam texture with a slightly alkaline pH of 7.8. Organic matter is limited at only 1%, which is the lowest reading on the entire unit. Small gravel is common within the profile and concentrated on the surface, indicating soil loss in the past. Some of the gravel is coated with white calcium-carbonate. No gullies are evident. Rows of seeded crested wheatgrass are contoured to the slight slope which limits erosion and also helps the buildup of litter. Windrowed piles of juniper and sagebrush are remnants of the pre-treatment of the flat.

The site supports a moderate stand of Wyoming big sagebrush with just over 1,000 plants/acre estimated in 1986 and 1994, increasing to 2,280 plants/acre in 2000. Forty-seven percent of the plants sampled were decadent in 1986, but this has decreased to only 14% by 1994 and 11% in 2000. Recruitment in the form of seedlings and young is excellent. Currently, ('00) 32% of the population consists of young plants, indicating an expanding population. Use of the sagebrush was extremely heavy in 1986 when 88% of the plants sampled were heavily hedged. On some plants, the new growth was short and unavailable due to the clubbed aspect of the plant. Use was much lighter in 1994, with only 2% of the sagebrush displaying heavy use. During the 2000 reading, use was mostly light to moderate with only 4% of the plants sampled displaying heavy use. Some sagebrush on this site display characteristics of black sagebrush (*Artemisia nova*), and mountain big sagebrush (*Artemisia tridentata vaseyana*). There is obviously some hybridizing occurring between the sagebrush subspecies. Plants with the heaviest use appeared to have more characteristics of mountain big sagebrush which is the most palatable of the sagebrush subspecies.

Other preferred browse plants include a few green ephedra and fourwing saltbush. Broom snakeweed is the most numerous shrub on the site, and similar to other trend sites in the area, it has increased in density. Density was estimated at only 266 plants/acre in 1986 which increased to 420 by 1994. Currently ('00), the population has exploded to 8,940 plants/acre. Most of the plants (98%) are mature and decadent so it does not appear that the population will continue to increase in the immediate future.

Crested wheatgrass completely dominates the herbaceous component by providing almost 100% of the herbaceous understory cover. Although seeded 20 years ago, the plants are still confined mainly to the drill rows. Other grass species are uncommon. Forbs are limited and provide little forage except possibly during a wet, favorable spring. The only common species is scarlet globemallow.

1986 APPARENT TREND ASSESSMENT

Past grazing management has maintained the crested wheatgrass which appears to have a stable trend. Although somewhat heavily used and putting on minimal growth, the sagebrush is reproducing and doing fairly well for such a low rainfall area (annual average of about 11 inches in Price). Therefore, the range trend appears stable, although continued heavy use of sagebrush could lead to a downward trend in terms of deer winter range. The soil is fairly well protected and the site is level so soil loss is not a major concern. Soil trend also appears to be stable.

1994 TREND ASSESSMENT

The soil trend is slightly down because of the loss of much of the litter cover and the increased percentage of bare ground. Again, this trend has been noted throughout much of Utah especially at the lower elevation sites with the prolonged drought we have been experiencing since the late 1980's. This will turn around with near normal precipitation patterns. The browse trend, especially for the sagebrush, is up with decreases in those classified with moderate to heavy use (88% to 2%), decreased decadency (47% to 14%), increase in density, and an increase in seedling recruitment (12% to 46%). Trend for the herbaceous understory is stable. The forb component for the herbaceous understory is almost nonexistent but nested frequency of scarlet globemallow has increased.

TREND ASSESSMENT

soil - slightly down (2)

browse - up (5)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil appears to be slightly down due to an increase in cover of bare ground and a continued decline in litter cover. Litter cover has been declining steadily since 1986, mostly due to the decomposition of churning litter. Bare ground has increased with each reading and is now high at 47%. On the positive side, erosion does not appear to be a problem due to the gentle terrain and the abundance of crested wheatgrass which has remained stable since 1986. The browse trend continues to improve with density increasing by 51% since 1994 and percent decadency declining from 14% to 11%. Young plant recruitment has increased from 16% to 32%. Use is mostly light to moderate and vigor good. The only negative aspect of the browse trend is the more than 4-fold increase in broom snakeweed density (420 to 8,940 plants/acre). Most of the population consists of mature and decadent plants so it does not appear that this population will continue to increase in the immediate future. The herbaceous trend appears stable with nested frequency of crested wheatgrass remaining stable. Forbs are still rare except for scarlet globemallow.

TREND ASSESSMENT

soil - slightly down (2)

browse - up (5)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 3

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Agropyron cristatum</i>	298	289	301	98	98	94	15.34	16.43
G	<i>Agropyron dasystachyum</i>	-	-	3	-	-	2	-	.01
G	<i>Agropyron smithii</i>	_b 7	_a -	_{ab} -	3	-	-	-	-
G	<i>Agropyron trachycaulum</i>	_b 5	_a -	_a -	3	-	-	-	-
G	<i>Oryzopsis hymenoides</i>	1	-	-	1	-	-	-	-
G	<i>Poa secunda</i>	-	1	-	-	1	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		311	290	304	105	99	96	15.34	16.44
Total for Grasses		311	290	304	105	99	96	15.34	16.44
F	<i>Astragalus convallarius</i>	1	-	5	1	-	2	-	.23
F	<i>Eriogonum ovalifolium</i>	-	1	-	-	1	-	.00	-
F	<i>Leucelene ericoides</i>	-	-	3	-	-	1	-	.00
F	<i>Lepidium spp. (a)</i>	-	-	-	-	-	-	-	-
F	<i>Orobanche fasciculata</i>	-	-	1	-	-	1	-	.00
F	<i>Sphaeralcea coccinea</i>	50	79	65	25	31	27	.50	1.23
F	<i>Thermopsis montana</i>	-	-	4	-	-	1	-	.15
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		51	80	78	26	32	32	0.50	1.63
Total for Forbs		51	80	78	26	32	32	0.50	1.63

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 3

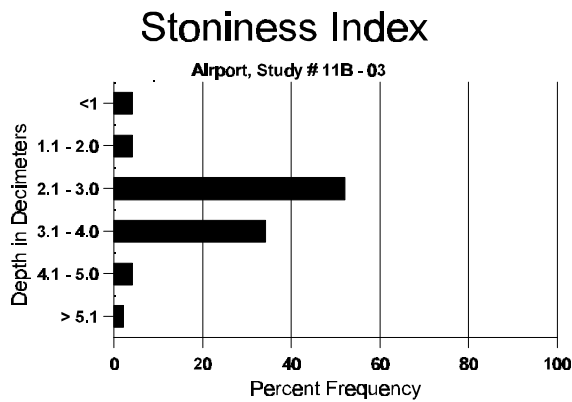
Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	<i>Artemisia tridentata wyomingensis</i>	32	49	4.21	5.21
B	<i>Atriplex canescens</i>	1	1	.03	.03
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	4	0	.15	-
B	<i>Ephedra viridis</i>	1	1	.38	.03
B	<i>Gutierrezia sarothrae</i>	11	54	.52	2.72
B	<i>Opuntia polyacantha</i>	10	8	.00	.03
Total for Browse		59	113	5.30	8.03

BASIC COVER --
Herd unit 11B, Study no: 3

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	306	324	3.25	21.21	27.20
Rock	325	50	.50	5.38	.18
Pavement	358	354	18.00	5.61	9.19
Litter	384	347	50.75	15.90	14.14
Cryptogams	14	73	0	.11	1.45
Bare Ground	355	367	27.50	31.23	47.47

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 3, Study Name: Airport

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.17	55.8 (13.54)	7.8	59.6	19.8	20.6	1.0	7.5	291.2	0.6



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 3

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	50	73	687	N/A
Elk	1	1	-	-
Deer	8	22	305	24 (58)
Cattle	4	10	17	2 (4)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 3

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total							
		1	2	3	4		1	2								
<i>Artemisia tridentata wyomingensis</i>																
S	86	2	2	-	-	-	-	-	-	4	-	-	133		4	
	94	26	-	-	-	-	-	-	-	26	-	-	520		26	
	00	12	-	-	-	-	-	-	-	12	-	-	240		12	
Y	86	2	1	4	-	-	-	-	-	7	-	-	233		7	
	94	6	-	-	-	-	-	-	-	6	-	-	180		9	
	00	35	-	-	2	-	-	-	-	37	-	-	740		37	
M	86	-	1	9	-	-	-	-	-	10	-	-	333	18 22	10	
	94	35	-	-	-	-	-	-	-	35	-	-	780	22 34	39	
	00	37	26	2	-	-	-	-	-	65	-	-	1300	18 23	65	
D	86	-	-	13	-	-	2	-	-	15	-	-	500		15	
	94	7	-	1	-	-	-	-	-	6	-	-	160		8	
	00	2	5	2	2	1	-	-	-	7	-	-	240		12	
X	86	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	220		11	
	00	-	-	-	-	-	-	-	-	-	-	-	340		17	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'86		06%		88%		00%		+ 5%								
'94		00%		02%		04%		+51%								
'00		28%		04%		04%										
Total Plants/Acre (excluding Dead & Seedlings)										'86	1066	Dec:	47%			
										'94	1120		14%			
										'00	2280		11%			
<i>Atriplex canescens</i>																
S	86	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	1	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	94	1	-	-	-	-	-	-	-	1	-	-	20	44 63	1	
	00	-	-	-	-	-	-	-	-	-	-	-	0	44 56	0	
D	86	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	1	-	-	-	1	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'86		00%		00%		00%		+ 0%								
'94		00%		00%		00%										
'00		100%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	0%			
										'94	20		0%			
										'00	20		100%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus stenophyllus																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	4	-	-	1	-	-	-	-	-	5	-	-	-	100	6	12	5
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	'86	-	-	3	-	-	-	-	-	-	3	-	-	-	100			3
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			100%			00%			+ 0%							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	100	Dec:	100%				
											'94	100		0%				
											'00	0		0%				
Ephedra viridis																		
Y	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'86	1	1	1	-	-	-	-	-	-	3	-	-	-	100	17	6	3
	'94	11	-	-	-	-	-	-	-	-	11	-	-	-	220	24	31	11
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	-	1	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		25%			25%			00%			+40%							
'94		00%			00%			00%			-91%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	133	Dec:	0%				
											'94	220		0%				
											'00	20		100%				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
<i>Gutierrezia sarothrae</i>																	
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	3	-	3	-	-	-	-	-	-	6	-	-	-	120		6
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	7	-	2	-	-	-	-	-	-	9	-	-	-	180		9
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	6 4	1
	94	21	-	-	-	-	-	-	-	-	21	-	-	-	420	9 11	21
	00	365	-	-	-	-	-	-	-	-	365	-	-	-	7300	7 12	365
D	86	6	-	-	-	-	-	-	-	-	6	-	-	-	200		6
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	72	-	-	-	-	-	1	-	-	14	-	-	59	1460		73
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%			+37%						
'94		00%			00%			00%			+95%						
'00		00%			.44%			13%									
Total Plants/Acre (excluding Dead & Seedlings)											'86	266	Dec:	75%			
											'94	420		0%			
											'00	8940		16%			
<i>Juniperus osteosperma</i>																	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'94		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-			
											'94	0		-			
											'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia polyacantha																		
S	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'86	7	-	-	-	-	-	-	-	-	7	-	-	-	233	4	6	7
	'94	12	-	-	-	-	-	-	-	-	12	-	-	-	240	3	15	12
	'00	11	-	-	-	-	-	-	-	-	11	-	-	-	220	3	6	11
D	'86	5	-	-	-	-	-	-	-	-	-	-	5	-	166		5	
	'94	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	'00	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			38%			-40%							
'94		00%			00%			08%			- 8%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	432	Dec:	38%			
												'94	260		8%			
												'00	240		8%			

Trend Study 11B-4-00

Study site name: Coal Creek.

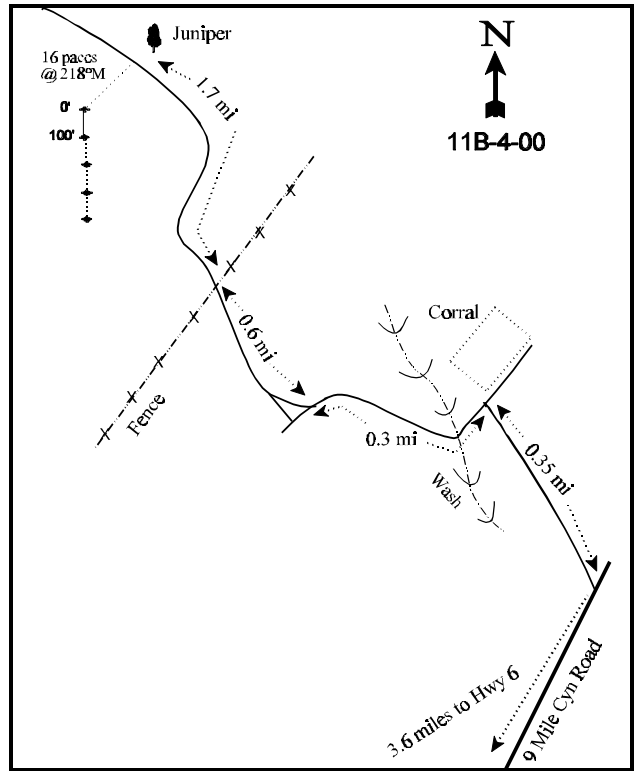
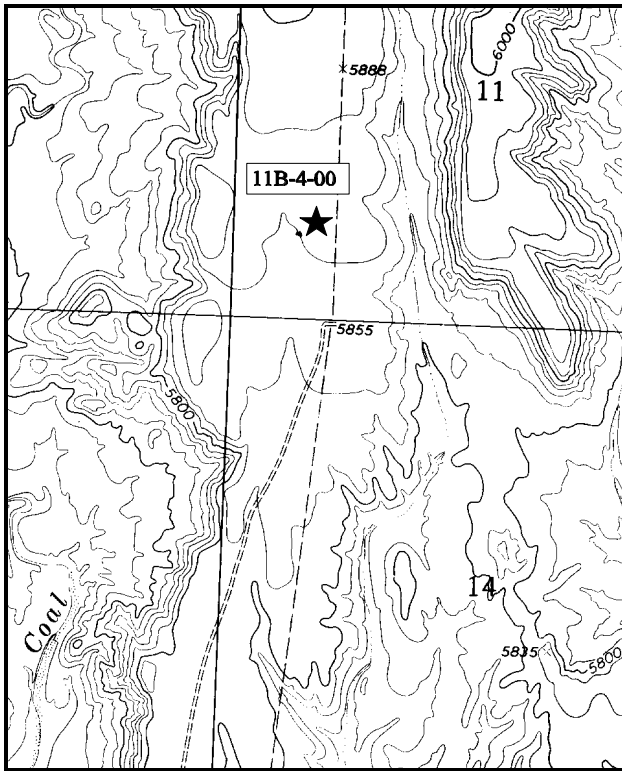
Range type: Big Sagebrush.

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Highway 6 east of Wellington, turn northeast on the Soldier Creek Road (9 Mile Canyon). Stay on this road 3.6 miles, then turn left onto a dirt road. Go 0.35 miles up to a fork near a corral. From the fork proceed 0.3 miles to another fork. Turn right and continue 0.6 miles to a wire gate. Go through the gate and drive 1.7 miles to a small Juniper 20 feet to the right of the road. The transect baseline starts 16 paces from the juniper on a bearing of 165°M. There is a browse tag #7839 on the 0-foot baseline stake.



Map Name: Wellington

Diagrammatic Sketch

Township 14S, Range 11, Section 11

UTM. 4385891.538 N, 529106.094 E

DISCUSSION

Trend Study No. 11B-4 (32-4)

The Coal Creek study is in an open sagebrush flat about four miles from the Book Cliffs on top of a long, narrow, south-sloping plateau at an elevation of 5,860 feet. The area is managed by the BLM as part of the Soldier Canyon allotment. It is grazed by cattle in winter and again in late spring. Permitted numbers are for 117 cattle mid-November through February and 125 cattle March to mid-June. Sign of cattle use was infrequent on this particular site in 1986 and deer pellet groups were encountered only occasionally. A pellet group transect located further up Coal Creek (elevation 6,300) is the lowest elevation pellet group transect in the unit. In the past, it has consistently shown the highest use of any area sampled in the herd unit. Deer days use/acre averaged 44 (109 ddu/ha) between 1981-82 and 1990-91. Numbers dropped considerably in 1991-92 to only 23 ddu/acre (58 ddu/ha) and have averaged only 17 deer days use/acre (41 ddu/ha) between 1991-92 and 1995-96. Numbers are usually higher in hard winters as the deer inevitably move to the lower elevations those years even though thermal cover is limited on the plateau. It does not appear that this study area is still being used by significant numbers of deer or elk since 1986. Quadrat frequency of deer pellet groups was only 15% in 1994 declining to 3% in 2000. A pellet group transect read parallel to the trend site baseline in 2000 estimates only 4 deer days use/acre (10 ddu/ha). These low numbers may be partly due to the mild winter conditions of the past several years. Rabbits appear to be abundant on the site with numerous pellets and trails. They appear to be heavily utilizing shadscale, prickly phlox, and narrowleaf low rabbitbrush.

The soil is moderately deep but compacted. It has a sandy clay loam texture with a soil reaction that is slightly alkaline (7.5 pH). Organic matter is low at only 1%, which ties this site with Airport (#3) as the lowest sites on unit 11 with respect to soil organic matter. Phosphorus is also low at just 6.4 ppm, where values less than 10 ppm may limit normal plant growth and development. Due to the compaction of the soil, effective rooting depth is estimated at just over 13 inches. There is abundant pavement on the surface in exposed areas but little rock within the soil profile. Vegetative and litter cover are both low, yet erosion is minimized due to the level terrain. Although localized soil loss is evident by soil pedestaling under shrubs.

Wyoming big sagebrush dominates the plateau by providing 66% of the total vegetation cover in 1994 and 69% in 2000. It has steadily increased in density from 1,866 plants/acre in 1986, to 2,900 in 1994, and 5,560 by 2000. Vigor has remained good and percent decadence steady, ranging from 21% in 1986 to 24% in 1994. Recruitment in the form of seedlings and young are currently ('00) excellent. The population in 1986 was heavily used with 29% of the shrubs classified as heavily browsed. Annual growth has been minimal, with any browsing causing them to appear they have been heavily hedged and clubbed in appearance. Use in 1994 and 2000 was mostly light with a few plants showing moderate and heavy use. Two desirable shrubs, winterfat and shadscale, occur at fairly low densities and are mostly decadent and over-utilized. Rabbits appear to be using these low growing shrubs. Density of shadscale has remained fairly stable since 1994, but winterfat has declined to the point that it was not sampled in 2000.

Composition in terms of numbers shows that broom snakeweed is by far the most numerous with 11,465 plants/acre estimated in 1986 and 6,280 in 1994. However, currently even with the great increase, they only make up 19% of the total browse cover. Density exploded in 2000 to an estimated 26,900 plants/acre. These individuals are quite small but are vigorous and virtually unutilized. Other invaders and possible indicators of range deterioration are pricklypear cactus and narrowleaf low rabbitbrush. Both have remained at a stable density since 1986.

Grasses and forbs are lacking on the site. Grasses currently ('00) provide only 4% cover with forbs accounting for less than ½ of 1%. There are some small open areas of perennial grasses, but these have been invaded by broom snakeweed. The most common grass species are galleta, bottlebrush squirreltail, needle-and-thread, red

three-awn, and blue grama. Since most of the production is from warm season grasses, the value for spring use is limited. The forb composition is poor.

1986 APPARENT TREND ASSESSMENT

There are a large number of undesirable invader species on this site. Although they indicate a less than optimal range condition, they do not necessarily indicate a future downward trend. However, the hedged form of the Wyoming big sagebrush could indicate a downward trend. An encouraging sign is the presence of young sagebrush. Actually, the area appears more to be recovering from past abuses and with favorable conditions may continue to produce a large amount of winter range forage. Not much can be done to protect the scarce, more palatable shrubs from overuse. Because of inadequate ground cover, presence of erosion pavement, and lack of organic matter, the soil trend appears to be declining.

1994 TREND ASSESSMENT

With the lack of significant slope and percent bare ground changing little, trend for the soils is considered stable but in less than satisfactory condition. Even though the key browse species, Wyoming big sagebrush, has more plants that are now judged as decadent, this is more than compensated for by the exceptionally high biotic potential (# of seedlings) of 99%. Both shadscale and winterfat have greatly improved vigor and much lower rates of decadency. Trend for key browse is up, but the broom snakeweed population should be watched closely for any unusual increases in its population. The trend for the herbaceous understory is slightly up, but still in very poor condition with a total of just 3% cover for all species combined.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - slightly up, but still poor (4)

2000 TREND ASSESSMENT

Trend for soil appears stable but still in poor condition with the ratio of bare ground to protective cover remaining unchanged. Litter and total vegetation cover are low while unprotected bare ground is high and herbaceous vegetation scarce. Interspaces between shrubs contain abundant erosion pavement while soil is pedestaled under the shrubs. Cryptogamic cover has increased but these are concentrated under shrub canopies. There is obviously some localized soil erosion occurring during high intensity storms but it is minimized by the level terrain. Trend for browse is up for the key species Wyoming big sagebrush. Density has increased due to a large number of young plants counted this year. Seedlings are also abundant. The number of decadent plants has increased (700 to 1,240 plants/acre) but this is more than compensated by the large number of young. Use is mostly light and vigor good. Rabbits appear to be heavily utilizing the other preferred browse shadscale. It appears to have a stable population but vigor is poor and percent decadence high. One negative aspect of the browse trend is the dramatic 4-fold increase in density of broom snakeweed since 1994 (6,280 plants/acre to 26,900). Trend for the herbaceous understory is up slightly but grasses and forbs are still lacking. Combined, they provide only 4% total cover. Grasses are diverse and sum of nested frequency for the most abundant grasses increased slightly. Sum of nested frequency of forbs declined.

TREND ASSESSMENT

soil - stable but in poor condition (3)

browse - up for Wyoming big sagebrush (5)

herbaceous understory - slightly up, but still poor (4)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 4

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Aristida purpurea</i>	a-	b10	b7	-	5	4	.08	.16
G	<i>Bouteloua gracilis</i>	a17	b41	c65	8	18	26	1.04	1.86
G	<i>Hilaria jamesii</i>	a-	b34	a5	-	12	2	.66	.18
G	<i>Oryzopsis hymenoides</i>	a-	b9	b15	-	5	8	.03	.44
G	<i>Poa fendleriana</i>	a-	b3	a-	-	3	-	.01	-
G	<i>Sitanion hystrix</i>	a28	a16	b65	12	6	28	.20	.81
G	<i>Stipa comata</i>	a1	a14	b31	1	7	12	.57	.77
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		46	127	188	21	56	80	2.61	4.23
Total for Grasses		46	127	188	21	56	80	2.61	4.23
F	<i>Astragalus convallarius</i>	-	2	-	-	1	-	.00	-
F	Cruciferae	-	3	-	-	1	-	.03	-
F	<i>Cryptantha</i> spp.	-	4	-	-	1	-	.15	-
F	<i>Eriogonum cernuum</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Eriogonum ovalifolium</i>	a-	b3	ab1	-	3	1	.01	.00
F	<i>Lappula occidentalis</i> (a)	-	b4	a-	-	3	-	.01	-
F	<i>Leucelene ericoides</i>	-	4	4	-	2	2	.15	.03
F	<i>Lepidium montanum</i>	a-	c24	b4	-	10	3	.08	.01
F	<i>Sphaeralcea coccinea</i>	3	1	-	1	1	-	.00	-
Total for Annual Forbs		0	6	0	0	4	0	0.01	0
Total for Perennial Forbs		3	41	9	1	19	6	0.43	0.05
Total for Forbs		3	47	9	1	23	6	0.46	0.05

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 4

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	<i>Artemisia tridentata wyomingensis</i>	74	82	15.10	16.59
B	<i>Atriplex confertifolia</i>	19	20	.45	.31
B	<i>Ceratoides lanata</i>	2	0	-	-
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	37	38	1.63	.66
B	<i>Echinocereus</i> spp.	0	1	-	.00
B	<i>Gutierrezia sarothrae</i>	81	95	2.20	4.37

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Juniperus osteosperma	0	1	-	-
B	Leptodactylon pungens	5	7	.30	.30
B	Opuntia spp.	28	34	.25	.48
Total for Browse		246	278	19.96	22.75

BASIC COVER --

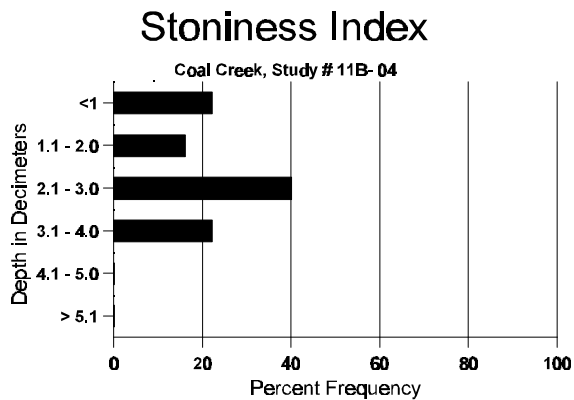
Herd unit 11B, Study no: 4

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	238	271	3.75	21.64	28.34
Rock	284	129	0	10.46	1.77
Pavement	291	319	18.25	4.25	17.54
Litter	369	320	39.00	20.09	17.54
Cryptogams	135	216	3.50	3.26	10.94
Bare Ground	339	360	35.50	35.29	47.24

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 4, Study Name: Coal Creek

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.20	50.2 (11.73)	7.5	54.0	22.0	24.0	1.0	6.4	140.8	0.6



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 4

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	00	00
Rabbit	45	39	374	N/A
Elk	-	1	-	-
Deer	15	3	52	4 (10)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 4

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
<i>Artemisia tridentata wyomingensis</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	132	-	-	11	-	-	-	-	-	143	-	-	-	2860			143
	00	22	-	-	56	-	-	23	-	-	101	-	-	-	2020			101
Y	86	2	2	1	-	-	-	-	-	-	5	-	-	-	333			5
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	68	-	-	32	-	-	15	-	-	115	-	-	-	2300			115
M	86	-	13	4	-	-	-	-	-	-	15	2	-	-	1133	14	15	17
	94	89	15	2	-	-	-	-	-	-	106	-	-	-	2120	20	31	106
	00	68	23	3	-	4	2	1	-	-	101	-	-	-	2020	22	35	101
D	86	-	3	3	-	-	-	-	-	-	6	-	-	-	400			6
	94	28	2	5	-	-	-	-	-	-	22	-	-	13	700			35
	00	38	11	2	4	5	2	-	-	-	32	1	-	29	1240			62
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		64%			29%			00%			+36%							
'94		12%			05%			09%			+48%							
'00		15%			03%			10%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	1866	Dec:	21%			
												'94	2900		24%			
												'00	5560		22%			

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Atriplex confertifolia</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	15	2	-	1	-	-	-	-	-	18	-	-	-	360	10	13	
	00	-	-	1	-	1	5	-	-	-	7	-	-	-	140	8	14	
D	86	-	-	2	-	-	-	-	-	-	-	-	2	-	133		2	
	94	10	-	2	-	-	-	-	-	-	10	-	-	2	240		12	
	00	-	1	-	-	-	8	1	-	9	-	-	-	19	380		19	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			100%			100%			+78%							
'94		07%			07%			07%			-10%							
'00		07%			85%			70%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	133	Dec:	100%				
											'94	600		40%				
											'00	540		70%				
<i>Ceratoides lanata</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	7	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
D	86	2	-	6	-	-	-	-	-	-	2	-	6	-	533		8	
	94	-	1	-	-	-	-	-	-	-	-	-	-	1	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			75%			75%			-89%							
'94		33%			00%			33%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	533	Dec:	100%				
											'94	60		33%				
											'00	0		0%				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total										
		1	2	3	4													
Chrysothamnus viscidiflorus stenophyllus																		
S	86	-	-	-	-	-	-	-	-	-	-	0		0				
	94	1	-	-	-	-	-	-	-	-	-	1	-	1				
	00	1	-	-	-	-	-	-	-	-	-	1	-	1				
Y	86	-	-	-	-	-	-	-	-	-	-	0		0				
	94	-	-	-	-	-	-	-	-	-	-	0		0				
	00	1	-	-	-	-	-	-	-	-	-	1	-	1				
M	86	1	-	-	-	-	-	-	-	-	-	1	3	7	1			
	94	55	1	2	7	-	-	-	-	-	-	59	7	10	65			
	00	2	1	1	1	-	2	-	-	-	-	7	4	7	7			
D	86	26	1	-	-	-	-	-	-	-	-	22	-	2	3	1800		27
	94	17	-	4	1	-	-	-	-	-	-	18	-	-	4	440		22
	00	19	-	1	8	-	-	32	-	-	-	10	-	-	50	1200		60
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	380		19
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>										
'86		04%		00%		18%		- 7%										
'94		01%		07%		11%		-22%										
'00		01%		06%		74%												
Total Plants/Acre (excluding Dead & Seedlings)										'86	1866	Dec:	96%					
										'94	1740		25%					
										'00	1360		88%					
Echinocereus spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	1	-	-	-	-	-	-	1	-	-	20	3	12	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>										
'86		00%		00%		00%												
'94		00%		00%		00%												
'00		00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-					
										'94	0		-					
										'00	20		-					

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total							
		1	2	3	4										
<i>Gutierrezia sarothrae</i>															
S	86	13	-	-	-	-	-	-	12	-	-	1	866		13
	94	1	-	-	-	-	-	-	1	-	-	-	20		1
	00	5	-	-	-	-	-	-	5	-	-	-	100		5
Y	86	25	-	-	-	-	-	-	24	-	-	1	1666		25
	94	35	-	-	1	-	-	-	36	-	-	-	720		36
	00	47	-	-	5	-	-	-	52	-	-	-	1040		52
M	86	100	-	-	-	-	-	-	98	-	1	1	6666	7 8	100
	94	242	-	-	11	-	-	-	239	-	14	-	5060	8 7	253
	00	1164	-	-	19	-	-	-	1183	-	-	-	23660	4 5	1183
D	86	47	-	-	-	-	-	-	38	-	4	5	3133		47
	94	25	-	-	-	-	-	-	22	-	-	3	500		25
	00	109	-	-	-	-	-	1	55	-	2	53	2200		110
X	86	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	360		18
	00	-	-	-	-	-	-	-	-	-	-	-	740		37
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>					<u>% Change</u>						
'86		00%	00%	07%					-45%						
'94		00%	00%	05%					+77%						
'00		00%	00%	04%											
Total Plants/Acre (excluding Dead & Seedlings)										'86	11465	Dec:	27%		
										'94	6280		8%		
										'00	26900		8%		
<i>Juniperus osteosperma</i>															
Y	86	1	-	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	1	-	-	20		1
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>					<u>% Change</u>						
'86		00%	00%	00%											
'94		00%	00%	00%											
'00		00%	00%	00%											
Total Plants/Acre (excluding Dead & Seedlings)										'86	66	Dec:	-		
										'94	0		-		
										'00	20		-		

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Leptodactylon pungens																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	21	-	-	-	-	-	-	-	-	21	-	-	-	420	5	7	21
	00	1	-	-	2	-	-	-	-	-	3	-	-	-	60	8	7	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	00	3	-	14	-	-	-	12	-	-	22	-	-	7	580		29	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			05%			+37%							
'00		00%			40%			20%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	440		5%			
												'00	700		83%			
Opuntia spp.																		
Y	86	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	17	-	-	-	-	-	-	-	-	11	-	6	-	1133	4	6	17
	94	51	-	-	-	-	-	-	-	-	51	-	-	-	1020	3	11	51
	00	40	-	-	1	-	-	-	-	-	41	-	-	-	820	4	8	41
D	86	2	-	-	-	-	-	-	-	-	1	-	1	-	133		2	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	19	-	-	1	-	-	-	-	-	12	-	2	6	400		20	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			40%			-20%							
'94		00%			00%			00%			+13%							
'00		00%			00%			13%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	1332	Dec:	10%			
												'94	1060		2%			
												'00	1220		33%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
S	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>					
'86		00%			00%			00%									
'94		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-		
												'94	0		-		
												'00	0		-		

Trend Study 11B-5-00

Study site name: B Canyon .

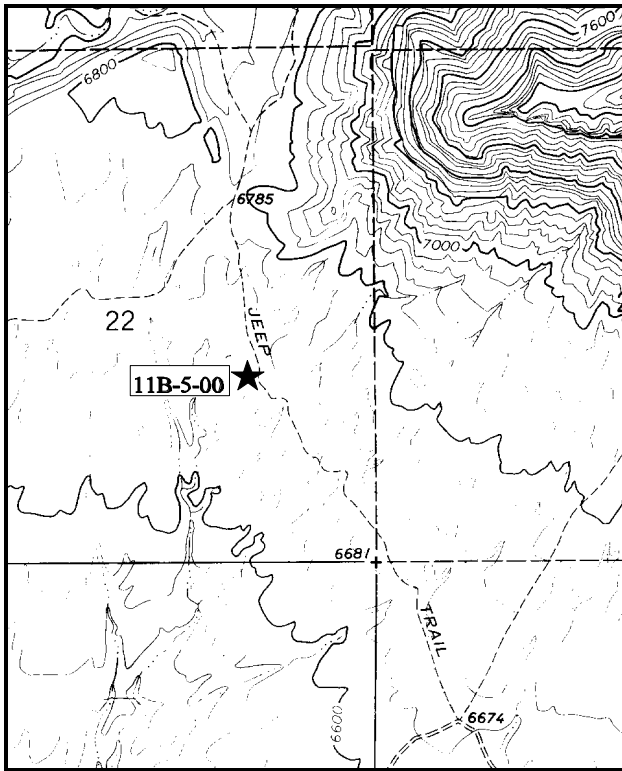
Range type: Chained, Seeded P-J Burn

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

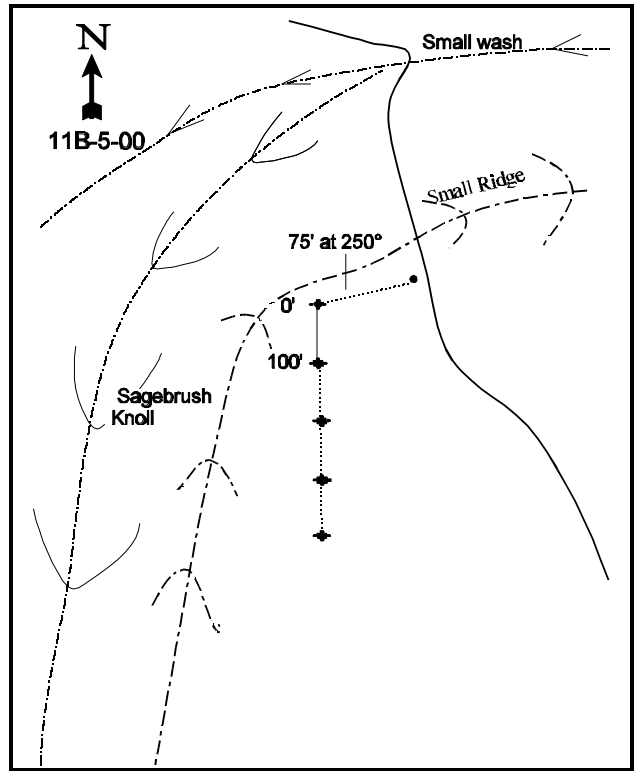
LOCATION DESCRIPTION

From the Sunnyside City limit sign on Highway 123 at the west end of town, turn north and go 0.2 miles, passing the East Carbon High School football field. Turn right and go 0.95 miles. Turn right and pass through a yellow metal gate, continuing 0.3 miles to a cattle guard. Stay on the main road and go north 2.05 miles to an intersection. Keep left at the intersection (right turn goes to A Canyon transect) and go 0.75 miles more to just beyond the crest of a small hill. On the left side of the road you should find a large white rock. The transect, marked by a red painted rebar (tag #7894), starts 75 feet away at a bearing of 235°M.



Map Name: Sunnyside 7.5'

Township 14S , Range 13E , Section 22



Diagrammatic Sketch

UTM. 4382172.724 N, 547990.634 E

DISCUSSION

Trend Study No. 11B-5 (32-6)

The 'B' Canyon study site is located near the mouth of 'B' Canyon on the gentle west-facing slope at the base of the Book Cliffs. Elevation at the site is 6,700 feet. The site is about 4 miles northwest of Sunnyside. Plans have been proposed to mine 15 million tons of coal from the 'B' Canyon mining project. Surface facilities, in addition to improved roads, would be located on public lands within the deer winter range. In 1966, the area was two-way chained and seeded to crested wheatgrass, fourwing saltbush, and nomad alfalfa. After 20 years, the site was again being dominated by the release of the young trees left after the original chaining. Pinyon and juniper density was estimated at 250 plants/acre (pinyon at 106 trees/acre and juniper at 149) in 1994, most were young trees. In 1996, the area was burned by a wildfire, and afterward, chained and apparently seeded with a dribbler. The wildfire eliminated all of the trees and nearly all of the shrubs. The only shrubs left are a few surviving mountain mahogany, bitterbrush, and resprouting green ephedra.

The site is on the Mud Springs grazing allotment, which is permitted for 338 cattle from mid-October to mid-June. The four pastures are rotated on the basis of forage condition and water availability as determined by the permittee. Cattle use on the site appears to be light to moderate. Judging from pellet groups, deer use is light, elk use is negligible, with rabbit use being somewhat heavier. Pellet group data from the 2000 reading estimate 9 deer and 4 cow days use/acre (22 ddu/ha, 10 cdu/ha). Rabbit pellets were frequently encountered.

The soil is moderately deep, but fairly rocky and variable as demonstrated by the presence of both black sagebrush and mountain big sagebrush prior to the fire. Effective soil depth is estimated at 13.7 inches. It has a sandy clay loam texture with a soil reaction that is neutral (7.3 pH). Phosphorus is limited at just 5.2 ppm, where values less than 10 ppm may limit normal plant growth and development. There are patches of exposed soil, but overall ground cover is good and erosion minimal. Rocks and pavement are found in the bare areas and large rocks and boulders are common within the soil profile and exposed on the surface. Many rocks in the soil profile contain a calcium carbonate crust.

The most numerous shrub prior to the 1996 fire was black sagebrush. It made up 56% of the browse cover in 1994 with a population of 6,080 plants/acre. The majority of these plants were mature and vigorous although rather heavily browsed in 1986. There was also some scattered mountain big sagebrush plants (180 plants/acre). Less numerous shrubs in the area included green ephedra (40 plants/acre) and true mountain mahogany (60 plants/acre). After the wildfire of 1996, there remained only a few surviving or resprouting fourwing saltbush (40 plants/acre), mountain mahogany (20 plants/acre), green ephedra (200 plants/acre), and bitterbrush (20 plants/acre). All of the fourwing and mountain mahogany and nearly all (90%) of the green ephedra were heavily hedged.

Before and after the fire, crested wheatgrass is the dominate herbaceous plant. They are tall, vigorous and appear to be lightly grazed. A few other valuable species, including Indian ricegrass, smooth brome, bluebunch wheatgrass, and mutton bluegrass are present, but provide only limited forage. Abundance of forbs is low as illustrated by no more than 1% cover for all forbs combined in 1994 and 2000.

1986 APPARENT TREND ASSESSMENT

The range appears to be in good condition. The key species, black sagebrush, is vigorous and productive. Although there is a fairly high percentage of decadent plants, there is a healthy number of young plants and the population appears stable. The one downward parameter is the increasing cover of the released pinyon and juniper, which in time could restrict growth and reproduction of more desirable browse species. Except for scattered bare patches, ground cover is excellent with little erosion. Therefore, the current soil trend appears to be stable also.

1994 TREND ASSESSMENT

The trend for soil is stable with percent bare ground decreasing slightly and a good cover value for grasses. The trend for browse is slightly up for the key browse species, black sagebrush. Percent decadency has declined (27% to 14%) and the percentage of plants that were moderate to heavily hedged has also gone down (67% to 1%). Trend for the herbaceous understory species is stable with nested frequency values that are almost unchanged from 1986. There was a slight decrease for the forbs, but altogether they provide less than 1% of the vegetative cover.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down with percent bare ground increasing and litter cover and vegetative cover declining. Since the fire, vegetation cover has changed from mainly shrub and tree cover to mostly herbaceous cover. Grass cover has doubled with sum of nested frequency increasing. Even with this change in composition, the ratio of bare soil to protective cover has decreased significantly. Erosion is not a noticeable problem on the site due to the abundant herbaceous cover combined with the gentle slope. Trend for browse is down due to a loss of most shrubs to fire. The few surviving preferred browse species are being heavily used but should increase through time. Trend for the herbaceous understory is up with an increase in the sum of nested frequency for perennial grasses and forbs. Nested frequency of the dominant grass, crested wheatgrass, remained stable but several other species increased.

TREND ASSESSMENT

soil - down slightly due to fire (2)

browse - down, most browse eliminated due to the fire (1)

herbaceous understory - up (5)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 5

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	269	263	274	94	87	95	9.44	17.78
G	Agropyron intermedium	a-	a-	b43	-	-	19	-	1.74
G	Agropyron smithii	4	-	-	2	-	-	-	-
G	Agropyron spicatum	a-	b6	a-	-	3	-	.33	-
G	Bouteloua gracilis	-	-	3	-	-	1	-	.03
G	Bromus inermis	12	6	4	5	4	1	.21	.38
G	Dactylis glomerata	a-	a-	b9	-	-	3	-	.04
G	Festuca ovina	a-	a-	b15	-	-	9	-	.09
G	Hilaria jamesii	a-	b12	a-	-	6	-	.10	-
G	Oryzopsis hymenoides	10	4	8	8	2	3	.06	.99
G	Poa fendleriana	a-	b7	a-	-	3	-	.21	-
G	Sitanion hystrix	1	-	-	1	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		296	298	356	110	105	131	10.36	21.06
Total for Grasses		296	298	356	110	105	131	10.36	21.06
F	Arabis selbyi	ab2	b11	a-	2	5	-	.02	-
F	Astragalus convallarius	ab13	a9	b21	5	3	12	.20	.55
F	Astragalus wingatanus	b21	ab15	a-	14	7	-	.46	.06
F	Chenopodium fremontii (a)	-	-	6	-	-	2	-	.01
F	Hedysarum boreale	2	-	3	2	-	1	-	.15
F	Lesquerella ludoviciana	3	7	5	1	3	3	.01	.01
F	Linum lewisii	-	-	8	-	-	3	-	.02
F	Machaeranthera grindelioides	3	1	-	1	1	-	.03	-
F	Medicago sativa	5	-	5	2	-	2	-	.01
F	Penstemon cyanocaulis	b17	a5	a4	11	2	2	.01	.03
F	Salsola iberica (a)	-	-	12	-	-	4	-	.04
F	Sanguisorba minor	-	-	1	-	-	1	-	.03
F	Schoenrambe linifolia	a-	a3	b16	-	2	8	.01	.06
F	Sphaeralcea coccinea	3	-	6	1	-	2	-	.01
Total for Annual Forbs		0	0	18	0	0	6	0	0.05
Total for Perennial Forbs		69	51	69	39	23	34	0.76	0.94
Total for Forbs		69	51	87	39	23	40	0.76	1.00

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 5

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia nova	78	0	8.85	-
B	Artemisia tridentata vaseyana	3	0	.81	-
B	Atriplex canescens	0	2	-	-
B	Cercocarpus montanus	3	1	1.00	.03
B	Ephedra viridis	2	2	.41	.15
B	Gutierrezia sarothrae	8	1	.21	-
B	Juniperus osteosperma	0	0	3.00	-
B	Opuntia spp	1	0	-	-
B	Pinus edulis	0	0	1.63	-
B	Purshia tridentata	0	1	-	.15
Total for Browse		95	7	15.93	0.33

BASIC COVER --

Herd unit 11B, Study no: 5

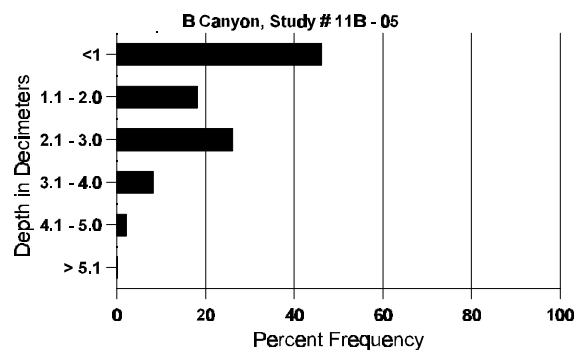
Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	292	303	11.50	28.43	24.17
Rock	235	233	7.00	10.55	13.60
Pavement	195	323	3.75	1.52	6.80
Litter	386	359	60.50	45.45	30.78
Cryptogams	77	3	.75	2.80	.63
Bare Ground	244	350	16.50	15.73	38.27

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 5, Study Name: B Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
13.72	51.4 (13.78)	7.3	51.0	26.4	22.6	2.2	5.2	124.8	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 5

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	00	00
Rabbit	20	66	209	N/A
Elk	1	-	-	-
Deer	35	20	113	9 (22)
Cattle	-	1	52	5 (11)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 5

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia nova																	
S	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6
	94	5	-	-	-	-	-	-	-	5	-	-	-	100		5	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	6	1	2	-	-	-	-	-	9	-	-	-	600		9	
	94	25	1	-	-	-	-	-	-	26	-	-	-	520		26	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	12	7	39	-	-	-	-	-	56	1	1	-	3866	9 16	58	
	94	159	42	-	-	34	-	-	-	235	-	-	-	4700	15 21	235	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
D	86	3	1	21	-	-	-	-	-	23	-	2	-	1666		25	
	94	24	11	2	1	5	-	-	-	33	-	-	10	860		43	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		10%			67%			03%			- 1%						
'94		31%			.65%			03%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	6132	Dec:	27%		
												'94	6080		14%		
												'00	0		0%		

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	3	-	-	-	-	-	-	-	3	-	-	-	200	20	20	3
	94	3	4	-	-	-	-	-	-	-	7	-	-	-	140	16	28	7
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		100%			00%			00%			-10%							
'94		44%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	200	Dec:	0%			
												'94	180		11%			
												'00	0		0%			
Atriplex canescens																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	1	-	-	1	2	-	-	-	40		2	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	100%			
												'94	0		0%			
												'00	40		0%			
Cercocarpus montanus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	1	1	-	-	-	-	3	-	-	-	60	38	42	3
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	9	8	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		33%			00%			00%			-67%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	60		-			
												'00	20		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total				
		1	2	3	4		1	2					
<i>Ephedra viridis</i>													
Y	86	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	0		0		
	00	-	1	-	-	-	-	-	20		1		
M	86	-	1	-	-	-	-	-	66	36	25	1	
	94	2	-	-	-	-	-	-	40	26	24	2	
	00	-	-	9	-	-	-	-	180	11	12	9	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>					
'86		100%		00%		100%		-39%					
'94		00%		00%		00%		+80%					
'00		10%		90%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'86	66	Dec:	-
										'94	40		-
										'00	200		-
<i>Gutierrezia sarothrae</i>													
Y	86	-	-	-	-	-	-	-	0		0		
	94	3	-	-	-	-	-	-	60		3		
	00	-	-	-	-	-	-	-	0		0		
M	86	-	-	-	-	-	-	-	0	-	-	0	
	94	12	-	-	-	-	-	-	240	8	7	12	
	00	1	-	-	-	-	-	-	20	-	-	1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>					
'86		00%		00%		00%		-93%					
'94		00%		00%		00%							
'00		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-
										'94	300		-
										'00	20		-
<i>Juniperus osteosperma</i>													
Y	86	1	-	-	-	-	-	-	66		1		
	94	-	-	-	-	-	-	-	0		0		
	00	-	-	-	-	-	-	-	0		0		
M	86	1	-	1	-	1	-	-	200	72	35	3	
	94	-	-	-	-	-	-	-	0	-	-	0	
	00	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>					
'86		25%		25%		00%							
'94		00%		00%		00%							
'00		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'86	266	Dec:	-
										'94	0		-
										'00	0		-

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	13	1
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	16	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	20		-			
												'00	0		-			
Pinus edulis																		
Y	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	108	71	1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	132	Dec:	-			
												'94	0		-			
												'00	0		-			
Purshia tridentata																		
Y	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	24	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	20		-			

Trend Study 11B-6-00

Study site name: Upper Cottonwood .

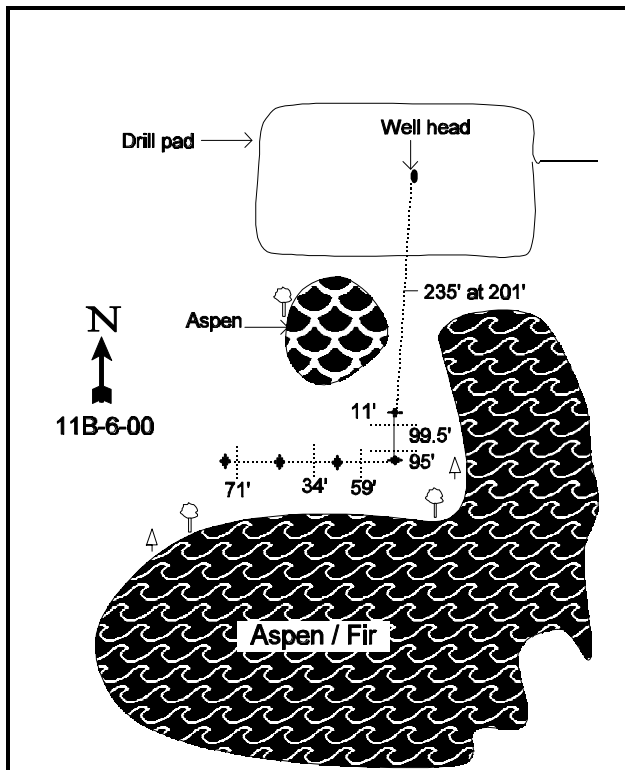
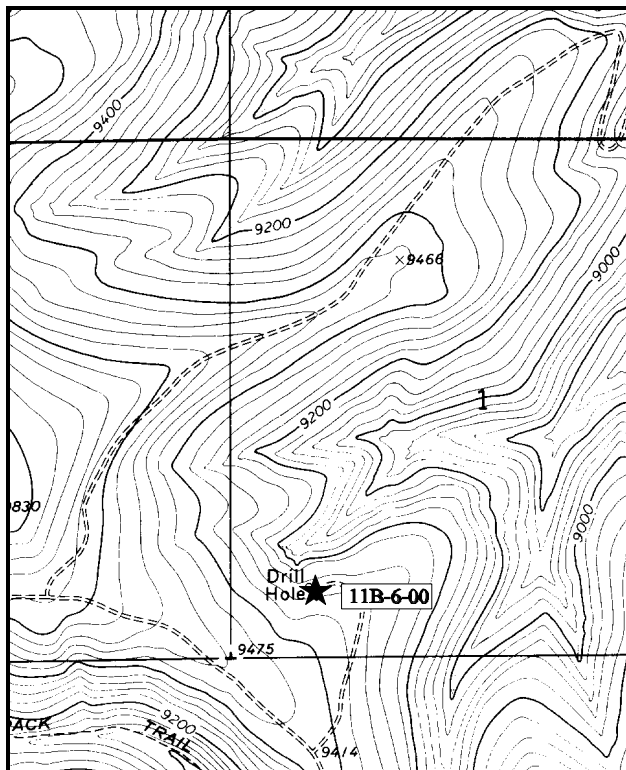
Range type: Dry Meadow .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Sunnyside, proceed up Water Canyon to the summit at Bruin Point (approximately 5.6 miles). Take the middle fork and go 0.35 miles to a cattle guard. Stay right just beyond the cattle guard and proceed 0.85 miles to an intersection. Go straight through the intersection and go 1.8 miles to a fork. Turn left and go 0.45 miles to the end of the road, an oil drilling pad. The baseline is located 235 feet south (201°) of the well head. The 0-foot end of the frequency baseline is marked by a 4-foot tall fence post tagged #7835.



Map Name: Bruin Point

Diagrammatic Sketch

Township 14S , Range 14E , Section 1

UTM. 4386718.631 N, 559717.686 E

DISCUSSION

Trend Study No. 11B-6 (32-10)

The Upper Cottonwood transect is located in an open meadow surrounded by quaking aspen, subalpine fir, and Douglas fir. The high, cool north-facing slope supports an abundant variety of plant life at an elevation of 9,300 feet. The meadow is near the ridge top at the headwaters of Cottonwood Creek where the slope is 15% to 22%. The slope gets progressively steeper towards the bottom of the small canyons. The lack of a permanent water source nearby limits the use of the area by big game during the summer. Historically, cattle have been given season long use of the large Green River allotment, however this allotment has not been grazed since 1994. The large allotment is divided into 8 pastures which are permitted to be used from February 1st through October 15th for a total of 3,038 AUM's.

Oil and gas exploration has been carried out in the area in the past, but there are no signs of any current activity. An extensive road system encourages recreational use by the public throughout the area. There is evidence of vehicles driving off-road into the meadows. Camping activity has taken place, most likely during the summer and the deer hunt. Little deer sign was noted in 1994 as evidenced by the pellet group quadrat frequency of only 2%. Elk were more numerous on the site with a quadrat frequency of 17%. Data from the 2000 reading shows a quadrat frequency of 12% for elk pellet groups and a pellet group transect taken along the study site baseline estimates 25 elk and 8 deer days use/acre (62 edu/ha and 20 ddu/ha). Most of the deer and elk pellet groups appear to be from the spring.

Typical of high elevation sites with approximately 20 inches of annual precipitation, there is abundant plant life associated with fairly deep soils rich with organic matter (5.5% O.M.). Effective rooting depth is estimated at 17 inches. There is very little rock on the surface but occasional rocks are found in the profile. The soil itself is a clay loam with a neutral soil reaction (6.7 pH). Total ground cover from vegetation and litter is quite high and there is little unprotected bare soil.

The meadow provides succulent herbaceous forage on this summer range for both deer and elk. Browse is an insignificant vegetative component on this study site. However, a few seedling and young aspens provide some forage which had been moderately to heavily browsed in 1986. Heavy browsing could affect aspen regeneration in the meadow. The study site baseline was lengthened in 1994, but aspen was mistakenly not sampled in the shrub density strips so no comparisons can be made with the 1986 data. In 2000, there were an estimated 1,480 aspen trees/acre, 78% of which are young trees. Use on all aspen sampled appeared light. Some gooseberry current occurs in scattered patches. Even with it's prickly traits, it is still moderately palatable. Also present in the opening is mountain snowberry and scattered mountain big sagebrush. The site is surrounded by large mature aspen, subalpine fir, and Douglas fir which are slowly moving in from the edges.

The herbaceous understory is abundant and diverse, yet dominated by the increasers Kentucky bluegrass and dandelion which currently ('00) provide 59% of the herbaceous cover. Kentucky bluegrass forms a thick lawn-like cover over the meadow. The dense, vigorous root system and sod formed by the Kentucky bluegrass provides excellent erosion control. Other species (sedges and several bunchgrasses) are less abundant although they also provide additional forage. Forbs are an important source of forage for deer and elk on summer range. The forb composition is diverse with over 20 species sampled in 1994 and 2000. Dandelion dominates the composition and accounted for 61% of the forb cover in 1994 and 53% in 2000. Other more desirable, late serial forbs are present but in low numbers.

1986 APPARENT TREND ASSESSMENT

The soil, although potentially erodible, is well protected with herbaceous species and the trend appears stable. Vegetative trend also appears stable as invasion of the meadow by woody species is advancing slowly. The dense herbaceous component and some selective hedging on the browse species will help to slow the advancing invasion. However, conifers will eventually establish further into the opening and shade out more of the meadow if no action is taken. This would indicate a very long-term downward trend in terms of big game summer range. Fire is a way to maintain these openings if it can be done safely and efficiently. It is desirable to maintain these scattered open meadows with abundant "edge", especially for elk habitat. The herbaceous component, which is less diverse and abundant in the surrounding forest, provides important spring and summer forage for deer and elk.

1994 TREND ASSESSMENT

There is still an excellent herbaceous cover protecting the soil surface with percent bare ground decreasing since 1986. Trend for soils is up slightly. The trend for browse is slightly down, but for this summer range it is not a critical component as it contributes only 18% of the vegetative cover. Trend for the herbaceous understory is slightly up because of the moderate increase in the total nested frequency value for perennial grasses. The forbs and grasses contribute almost equal amounts of cover, 12% and 13% vegetative cover respectively.

TREND ASSESSMENT

soils - slightly improving (4)

browse - slightly down, but not critical for summer range (2)

herbaceous understory - slightly up (4)

2000 TREND ASSESSMENT

Trend for soil is stable with similar relative cover values of protective ground cover compared to 1994. There is no problem with erosion on the site. Browse is not an important component on this summer range but density of mountain big sagebrush and gooseberry currant have increased. A negative aspect to the browse trend is the increase in conifer cover. The browse trend is considered stable. The herbaceous understory is the key component on this summer range. Forbs and grasses are diverse and abundant but the grass component is dominated by the increaser, Kentucky bluegrass which currently accounts for 67% of the grass cover. Other common native grasses include blue wildrye and subalpine needlegrass. Nested frequency of Kentucky bluegrass has declined significantly since 1994 while subalpine needlegrass has increased significantly. Sum of nested frequency of all perennial grasses has declined slightly. The forb composition is dominated by the increaser, dandelion, which provides 53% of the forb cover. It has remained stable in nested frequency since 1994. Overall, cover of forbs has increased from 12% to 17% since the last reading. Sum of nested frequency has also increased. With this in mind, trend for the herbaceous understory is considered stable.

TREND ASSESSMENT

soils - stable (3)

browse - stable, but not critical for summer range (3)

herbaceous understory - stable, but composition poor (3)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 6

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Agropyron spicatum</i>	3	-	-	2	-	-	-	-
G	<i>Bromus carinatus</i>	_b 73	_a 6	_a 27	31	4	10	.07	.44
G	<i>Carex</i> spp.	_a 22	_b 39	_{ab} 26	9	17	15	.13	.35
G	<i>Elymus glaucus glaucus</i>	_a 2	_b 75	_b 64	2	29	22	.64	1.11
G	<i>Poa fendleriana</i>	_b 5	_a -	_{ab} 3	3	-	1	-	.03
G	<i>Poa pratensis</i>	_b 307	_b 289	_a 241	85	84	72	11.51	7.83
G	<i>Stipa columbiana</i>	_a -	_b 23	_c 63	-	13	29	.33	1.69
G	<i>Stipa lettermani</i>	_a 1	_b 55	_a 22	1	23	8	.33	.17
G	<i>Trisetum spicatum</i>	_b 6	_b 14	_a -	4	5	-	.22	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		419	501	446	137	175	157	13.25	11.63
Total for Grasses		419	501	446	137	175	157	13.25	11.63
F	<i>Achillea millefolium</i>	_b 160	_b 144	_a 91	67	58	39	1.52	.81
F	<i>Agoseris aurantiaca</i>	_a 10	_a 7	_b 62	5	4	27	.02	.44
F	<i>Antennaria parvifolia</i>	37	38	41	16	16	17	.45	1.33
F	<i>Androsace septentrionalis</i> (a)	-	-	39	-	-	17	-	.33
F	<i>Aquilegia coerulea</i>	_b 8	_a -	_a -	4	-	-	-	-
F	<i>Arabis drummondi</i>	_a 1	_b 17	_b 9	1	8	5	.04	.05
F	<i>Astragalus miser</i>	_{ab} 20	_a 5	_b 36	8	3	15	.01	.42
F	<i>Aster</i> spp.	_a -	_b 41	_c 89	-	17	33	.36	1.26
F	<i>Calochortus gunnisoni</i>	_b 13	_a -	_a -	6	-	-	-	-
F	<i>Chaenactis douglasii</i>	_a -	_b 9	_a -	-	3	-	.01	-
F	<i>Chenopodium fremontii</i> (a)	-	-	2	-	-	1	-	.03
F	<i>Cirsium calcareum</i>	15	24	9	8	13	5	.26	.02
F	<i>Comandra pallida</i>	_a -	_a -	_b 17	-	-	9	-	.14
F	<i>Collinsia parviflora</i> (a)	_a -	_a -	_b 7	-	-	4	-	.02
F	<i>Descurainia pinnata</i> (a)	_a -	_a -	_b 32	-	-	14	-	.24
F	<i>Erigeron speciosus</i>	5	11	17	3	5	6	.10	.22
F	<i>Fragaria vesca</i>	_a 8	_b 39	_{ab} 21	3	13	9	.70	.41
F	<i>Gayophytum ramosissimum</i> (a)	-	-	4	-	-	3	-	.04
F	<i>Gentiana prostrata</i>	_a -	_a -	_b 35	-	-	14	-	.63
F	<i>Lupinus argenteus</i>	_a 2	_a 1	_b 10	1	1	5	.03	.39
F	<i>Monardella odoratissima</i>	_b 4	_a -	_a -	3	-	-	-	-
F	<i>Osmorhiza occidentalis</i>	-	5	3	-	3	2	.04	.01
F	<i>Phlox longifolia</i>	_c 22	_b 10	_a -	11	5	-	.02	-
F	<i>Polygonum douglasii</i> (a)	_a -	_b 74	_a 5	-	28	2	.16	.01

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
F	Potentilla gracilis	-	3	-	-	2	-	.01	-
F	Ranunculus alismaefolius	_b 45	_a 14	_a 12	23	7	5	.03	.36
F	Silene menziesii	_b 30	_b 35	_a 2	14	15	1	.15	.00
F	Taraxacum officinale	_a 236	_b 255	_{ab} 253	84	84	86	7.49	9.01
F	Thalictrum fendleri	_a -	_{ab} 4	_b 7	-	2	3	.03	.01
F	Unknown forb-perennial	_b 58	_a -	_a -	23	-	-	-	-
F	Viola adunca	54	53	56	25	23	29	.34	.87
F	Vicia americana	_b 12	_{ab} 6	_a -	5	2	-	.41	-
Total for Annual Forbs		0	74	89	0	28	41	0.16	0.68
Total for Perennial Forbs		740	721	770	310	284	310	12.07	16.44
Total for Forbs		740	795	859	310	312	351	12.23	17.12

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 6

T y p e	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Abies lasiocarpa	0	11	2.13	4.99
B	Artemisia tridentata vaseyana	4	5	.03	1.13
B	Populus tremuloides	0	31	2.31	1.10
B	Pseudotsuga menziesii	0	0	-	.53
B	Purshia tridentata	0	1	-	-
B	Ribes montigenum	14	17	.82	1.83
B	Rosa woodsii	1	0	-	-
B	Symphoricarpos oreophilus	14	15	.23	.21
Total for Browse		33	80	5.54	9.81

CANOPY COVER --

Herd unit 11B, Study no: 6

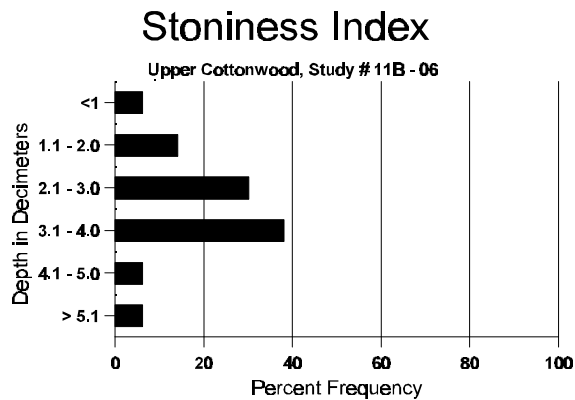
Species	Percent Cover
	'00
Abies lasiocarpa	6
Populus tremuloides	5

BASIC COVER --
Herd unit 11B, Study no: 6

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	368	352	27.75	36.17	45.02
Rock	134	29	.25	.59	.11
Pavement	92	69	.25	.21	.34
Litter	395	386	53.50	38.91	62.68
Cryptogams	59	34	0	2.36	.65
Bare Ground	254	232	18.25	11.34	17.66

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 6, Study Name: Upper Cottonwood

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.06	53.4 (17.24)	6.7	28.0	34.7	34.6	5.5	17.3	246.4	0.8



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 6

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre (00)	Days Use per Acre (ha)
Rabbit	4	-	-	-
Elk	17	12	331	26 (63)
Deer	2	-	104	8 (20)
Cattle	2	-	-	-

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 6

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
		1	2	3	4					
<i>Abies lasiocarpa</i>										
S	86	-	-	-	-	-	-	-	0	0
	94	-	-	-	-	-	-	-	0	0
	00	3	-	-	-	-	-	-	60	3
Y	86	-	-	-	-	-	-	-	0	0
	94	-	-	-	-	-	-	-	0	0
	00	14	-	-	-	-	-	-	280	14
M	86	-	-	-	-	-	-	-	0	0
	94	-	-	-	-	-	-	-	0	0
	00	3	-	-	-	-	-	2	100	5
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>		
'86		00%		00%		00%				
'94		00%		00%		00%				
'00		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-	
						'94	0		-	
						'00	380		-	
<i>Artemisia tridentata vaseyana</i>										
Y	86	-	-	-	-	-	-	-	0	0
	94	1	-	-	-	-	-	-	20	1
	00	1	-	-	-	-	-	-	20	1
M	86	-	-	-	-	-	-	-	0	0
	94	4	-	-	-	-	-	-	80	4
	00	5	-	-	-	-	-	-	100	5
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>		
'86		00%		00%		00%				
'94		00%		00%		00%		+17%		
'00		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-	
						'94	100		-	
						'00	120		-	
<i>Cercocarpus ledifolius</i>										
S	86	-	-	-	-	-	-	-	0	0
	94	1	-	-	-	-	-	-	20	1
	00	-	-	-	-	-	-	-	0	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>		
'86		00%		00%		00%				
'94		00%		00%		00%				
'00		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-	
						'94	0		-	
						'00	0		-	

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Juniperus communis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	120	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	0		-			
<i>Populus tremuloides</i>																		
S	86	3	1	-	-	-	-	-	-	-	2	-	2	-	266		4	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	1	3	1	-	-	-	-	-	-	5	-	-	-	333		5	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	58	-	-	-	-	-	-	-	-	58	-	-	-	1160		58	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	5	-	-	-	-	-	-	10	-	15	-	-	-	300	-	-	15
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	280		14	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		60%			20%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	333	Dec:	0%			
												'94	0		0%			
												'00	1480		1%			
<i>Pseudotsuga menziesii</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	20		-			
Ribes montigenum																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	20	-	-	-	-	-	-	-	-	19	-	1	-	1333		20	
	94	5	-	-	2	-	-	-	-	-	7	-	-	-	140		7	
	00	2	-	-	1	-	-	-	-	-	3	-	-	-	60		3	
M	86	14	-	-	-	-	-	-	-	-	14	-	-	-	933	25 28	14	
	94	8	-	-	6	-	-	2	-	-	16	-	-	-	320	26 62	16	
	00	25	-	-	5	-	-	5	-	-	34	1	-	-	700	20 43	35	
D	86	5	-	-	-	-	-	-	-	-	3	-	-	2	333		5	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			08%			-82%							
'94		00%			00%			00%			+39%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	2599	Dec:	13%			
												'94	460		0%			
												'00	760		0%			
Rosa woodsii																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14 12	1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	20		-			
												'00	0		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Symphoricarpos oreophilus																	
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
M	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400	22 24	6
	94	7	2	-	6	-	-	-	-	-	15	-	-	-	300	17 24	15
	00	10	2	-	2	-	-	-	-	-	14	-	-	-	280	18 24	14
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	-	-	1	20		1	
	00	1	-	-	1	-	-	-	-	-	1	-	1	40		2	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>						
'86		00%			00%			00%			-40%						
'94		09%			00%			05%			-14%						
'00		11%			00%			05%									
Total Plants/Acre (excluding Dead & Seedlings)											'86	733	Dec:	0%			
											'94	440		5%			
											'00	380		11%			

Trend Study 11B-7-00

Study site name: Cottonwood .

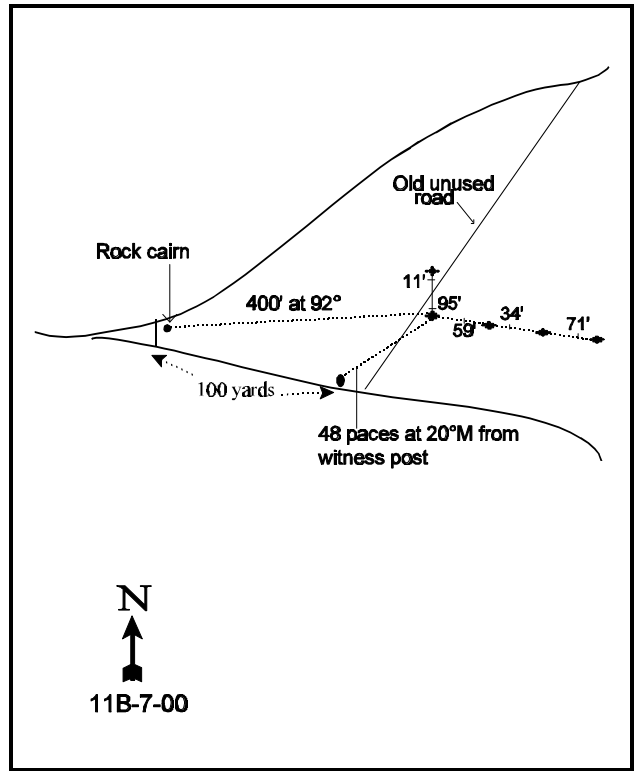
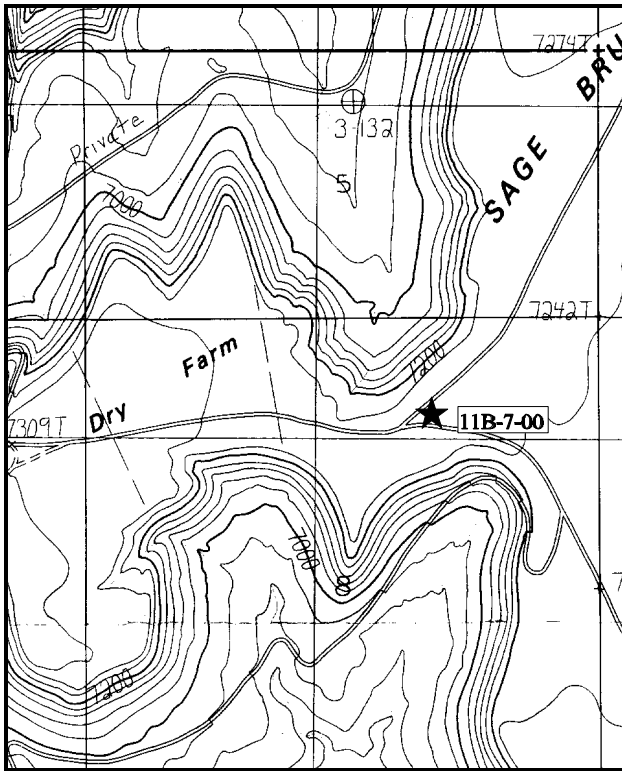
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks frequency belts) line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

LOCATION DESCRIPTION

At the Range Creek Summit (Bruin Point) take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Pass straight through an intersection beyond the next cattle guard and go 3.1 miles. Turn left at the fork and continue 2.5 miles. Pass through a gate near a cabin and continue 3.2 miles. Cross a cattle guard and proceed 5.3 miles on the main road. Bear right, cutting across the angle of a fork, and go 0.2 miles to a cattle guard. Continue 0.5 miles to another major fork. Stay right and go 100 yards to a rebar witness post on left side of the road. The 100-foot baseline stake is 48 paces at 20°M from the witness post. All markers are rebar, and the 0-foot end of the baseline has a browse tag #7872 attached.



Map Name: Twin Hollow

Diagrammatic Sketch

Township 13S , Range 16E , Section 8

UTM. 4396125.773 N, 573453.778 E

DISCUSSION

Trend Study No. 11B-7 (32-11)

The Cottonwood transect samples a sagebrush flat at the northeast end of Cottonwood Ridge. The extensive sagebrush opening is surrounded by a mature pinyon pine woodland which gradually slopes down to steep canyons that drain east into the Green River. Terrain at the study site is nearly level with an elevation of 7,200 feet. A pellet group transect which runs north of the transect was read every year until 1989 when it was dropped. Data from the previous years was quite variable, but no use was the most common result. During the 12 years previous to 1989, deer did not use the area during most of the winters, and use ranged from 1 to 9 deer days use/acre (2 to 23 ddu/ha) during any one year. Correspondingly, few deer and elk pellet groups were found on the study site. Both deer and elk had the same quadrat frequency in 1994 (10%). Quadrat frequency of deer and elk pellet groups dropped in 2000 to only 1% and 6% respectively. A pellet group transect read along the study site baseline in 2000 estimates 23 elk and 1 deer days use/acre (57 edu/ha and 2 ddu/ha). Cattle grazing pressure also appears to have been low during past readings and widely dispersed. As part of the Green River allotment, the area receives spring cattle use during some years, although the allotment has been closed to grazing since 1994.

The soil is moderately deep and rocky with an effective rooting depth estimated at nearly 14 inches. There appears to be a layer of bedrock or a hardpan 12-16 inches below the surface. Deeper depth measurements were possible under sagebrush. The soil is a loam with a slightly alkaline soil reaction (7.4 pH). Phosphorus is limited at only 4.6 ppm, where values less than 10 ppm may limit normal plant growth and development. Much of the soil surface was exposed in 1986 when 59% of the ground surface was estimated as bare ground. Bare ground continues to be moderately high at around 40%. Litter and cryptogamic cover is limited to the areas beneath the sagebrush canopy. There is some evidence of soil movement and soil pedestaling around sagebrush, but the flat terrain prevents severe erosion.

This sagebrush flat is dominated by an overly mature stand of Wyoming big sagebrush which provided 96% of the browse cover in 1994 and 98% in 2000. The sagebrush density was estimated at 5,132 plants/acre in 1986, decreasing slightly in 1994 to 4,020 plants/acre. Most of the change in density appears to be from the loss of decadent plants which had a density of 3,400 plants/acre in 1986 and 1,420 by 1994. This change along with an increase in mature plants has reduced percent decadency from 66% to 35%. The percentage of the plants showing poor vigor also improved from 32% in 1986 to only 14% in 1994. Density increased slightly to 4,140 plants/acre in 2000 but vigor is poor on 31% of the plants sampled and 69% of the population is now decadent. A large proportion of the mature sagebrush sampled in 1994 are now decadent and 43%, or 1,240 plants/acre, of those decadent shrubs appear to be dying. Reproduction is currently poor. Sagebrush showing heavy use has increased steadily from 12% in 1986 to 19% in 1994, and 32% in 2000. Currently ('00), 61% of the sagebrush sampled display moderate to heavy use. The plants on this site have produced limited new growth and are not very vigorous. This condition makes the hedging appear more severe when coupled with the extended drought.

Broom snakeweed, an increaser, occurs in the bare interspaces. It has fluctuated in density but currently appears to have a stable, mostly mature population. Very few pinyon are found in the flat and they do not appear to be increasing. The surrounding woodland provides good cover.

Herbaceous plants are not of much importance in terms of deer winter range. However, the herbaceous species do provide some spring forage. Grass abundance is moderate for a Wyoming sagebrush type. The majority of the grasses are found in the protection of the sagebrush with exception of needle-and-thread and western wheatgrass. In recent years, grazing pressure has been moderate, but historically the area was subjected to long periods of excessive use by livestock. Since 1994, with no livestock grazing, cover of perennial grasses has nearly tripled and frequency has increased as well.

Forbs are diverse and produced as much cover as the grasses in 1994. Due to dry conditions in 2000, frequency of forbs declined. The majority of the forbs are found growing within the protection of the sagebrush, except for the low rounded mats of desert phlox. None are particularly important. Lobe-leaf groundsel, scarlet globemallow, and desert phlox are the most obvious species.

1986 APPARENT TREND ASSESSMENT

The key species, Wyoming big sagebrush, shows a high incidence of decadence (66%) and poor vigor (32%), but the biotic potential (# of seedlings) is 30%. Recruitment appears adequate to maintain the stand so trend appears to be fairly stable. The shallow soil is a factor that cannot be changed, but a favorable water year would do much to improve the condition of the sagebrush. At this time, there does not appear to be excessive use by livestock or big game. Due to its scattered and clumped distribution, the winterfat will always appear to be over utilized. The soil is in poor condition due to the large amounts of unprotected bare ground and lack of litter cover.

1994 TREND ASSESSMENT

The trend for soils has improved slightly since 1986 with the decrease in percent bare ground from 59% to 44% and a significant increase in the sum of nested frequency for western wheatgrass which is highly rhizomatous. The key browse, Wyoming big sagebrush, makes up 96% of the browse cover. It has experienced significant improvements in vigor and a decrease in percent decadence. The density has gone down, but the population appears more healthy and vigorous. Trend for browse is stable. The herbaceous understory has noted a slight increase in nested frequency for grasses and forbs. There has been a very significant increase in western wheatgrass. Trend for herbaceous understory is slightly improved.

TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - slightly up (4)

2000 TREND ASSESSMENT

Trend for soil appears to be improving slightly with similar amounts of bare ground combined with increased perennial grass cover and nested frequency. Trend for the key browse species, Wyoming big sagebrush is slightly down. Density has increased slightly from 4,020 plants/acre in 1994 to 4,140 by 2000. However, the proportion of plants in poor vigor has increased from 14% in 1994 to 31%, and percent decadence has gone up from 35% to 69%. Reproduction is poor and 1,240 plants/acre of the decadent sagebrush are classified as dying. There is currently not enough young plants to replace the dying shrubs. Use is moderate to heavy but these shrubs are not very vigorous and have limited growth which makes them appear more heavily hedged. The downward trend is more a response to the increased competition with the herbaceous understory combined with the extremely dry conditions of the past few years. An above normal precipitation pattern, especially in the spring and early summer, would do much to reverse this trend. The herbaceous understory displays a mixed trend. Cover and frequency of perennial grasses have increased dramatically. The biggest change comes from the significant increase in Indian ricegrass. On the down side, due in part to the dry spring and summer, frequency of perennial forbs has declined. Overall, the herbaceous trend is considered up slightly.

TREND ASSESSMENT

soils - slightly improving (4)

browse - slightly down (2)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Agropyron smithii</i>	_a 88	_b 203	_b 235	35	71	87	2.58	4.73
G	<i>Elymus salina</i>	_a -	_b 7	_b 6	-	3	3	.18	.01
G	<i>Oryzopsis hymenoides</i>	_a 73	_a 65	_b 116	34	27	47	1.00	6.86
G	<i>Poa fendleriana</i>	_b 14	_{ab} 8	_a 2	7	3	1	.01	.03
G	<i>Sitanion hystrix</i>	_b 68	_a 26	_a 30	32	11	15	.30	.61
G	<i>Stipa comata</i>	_b 116	_a 79	_{ab} 99	56	37	37	1.57	3.81
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		359	388	488	164	152	190	5.66	16.09
Total for Grasses		359	388	488	164	152	190	5.66	16.09
F	<i>Antennaria rosea</i>	_a -	_a -	_b 11	-	-	4	-	.02
F	<i>Arabis drummondii</i>	_b 20	_a 8	_a 4	12	4	2	.01	.01
F	<i>Castilleja chromosa</i>	_b 5	_{ab} 1	_a -	4	1	-	.00	-
F	<i>Chaenactis douglasii</i>	-	1	-	-	1	-	.00	-
F	<i>Cryptantha fulvocanescens</i>	_b 48	_c 73	_a -	23	31	-	.65	-
F	<i>Erigeron eatonii</i>	-	1	4	-	1	2	.00	.01
F	<i>Eriogonum racemosum</i>	-	4	-	-	2	-	.01	-
F	<i>Erigeron speciosus</i>	_b 6	_a -	_a -	4	-	-	-	-
F	<i>Hymenoxys acaulis</i>	_a -	_a 7	_b 18	-	3	11	.01	.10
F	<i>Lesquerella spp.</i>	_B 19	_{ab} 18	_a 7	11	7	3	.03	.01
F	<i>Machaeranthera canescens</i>	-	1	-	-	1	-	.00	-
F	<i>Phlox austromontana</i>	_a 144	_b 203	_b 199	62	83	78	4.51	5.32
F	<i>Senecio multilobatus</i>	_b 71	_c 107	_a 3	34	53	2	.49	.01
F	<i>Sphaeralcea coccinea</i>	34	21	30	14	12	14	.11	.11
F	<i>Townsendia incana</i>	_b 54	_b 32	_a 5	25	17	4	.08	.02
F	Unknown forb-perennial	_b 9	_a -	_a -	3	-	-	-	-
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		410	477	281	192	216	120	5.95	5.63
Total for Forbs		410	477	281	192	216	120	5.95	5.63

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 7

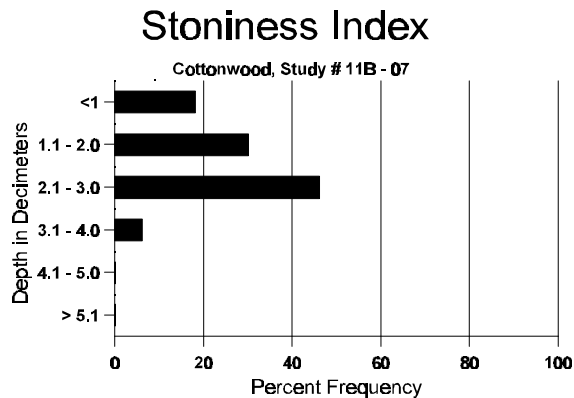
Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia tridentata wyomingensis	85	84	14.30	15.89
B	Ceratoides lanata	3	1	-	-
B	Gutierrezia sarothrae	39	27	.59	.29
B	Opuntia spp.	3	3	-	.00
B	Pinus edulis	0	2	.00	.00
Total for Browse		130	117	14.90	16.20

BASIC COVER --
Herd unit 11B, Study no: 7

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	325	331	4.25	25.72	38.57
Rock	181	49	.75	2.25	1.16
Pavement	285	230	9.00	1.00	1.81
Litter	363	346	25.75	16.70	24.78
Cryptogams	142	245	1.25	2.92	8.11
Bare Ground	365	346	59.00	43.98	40.79

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 7, Study Name: Cottonwood

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
13.89	62.4 (15.12)	7.4	42.0	31.4	26.6	2.3	4.6	208.0	0.8



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 7

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	00	00
Rabbit	43	40	261	N/A
Elk	10	6	305	24 (58)
Deer	10	1	17	2 (4)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 7

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
<i>Artemisia tridentata wyomingensis</i>																		
S	86	22	1	-	-	-	-	-	-	-	23	-	-	-	1533			23
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	6	-	1	-	-	-	-	-	-	6	-	-	1	466			7
	94	1	-	-	2	-	-	-	-	-	3	-	-	-	60			3
	00	6	1	-	-	-	-	-	-	-	6	-	-	1	140			7
M	86	10	8	1	-	-	-	-	-	-	10	8	-	1	1266	24	25	19
	94	102	21	5	-	-	-	-	-	-	128	-	-	-	2560	22	31	128
	00	20	19	17	-	1	-	-	-	-	56	1	-	-	1140	21	32	57
D	86	18	26	7	-	-	-	-	-	-	19	9	2	21	3400			51
	94	13	24	31	-	-	2	-	-	-	41	-	-	29	1400			70
	00	54	31	49	-	9	-	-	-	-	79	-	2	62	2860			143
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	580			29
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1240			62
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		44%			12%			32%			-22%							
'94		22%			19%			14%			+ 3%							
'00		29%			32%			31%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	5132	Dec:	66%			
												'94	4020		35%			
												'00	4140		69%			

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ceratoides lanata</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	1	1	2	-	-	-	-	-	-	4	-	-	-	266	9	6	4
	94	1	-	-	-	-	-	2	-	-	3	-	-	-	60	6	5	3
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	-	-	1
D	86	-	-	1	1	-	-	-	-	-	1	-	-	1	133		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		11%			33%			11%			-87%							
'94		00%			00%			00%			-75%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	599	Dec:	22%			
												'94	80		0%			
												'00	20		0%			
<i>Gutierrezia sarothrae</i>																		
S	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
M	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333	7	3	5
	94	121	-	-	-	-	-	-	-	-	121	-	-	-	2420	5	7	121
	00	74	-	-	-	-	-	-	-	-	74	-	-	-	1480	3	4	74
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	7	-	1	-	-	-	-	-	-	2	-	-	6	160		8	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	360		18	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%			+77%							
'94		00%			.76%			05%			-36%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	599	Dec:	0%			
												'94	2620		6%			
												'00	1680		0%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	3	-	2	-	-	-	-	-	-	3	-	-	2	100	2	5	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	3	6	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	2	-	-	-	-	-	-	-	-	-	2	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%			-30%							
'94		00%			57%			57%			-57%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	200	Dec:	0%			
												'94	140		29%			
												'00	60		0%			
Pinus edulis																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'94	0		-			
												'00	40		-			

Trend Study 11B-8-00

Study site name: Cedar Corral .

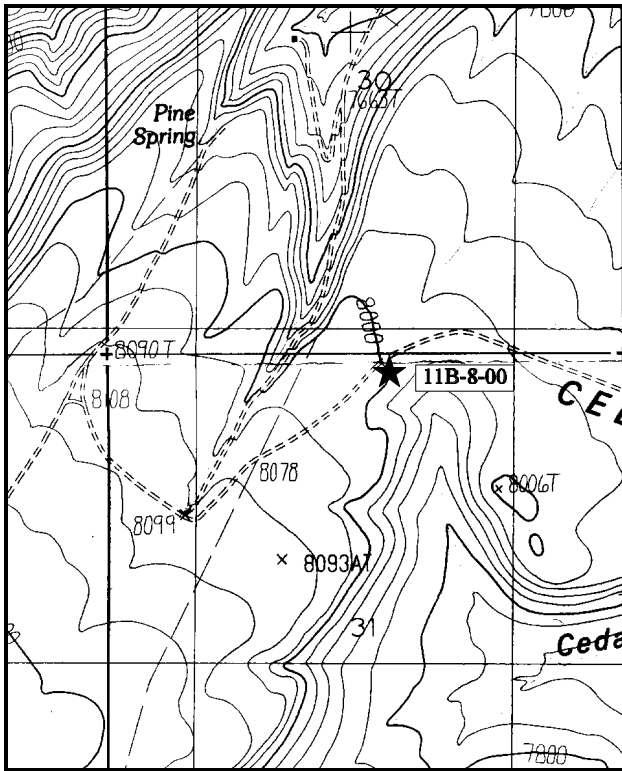
Range type: Pinyon-Juniper .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 2 rebar @ 5ft.

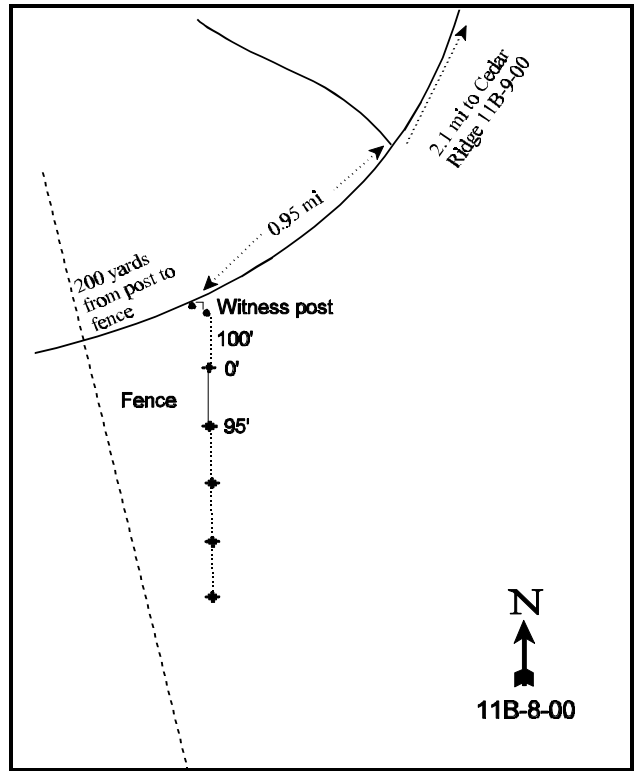
LOCATION DESCRIPTION

From Bruin Point take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Proceed past another cattle guard, go straight through an intersection and continue 3.1 miles. Turn left at the fork and continue 2.5 miles to a gate by a cabin. Continue 3.2 miles, cross a cattle guard and go 5.3 miles more on the main road to a fork where you bear right. Go 0.2 miles to a cattle guard. Continue 0.5 miles to a major fork. Stay right and go 0.4 miles (passing 11B-7-00) to a fork. Stay right on the main road and go 4.8 miles to a junction. Turn left and go 2.7 miles to a "T" intersection. Turn right and proceed 0.95 miles to a witness post (fence post surrounded by pile of rocks) on the left side of the road, fifteen feet beyond a pinyon. The 0-foot end of the baseline (marked by a fence post tagged #7801) is 100 feet south of the witness post. There is a fence crossing the road approximately 200 yards southwest of the witness post.



Map Name: Twin Hollow

Township 13S , Range 16E , Section 31



Diagrammatic Sketch

UTM. 4389651.061 N, 571353.333 E

DISCUSSION

Trend Study No. 11B-8 (32-12)

The Cedar Corral site is located at a moderately high elevation (8,100 feet) on the southern part of the West Tavaputs Plateau. This study samples a part of the pinyon-juniper mountain brush-grass type with a northeast aspect on a nearly level slope (1%-2%). The study is on BLM land, just across the fence from private land. Cattle grazed the area in the past as part of the Green River allotment. However, there has been no cattle grazing on this allotment since 1994. The area also serves as big game winter range. The grasses are rather depleted in this type, with better elk forage found in the intermittent openings. The large pinyon provide excellent hiding and thermal cover, but the high elevation of the site would limit it's use in many winters. Pellet group observations indicate light deer and elk use. Pellet group data from the 2000 reading estimate 8 deer and 10 elk days use/acre (20 ddu/ha and 25 edu/ha). Wild horse use is estimated at 9 days use/acre (22 hdu/ha). The Range Creek unit is used by an estimated 213 wild horses which reside in two groups. One group frequents the Cottonwood and Cold ridge area, while the other group primarily uses the Cedar ridge area. In addition, some sage grouse sign was also encountered.

The soil is moderately shallow, yet quite variable as evidenced with the presence of black sagebrush and mountain big sagebrush. Effective soil depth is estimated at just over 9 inches. It is very compacted with abundant rocks on the surface and throughout the profile. There are also extensive sandstone rock layers just under the surface in some areas. The soil has a sandy clay loam to sandy loam texture with a marginally neutral soil reaction (6.6 pH). Organic matter is low at 1.9 % and phosphorus is limited at just 4.5 ppm. Phosphorus levels less than 10 ppm may limit normal plant growth and development. There is evidence of erosion and soil movement, but the level terrain keeps water erosion to a minimum. There is a build-up of soil, litter and cryptogams under the scattered shrubs. Soil is deeper under the old pinyon.

Pinyon pine is the dominant overstory tree species with an estimated density of 128 trees/acre in 2000 using point-center quarter data. Overhead canopy cover is estimated at 15%. Utah juniper and Rocky Mountain juniper are less common with an estimated density of 11 and 8 trees/acre respectively. Valuable deer browse species include, true mountain mahogany, mountain big sagebrush, black sagebrush, and serviceberry. These key species currently ('00) make up 75% of the total browse cover. Utilization has been mostly light to moderate since 1986. Vigor is generally good and percent decadence low.

Several desirable forage grasses occur on the site, but overall abundance is erratic with a low cover value of only 3% in 1994 and 6% in 2000. Common species include: thickspike and bluebunch wheatgrass, and mutton and Sandberg bluegrass. Utilization of grasses is light. A variety of forbs are present, but the majority are small, low-growing varieties and their contribution to forage production is small. Combined, forbs do produce more cover than grasses. The most abundant species is the succulent, lance-leaved sedum or stonecrop. The only other common species include pussy toes, hairy goldaster, and desert phlox.

1986 APPARENT TREND ASSESSMENT

As far as browse species are concerned, vegetative trend is considered stable to possibly up because of the current excellent vigor and reproduction of the important browse species. If the management objective stresses the importance of grasses however, they are not fairing quite as well and under continued cattle grazing may decrease further. The soil trend appears stable.

1994 TREND ASSESSMENT

The soil trend is considered stable at this time, but with the continuing loss of grasses and forbs. This trend should be closely monitored. Overall trend for the five key browse is slightly up with significant decreases in

percent decadency and improved vigor. The herbaceous trend is slightly down due to a decrease in the sum nested frequency of grasses and forbs.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - slightly down (2)

2000 TREND ASSESSMENT

Trend for soil is up slightly due to an increase in vegetative and litter cover combined with a decline in percent bare ground. Trend for browse appears stable with similar densities, good vigor and reproduction, low decadence, and mostly light use of the key species. It appears that deer and elk do not use this area very heavily. The only question to the browse trend is: will the pinyon and juniper continue to increase in canopy cover and how quickly? Currently, pinyon provides an overhead canopy cover of 15%. It doesn't currently appear to be effecting the understory shrubs. However, if it increases in the future, it will come at the expense of the understory shrubs and herbaceous plants. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of perennial grasses and forbs. Sum of nested frequency of grasses and forbs have steadily declined since 1986 when the site was established. This is likely due to the increase in cover of shrubs and trees.

TREND ASSESSMENT

soils - up slightly (4)

browse - stable (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 8

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Agropyron dasystachyum</i>	_a 43	_{ab} 59	_b 66	17	29	30	.22	.42
G	<i>Agropyron spicatum</i>	_b 163	_a 41	_a 42	67	18	18	.41	1.81
G	<i>Koeleria cristata</i>	_c 23	_b 7	_a -	11	3	-	.16	-
G	<i>Oryzopsis hymenoides</i>	13	2	17	5	1	7	.03	.28
G	<i>Poa fendleriana</i>	_a 18	_b 79	_b 65	8	28	29	1.65	1.75
G	<i>Poa secunda</i>	_b 85	_a 45	_a 56	40	18	24	.50	1.25
G	<i>Sitanion hystrix</i>	_a 1	_b 21	_a -	1	11	-	.39	-
G	<i>Stipa comata</i>	_a -	_{ab} 4	_b 10	-	2	4	.03	.21
G	<i>Stipa lettermani</i>	_a -	_b 15	_a -	-	5	-	.12	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		346	273	256	149	115	112	3.54	5.75
Total for Grasses		346	273	256	149	115	112	3.54	5.75
F	<i>Allium</i> spp.	_a -	_b 26	_a 2	-	12	2	.06	.06
F	<i>Antennaria rosea</i>	57	60	61	23	22	23	2.25	2.48
F	<i>Arabis drummondii</i>	_b 41	_a 3	_a -	18	1	-	.00	-
F	<i>Arabis perennans</i>	_b 21	_b 14	_a -	10	5	-	.02	-
F	<i>Astragalus argophyllus</i>	8	5	1	4	2	1	.03	.00
F	<i>Castilleja flava</i>	2	-	-	1	-	-	-	-
F	<i>Castilleja linariaefolia</i>	-	-	3	-	-	1	-	.00
F	<i>Calochortus nuttallii</i>	1	2	-	1	1	-	.00	-
F	<i>Chaenactis douglasii</i>	-	5	-	-	2	-	.01	-
F	<i>Collinsia parviflora</i> (a)	-	1	-	-	1	-	.00	-
F	<i>Crepis acuminata</i>	_b 21	_a -	_a 2	11	-	2	-	.01
F	<i>Cryptantha</i> spp.	-	-	1	-	-	1	-	.03
F	<i>Eriogonum alatum</i>	_b 11	_a -	_a -	5	-	-	-	-
F	<i>Eriogonum eatonii</i>	_b 100	_a 27	_a 13	48	10	8	.12	.06
F	<i>Eriogonum flagellaris</i>	_a 12	_b 37	_{ab} 21	5	17	11	.13	.18
F	<i>Eriogonum racemosum</i>	_a -	_b 11	_a -	-	5	-	.19	-
F	<i>Eriogonum umbellatum</i>	_b 59	_a 21	_{ab} 43	28	12	20	.20	.27
F	<i>Heterotheca villosa</i>	_a 7	_b 30	_b 37	4	13	19	.82	1.79
F	<i>Ipomopsis aggregata</i>	11	10	3	4	4	1	.02	.00
F	<i>Linum lewisii</i>	-	4	-	-	2	-	.01	-
F	<i>Lomatium triternatum</i>	_b 29	_a -	_a 3	13	-	2	-	.01
F	<i>Machaeranthera canescens</i>	-	2	-	-	1	-	.03	-
F	<i>Machaeranthera grindelioides</i>	4	-	-	3	-	-	-	-
F	<i>Penstemon</i> spp.	-	3	4	-	1	2	.00	.01

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
F	Phlox austromontana	_b 31	_a 15	_b 28	14	7	13	.43	.91
F	Phlox longifolia	-	-	3	-	-	2	-	.01
F	Polygonum douglasii (a)	_a -	_b 35	_a 4	-	13	1	.06	.00
F	Sedum lanceolatum	_a 135	_b 210	_a 152	56	69	58	3.44	2.44
F	Senecio multilobatus	-	1	-	-	1	-	.00	-
F	Sphaeralcea coccinea	_a -	_b 9	_a -	-	4	-	.04	-
F	Taraxacum officinale	-	3	-	-	2	-	.04	-
F	Trifolium spp.	_b 32	_a -	_a -	15	-	-	-	-
Total for Annual Forbs		0	36	4	0	14	1	0.07	0.00
Total for Perennial Forbs		582	498	377	263	193	166	7.91	8.30
Total for Forbs		582	534	381	263	207	167	7.98	8.31

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 8

T y p e	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Amelanchier utahensis	25	23	4.46	6.61
B	Artemisia frigida	-	-	.00	-
B	Artemisia nova	49	40	3.44	2.45
B	Artemisia tridentata vaseyana	57	66	6.50	9.81
B	Cercocarpus montanus	12	19	1.87	3.09
B	Chrysothamnus depressus	31	23	.25	.25
B	Chrysothamnus nauseosus	-	-	-	.63
B	Chrysothamnus viscidiflorus viscidiflorus	34	28	.50	.13
B	Gutierrezia sarothrae	18	12	.03	.04
B	Opuntia spp.	11	7	.05	.00
B	Pediocactus simpsonii	0	1	-	-
B	Pinus edulis	0	7	3.29	4.76
B	Symphoricarpos oreophilus	17	19	.18	1.66
Total for Browse		254	245	20.60	29.47

CANOPY COVER --
Herd unit 11B, Study no: 8

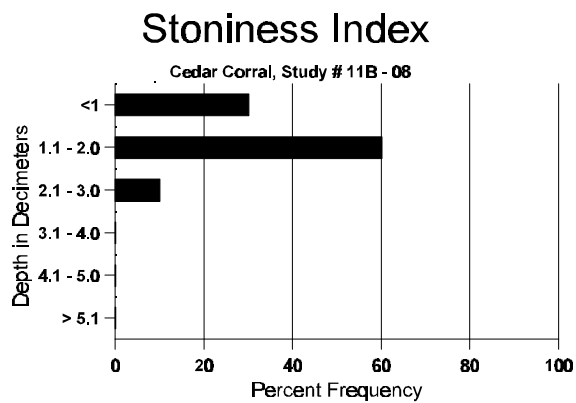
Species	Percent Cover
	'00
Amelanchier utahensis	1
Pinus edulis	15

BASIC COVER --
Herd unit 11B, Study no: 8

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	323	295	4.50	32.50	37.30
Rock	162	110	8.50	6.57	8.14
Pavement	63	97	1.00	.14	.72
Litter	383	372	50.75	40.25	52.41
Cryptogams	38	64	3.50	.38	1.94
Bare Ground	268	221	31.75	29.77	22.95

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 8, Study Name: Cedar Corral

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.50	64.2 (9.92)	6.6	54.0	25.4	20.6	1.9	4.5	198.4	0.8



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 8

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	00	00
Rabbit	29	14	157	N/A
Horse	2	4	104	N/A
Elk	8	8	131	10 (25)
Deer	16	7	157	8 (20)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 8

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Amelanchier utahensis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	2	-	-	-	-	-	-	-	-	-	60			3
	00	2	-	-	-	-	-	4	-	-	-	-	-	-	120			6
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	2	-	-	-	-	-	-	-	-	-	80			4
	00	8	-	-	3	-	-	-	-	-	-	-	-	-	220			11
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	22	6	-	-	-	-	-	-	-	-	-	-	-	560	47	59	28
	00	7	7	-	4	2	-	-	-	-	-	-	-	-	400	46	56	20
D	86	2	-	-	-	-	-	-	-	-	-	-	-	-	133			2
	94	1	1	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	1	2	-	-	1	-	-	-	-	-	-	-	-	80			4
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			+80%							
'94		21%			00%			03%			+ 3%							
'00		34%			00%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	100%			
												'94	680		6%			
												'00	700		11%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4				
Artemisia nova									
S	86	9	-	-	-	-	-	9	
	94	-	-	-	-	-	-	0	
	00	2	-	-	-	-	-	40	
Y	86	21	2	-	-	-	-	23	
	94	9	2	-	1	-	-	12	
	00	4	-	-	-	-	-	80	
M	86	5	2	-	-	-	-	7	
	94	61	33	9	-	-	-	103	
	00	47	25	2	2	-	-	76	
D	86	4	2	-	-	-	-	6	
	94	6	5	1	-	-	-	9	
	00	7	2	-	-	-	-	6	
X	86	-	-	-	-	-	-	0	
	94	-	-	-	-	-	-	280	
	00	-	-	-	-	-	-	200	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>	
'86		17%		00%		00%		+ 6%	
'94		31%		08%		02%		-30%	
'00		30%		02%		03%			
Total Plants/Acre (excluding Dead & Seedlings)						'86	2399	Dec:	17%
						'94	2540		9%
						'00	1780		10%
Artemisia tridentata vaseyana									
S	86	23	3	-	-	-	-	26	
	94	4	-	-	2	-	-	6	
	00	6	-	-	-	-	-	6	
Y	86	16	-	-	-	-	-	16	
	94	34	-	-	1	-	-	35	
	00	14	-	-	-	-	-	14	
M	86	5	-	-	-	-	-	5	
	94	88	30	-	2	-	-	120	
	00	99	21	-	13	-	2	130	
D	86	-	-	-	-	-	-	0	
	94	2	5	-	-	-	2	6	
	00	27	2	-	3	-	-	14	
X	86	-	-	-	-	-	-	0	
	94	-	-	-	-	-	-	340	
	00	-	-	-	-	-	-	360	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>	
'86		00%		00%		00%		+57%	
'94		21%		00%		02%		+ 9%	
'00		13%		00%		10%			
Total Plants/Acre (excluding Dead & Seedlings)						'86	1399	Dec:	0%
						'94	3280		5%
						'00	3620		18%

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	86	4	2	-	-	-	-	-	-	-	6	-	-	-	400		6	
	94	1	-	1	-	-	-	-	-	-	2	-	-	-	40		2	
	00	5	-	-	2	-	-	-	-	-	7	-	-	-	140		7	
M	86	2	1	-	-	-	-	-	-	-	3	-	-	-	200	15	15	3
	94	7	2	-	2	-	-	-	-	-	11	-	-	-	220	51	51	11
	00	4	5	1	2	1	-	-	-	-	12	-	1	-	260	56	68	13
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		30%			00%			00%			-61%							
'94		15%			08%			00%			+38%							
'00		33%			05%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	666	Dec:	10%				
											'94	260		0%				
											'00	420		5%				
Chrysothamnus depressus																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	86	37	-	-	-	-	-	-	-	-	37	-	-	-	2466	4	6	37
	94	60	1	-	1	-	-	-	-	-	62	-	-	-	1240	4	8	62
	00	33	8	-	2	-	-	-	-	-	43	-	-	-	860	4	6	43
D	86	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	94	2	3	-	-	-	-	-	-	-	3	-	-	2	100		5	
	00	4	-	1	-	-	-	-	-	-	1	-	-	4	100		5	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			-57%							
'94		06%			00%			03%			-30%							
'00		16%			02%			08%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	3332	Dec:	14%				
											'94	1420		7%				
											'00	1000		10%				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total		
		1	2	3	4					
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
S	86	-	-	-	-	-	-	0		0
	94	-	-	1	-	-	-	20		1
	00	-	-	-	-	-	-	0		0
Y	86	1	-	-	-	-	-	66		1
	94	6	-	-	-	-	-	120		6
	00	6	-	-	-	-	-	120		6
M	86	7	-	-	-	-	-	466	10 7	7
	94	46	-	5	-	-	-	1020	9 8	51
	00	25	-	4	-	-	-	580	10 9	29
D	86	3	-	-	-	-	-	200		3
	94	1	-	-	-	-	-	20		1
	00	3	-	-	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>			<u>%Change</u>			
'86		00%	00%	00%			+37%			
'94		00%	00%	02%			-34%			
'00		00%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'86	732	Dec:	27%		
					'94	1160		2%		
					'00	760		8%		
<i>Gutierrezia sarothrae</i>										
S	86	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	20		1
	00	-	-	-	-	-	-	0		0
Y	86	2	-	-	-	-	-	133		2
	94	3	-	-	-	-	-	60		3
	00	2	-	-	-	-	-	40		2
M	86	6	-	-	-	-	-	400	5 6	6
	94	20	-	-	-	-	-	400	5 6	20
	00	17	-	1	-	-	-	360	5 6	18
D	86	-	-	-	-	-	-	0		0
	94	-	1	-	-	-	-	20		1
	00	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>			<u>%Change</u>			
'86		00%	00%	00%			-10%			
'94		04%	00%	00%			-17%			
'00		00%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'86	533	Dec:	0%		
					'94	480		4%		
					'00	400		0%		

AGE	YGR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Opuntia spp.																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	3	7	6
	00	4	-	-	1	-	-	-	-	-	5	-	-	-	100	2	4	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	4	-	-	-	-	-	-	-	4	-	-	1	100			5
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		25%			00%			06%			-50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	320		31%			
												'00	160		13%			
Pediocactus simpsonii																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	4	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	20		-			
Pinus edulis																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	2	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	-	-	-	2	-	-	5	-	-	-	100	-	-	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	140		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	3	-	-	-	-	-	3	-	-	-	60		3	
	00	-	2	-	5	-	-	-	-	-	7	-	-	-	140		7	
M	86	2	1	-	-	-	-	-	-	-	3	-	-	-	200	18 25	3	
	94	10	-	-	18	1	-	2	-	-	31	-	-	-	620	15 27	31	
	00	16	-	-	16	-	-	4	-	-	36	-	-	-	720	8 14	36	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
	00	-	-	-	6	-	-	-	-	-	6	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		33%			00%			00%			+71%							
'94		03%			03%			00%			+29%							
'00		04%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	200	Dec:	0%				
											'94	700		3%				
											'00	980		12%				

Trend Study 11B-9-00

Study site name: Cedar Ridge .

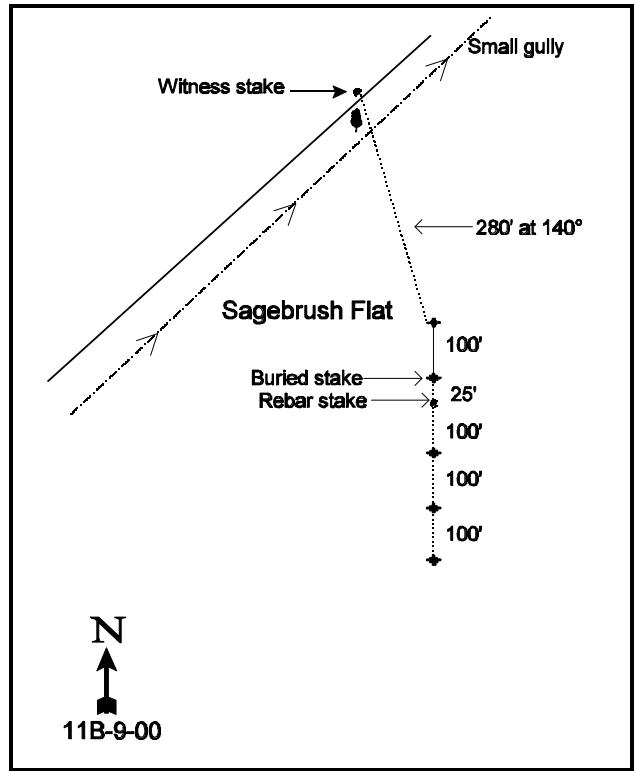
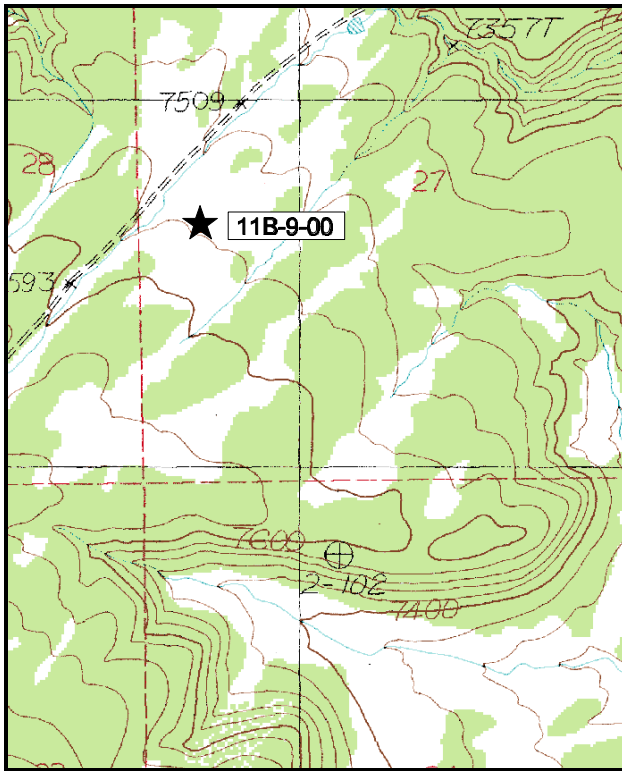
Range type: Black Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Go through an intersection beyond another cattle guard and go 3.1 miles. Turn left at the fork and continue 2.5 miles to a gate by a cabin. Proceed 3.2 miles, cross a cattle guard and go 5.3 miles on the main road to a fork. Bear right and continue 0.2 miles to a cattle guard. Go 0.5 miles to a major fork. Stay right and keep going 0.4 miles (passing Cottonwood 11B-7) to another fork. Stay on the main road (right) and go 4.8 miles to a junction. Turn left and go 2.7 miles to a "T" intersection. Turn left and go 2.1 miles to a witness post on the left side of the road. The transect starts 280 feet southeast of the witness post across the wash in the sage flat. There is a 25 foot break in the baseline between the end of line 1 and 2. The end of line 1 is marked by partially buried rebar. The rest of the stakes, including the witness post, are green fence posts.



Map Name: Cedar Ridge Canyon

Diagrammatic Sketch

Township 13S , Range 16E , Section 28

UTM. 4390704.622 N, 575697.778 E

DISCUSSION

Trend Study No. 11B-9 (32-13)

This study is located on the wide southwest portion of Cedar Ridge. The area is 6-8 miles east of the Green River. Cedar Ridge is an important concentration area for wintering mule deer, although much of the use occurs on the lower limits of the ridge. The study site is located within an extensive sagebrush park at an elevation of 7,600 feet. This area and surrounding country is basically level, but dissected by numerous deep, intermittent drainages. The area drains to the northeast. The study site has a gentle slope with a northern aspect. The area is used by deer, elk, and a large number of wild horses. Deer pellet groups on the site indicate light use during all readings although several antler drops were found in 1986. A well worn trail passes through the flat. Both cattle and horse droppings were common in 1994, but significant use was not evident. There was also light elk sign observed in 1994. During the 2000 reading, a pellet group transect read along the study site baseline estimates 29 elk and 21 horse days use/acre (71 edu/ha and 52 hdu/ha). No deer pellet groups were encountered but a few were picked up in the quadrats.

The soil is moderately shallow as indicated by the abundance of black sagebrush. A rocky layer is found around 12 to 15 inches in depth which limits deeper soil measurements. Effective rooting depth is estimated at almost 13 inches. The soil has a loam texture with a neutral soil reaction (7.0 pH). Phosphorus is limited at only 5.3 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil is fairly rocky, but there is little concentration of erosion pavement or rocks on the soil surface. It is loosely compacted with a fair amount of bare soil. Litter and vegetative cover are evenly dispersed and provide adequate soil protection. Some small rills are evident, with an old gully north of the transect along the road. Erosion should not be a problem as long as a high percentage of ground cover comes from herbaceous species.

This open sagebrush park is surrounded by pinyon-juniper woodland. The dominant browse species is black sagebrush as it provides more than 90% of the browse cover. It had an estimated density of 5,733 plants/acre in 1986, and appeared to be expanding with an extremely high number of seedlings. By 1994, the population increased 4-fold to 22,840 plants/acre. It appears that many of the seedlings sampled in 1986 survived to become young plants as half of the population consisted of young plants. Also, the 1994 reading was done with the larger sample size which better estimates shrub populations. Leader growth was good and the plants appeared vigorous. Use was mostly light. The population of black sagebrush increased slightly in 2000 to 25,180 plants/acre. The stand has become increasingly mature (84%), while seedlings and young are still common and mature plants appear to be producing abundant seed. Use continues to be light, vigor good, and decadence low.

Other shrubs present include: dwarf rabbitbrush, rubber rabbitbrush, broom snakeweed, and gray horsebrush. These species make up only a small percent of the browse composition. Junipers appear to be slowly invading the flat, but will not threaten the site for decades. Point-center quarter data from 2000 estimate only 12 pinyon and 11 juniper trees/acre with average diameters of 4.5 inches and 3.4 inches respectively. The surrounding pinyon-juniper stand provides good cover and still maintains a good shrub understory.

Grasses and forbs are moderately abundant and an important component of this site. They not only provide valuable forage, but they also provide excellent protective ground cover. The most abundant species of grasses are needle-and-thread and mutton bluegrass. Bluebunch wheatgrass and thickspike wheatgrass are also fairly abundant. Use of mutton and Sandberg bluegrass appeared fairly heavy in 2000. Forb composition is relatively diverse for this type of site with 24 species of forbs encountered in 1994 and 18 in 2000. Common species include the low growing pussytoes, sulfur eriogonum, mat penstemon, and long-leaf phlox. Lobe-leaf groundsel and scarlet globemallow are also common.

1986 APPARENT TREND ASSESSMENT

The area appears in good health, with a good diversity of species and moderate amounts of forage production for this range type. The sagebrush population is increasing with a very high biotic potential (# of seedlings). Sagebrush provides the bulk of the forage on the site, but the grasses are also vigorous and productive. Invasion by the few increaser woody species and pinyon-juniper is not currently a threat. Therefore, vegetative trend appears stable to improving on this site. The site provides good normal winter range for deer and elk. The soil has excellent protection and although there is the potential for erosion the current trend appears stable.

1994 TREND ASSESSMENT

The area still remains in good health. The trend for soils is up with a significant decrease in percent bare ground (46% to 33%), even with a decrease in nested frequency value for grasses, this was compensated for with an increase in nested frequency for the forbs. The primary browse species is black sagebrush, which makes up 90% of the total browse cover. The population is quite high at 22,840 plants/acre, but 50% of the population is classified as young plants. Percent decadency has declined to only 5% and the browse trend is considered up. The trend for the herbaceous understory is a little confusing because the nested frequency value of grasses has decreased, while the nested frequency for forbs has increased. Nested frequency of grasses and forbs combined have remained fairly stable. Trend for the herbaceous understory is therefore considered stable, but could decline with continued drought.

TREND ASSESSMENT

soil - up (5)

browse - up (5)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is slightly improved with decreases in bare soil, increases in litter cover, and improved ratios of protective ground cover (vegetation, litter and cryptogams) to bare ground. There is little erosion occurring due to the level terrain combined with good herbaceous cover. Trend for browse is slightly up. The key species, black sagebrush, has increased in density and nearly doubled in cover. Seedlings and young are still abundant, vigor is good and use light. However, continued increases in density and cover will negatively effect the herbaceous understory. Trend for the herbaceous understory is stable. Sum of nested frequency for grasses and forbs has remained similar to 1994. Nested frequency of the dominant grass, needle-and-thread, declined significantly since 1994, but cover remained similar and several other species of grass increased in nested frequency.

TREND ASSESSMENT

soil - slightly up (4)

browse - up slightly, but becoming too dense (4)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 9

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Agropyron dasystachyum</i>	_a 10	_a 8	66	4	5	26	.02	.81
G	<i>Agropyron spicatum</i>	66	49	61	28	22	22	.86	.51
G	<i>Bouteloua gracilis</i>	_a 30	_b 43	30	10	15	10	2.12	.91
G	<i>Bromus tectorum</i> (a)	-	-	2	-	-	1	-	.00
G	<i>Koeleria cristata</i>	_a -	_b 25	_a -	-	11	-	.29	-
G	<i>Oryzopsis hymenoides</i>	_a -	_{ab} 3	_b 7	-	1	4	.00	.09
G	<i>Poa fendleriana</i>	_b 190	_a 57	_a 87	81	24	32	.43	2.38
G	<i>Poa secunda</i>	_b 70	_a 8	_b 92	30	3	39	.01	.62
G	<i>Sitanion hystrix</i>	_b 40	_a 21	_a 4	17	8	2	.06	.03
G	<i>Stipa comata</i>	_b 246	_b 269	_a 160	87	88	59	5.36	4.62
Total for Annual Grasses		0	0	2	0	0	1	0	0.00
Total for Perennial Grasses		652	483	507	257	177	194	9.21	9.99
Total for Grasses		652	483	509	257	177	195	9.21	10.00
F	<i>Agoseris glauca</i>	-	-	3	-	-	1	-	.00
F	<i>Antennaria parvifolia</i>	65	87	98	26	35	42	2.59	2.63
F	<i>Arenaria fendleri</i>	-	-	1	-	-	1	-	.00
F	<i>Arabis perennans</i>	_b 10	_{ab} 3	_a -	6	2	-	.01	-
F	<i>Astragalus convallarius</i>	_b 12	_a 3	_{ab} 10	7	1	5	.00	.12
F	<i>Astragalus tenellus</i>	_a -	_b 12	_b 18	-	5	11	.03	.37
F	<i>Astragalus utahensis</i>	-	3	2	-	1	1	.00	.00
F	<i>Castilleja flava</i>	-	-	9	-	-	4	-	.07
F	<i>Castilleja linariaefolia</i>	_b 23	_a 4	_{ab} 12	12	2	5	.03	.10
F	<i>Calochortus nuttallii</i>	_a 3	_b 42	_a 7	3	23	3	.11	.01
F	<i>Cryptantha</i> spp.	23	18	30	8	9	16	.15	.28
F	<i>Delphinium nuttallianum</i>	_b 12	_a -	_{ab} 2	6	-	2	-	.01
F	<i>Eriogonum alatum</i>	-	2	2	-	1	1	.03	.03
F	<i>Erigeron eatonii</i>	-	2	1	-	2	1	.03	.00
F	<i>Eriogonum umbellatum</i>	29	29	33	15	13	17	.28	.45
F	<i>Hedysarum boreale</i>	_a -	_c 33	_b 11	-	16	4	.95	.07
F	<i>Heterotheca villosa</i>	-	-	3	-	-	1	-	.00
F	<i>Ipomopsis aggregata</i>	-	-	3	-	-	1	-	.00
F	<i>Lesquerella</i> spp.	-	4	-	-	2	-	.03	-
F	<i>Linum lewisii</i>	-	-	2	-	-	1	-	.03
F	<i>Machaeranthera canescens</i>	-	3	5	-	1	3	.00	.01
F	<i>Machaeranthera grindelioides</i>	5	5	-	3	2	-	.01	-
F	<i>Penstemon caespitosus</i>	35	45	39	16	20	14	.83	.82

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
F	Pedicularis centranthera	a-	b25	a-	-	10	-	.82	-
F	Penstemon humilis	a-	a-	b8	-	-	4	-	.09
F	Penstemon strictus	6	12	11	3	5	6	.05	.03
F	Phlox hoodii	2	4	5	2	2	3	.03	.16
F	Phlox longifolia	60	65	57	28	27	25	.21	.29
F	Senecio multilobatus	46	45	50	22	18	25	.27	.30
F	Sphaeralcea coccinea	a19	b62	a27	8	26	13	.50	.11
F	Townsendia incana	-	-	16	-	-	6	-	.05
F	Trifolium spp.	b11	a-	b6	5	-	4	-	.02
F	Unknown forb-perennial	b20	a-	a-	12	-	-	-	-
F	Vicia spp.	-	1	-	-	1	-	.00	-
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		381	509	471	182	224	220	7.03	6.14
Total for Forbs		381	509	471	182	224	220	7.03	6.14

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 9

T y p e	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia nova	100	100	11.60	20.65
B	Artemisia tridentata vaseyana	0	1	-	.15
B	Chrysothamnus depressus	34	41	1.23	.81
B	Chrysothamnus viscidiflorus	2	0	-	-
B	Gutierrezia sarothrae	16	10	.06	.01
B	Juniperus osteosperma	0	1	-	.18
B	Opuntia spp.	2	0	.03	-
B	Pinus edulis	0	2	-	.03
B	Tetradymia canescens	5	5	-	.03
Total for Browse		159	160	12.93	21.87

CANOPY COVER --

Herd unit 11B, Study no: 9

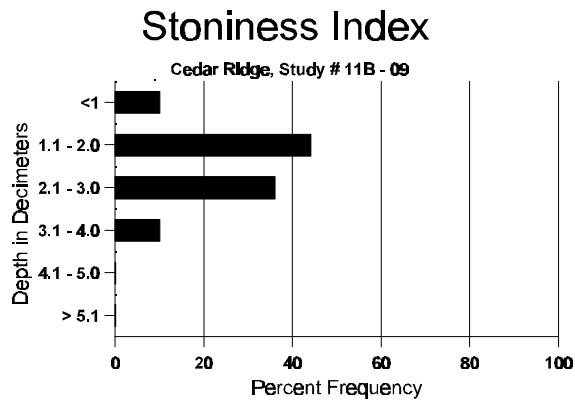
Species	Percent Cover
	'00
Juniperus osteosperma	.60
Pinus edulis	.20

BASIC COVER --
Herd unit 11B, Study no: 9

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	344	338	7.75	29.64	36.77
Rock	140	35	0	.58	.28
Pavement	168	158	.75	.28	1.68
Litter	389	367	44.50	25.51	43.31
Cryptogams	26	95	.75	.56	2.74
Bare Ground	364	316	46.25	33.27	31.65

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 9, Study Name: Cedar Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.94	64.6 (11.26)	7.0	47.3	32.2	20.6	2.4	5.3	243.2	0.7



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 9

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	12	8	9	N/A
Horse	12	3	244	N/A
Elk	5	20	374	29 (71)
Deer	9	4	-	-
Cattle	1	-	-	-
Sage grouse	-	-	9	N/A

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 9

A Y G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	86	237	-	-	-	-	-	-	-	-	237	-	-	-	15800		237	
	94	96	-	-	-	-	-	-	-	-	96	-	-	-	1920		96	
	00	239	-	-	-	-	-	-	-	-	239	-	-	-	4780		239	
Y	86	32	3	-	-	-	-	-	-	-	35	-	-	-	2333		35	
	94	548	16	-	5	-	-	-	-	-	569	-	-	-	11380		569	
	00	101	-	-	-	-	-	-	-	-	99	2	-	-	2020		101	
M	86	10	19	1	-	-	-	-	-	-	28	2	-	-	2000	17	17	30
	94	491	28	-	-	-	-	-	-	-	518	-	-	1	10380	14	21	519
	00	924	15	6	29	83	-	-	-	-	1057	-	-	-	21140	9	15	1057
D	86	2	14	5	-	-	-	-	-	-	21	-	-	-	1400		21	
	94	29	20	5	-	-	-	-	-	-	27	-	-	27	1080		54	
	00	96	-	1	1	3	-	-	-	-	53	-	-	48	2020		101	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	380		19	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	620		31	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		42%			07%			00%			+75%							
'94		06%			.43%			02%			+ 9%							
'00		08%			.55%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	5733	Dec:	24%			
												'94	22840		5%			
												'00	25180		8%			
Artemisia tridentata vaseyana																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	-	-	-	-	20	6	11	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	20		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total										
		1	2	3	4		5	6		7	8	9							
Chrysothamnus depressus																			
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2		
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6		
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6		
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10		
M	86	13	-	-	-	-	-	-	-	-	13	-	-	-	866	4	7	13	
	94	179	-	-	-	-	-	-	-	-	179	-	-	-	3580	4	7	179	
	00	194	-	-	11	-	-	-	-	-	205	-	-	-	4100	3	8	205	
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1		
	94	7	-	-	-	-	-	-	-	-	4	-	-	3	140		7		
	00	5	-	-	-	-	-	-	-	-	1	-	-	4	100		5		
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>											
'86		00%		00%		00%		+65%											
'94		00%		00%		02%		+13%											
'00		00%		00%		02%													
Total Plants/Acre (excluding Dead & Seedlings)										'86	1332	Dec:	5%						
										'94	3840		4%						
										'00	4400		2%						
Chrysothamnus nauseosus																			
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	24	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	21	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>											
'86		00%		00%		00%													
'94		00%		00%		00%													
'00		00%		00%		00%													
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-						
										'94	0		-						
										'00	0		-						

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4		1	2			
Chrysothamnus viscidiflorus											
Y	86	-	-	-	-	-	-	-	0	-	0
	94	1	-	-	-	-	-	-	20	-	1
	00	-	-	-	-	-	-	-	0	-	0
M	86	-	-	-	-	-	-	-	0	-	0
	94	-	-	-	-	-	1	-	20	-	1
	00	-	-	-	-	-	-	-	0	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'86		00%		00%		00%					
'94		00%		00%		00%					
'00		00%		00%		00%					
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-		
						'94	40		-		
						'00	0		-		
Gutierrezia sarothrae											
S	86	1	-	-	-	-	-	-	66	-	1
	94	-	-	-	-	-	-	-	0	-	0
	00	-	-	-	-	-	-	-	0	-	0
Y	86	5	-	-	-	-	-	-	333	-	5
	94	3	-	-	-	-	-	-	60	-	3
	00	2	-	-	-	-	-	-	40	-	2
M	86	17	-	-	-	-	-	-	1133	6	4
	94	23	-	-	1	-	-	-	480	6	7
	00	13	-	-	-	-	-	-	260	4	4
D	86	1	-	-	-	-	-	-	66	-	1
	94	-	-	-	-	-	-	-	0	-	0
	00	-	-	-	-	-	-	-	0	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'86		00%		00%		00%		-65%			
'94		00%		00%		00%		-44%			
'00		00%		00%		00%					
Total Plants/Acre (excluding Dead & Seedlings)						'86	1532	Dec:	4%		
						'94	540		0%		
						'00	300		0%		
Juniperus osteosperma											
M	86	-	-	-	-	-	-	-	0	-	0
	94	-	-	-	-	-	-	-	0	-	0
	00	1	-	-	-	-	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>			
'86		00%		00%		00%					
'94		00%		00%		00%					
'00		00%		00%		00%					
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-		
						'94	0		-		
						'00	20		-		

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	4	4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	80		-			
												'00	0		-			
Pinus edulis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	40		-			
Tetradymia canescens																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	2	-	-	-	-	-	-	-	2	-	-	-	133	11	11	2
	94	5	-	-	-	-	-	1	-	-	6	-	-	-	120	6	9	6
	00	1	2	-	-	-	-	-	-	-	3	-	-	-	60	5	7	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		100%			00%			00%			+ 5%							
'94		00%			00%			00%			-14%							
'00		33%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	0%			
												'94	140		14%			
												'00	120		33%			

Trend Study 11B-10-00

Study site name: Upper Little Park Wash .

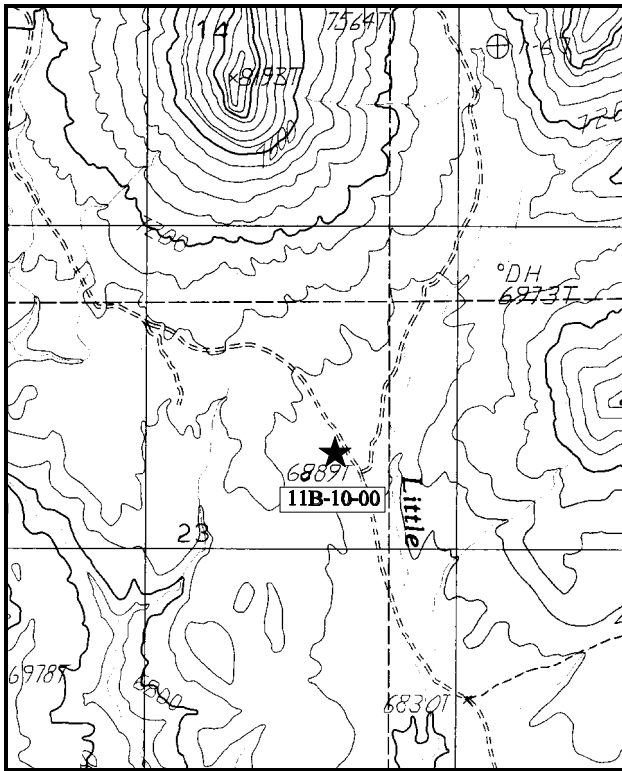
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

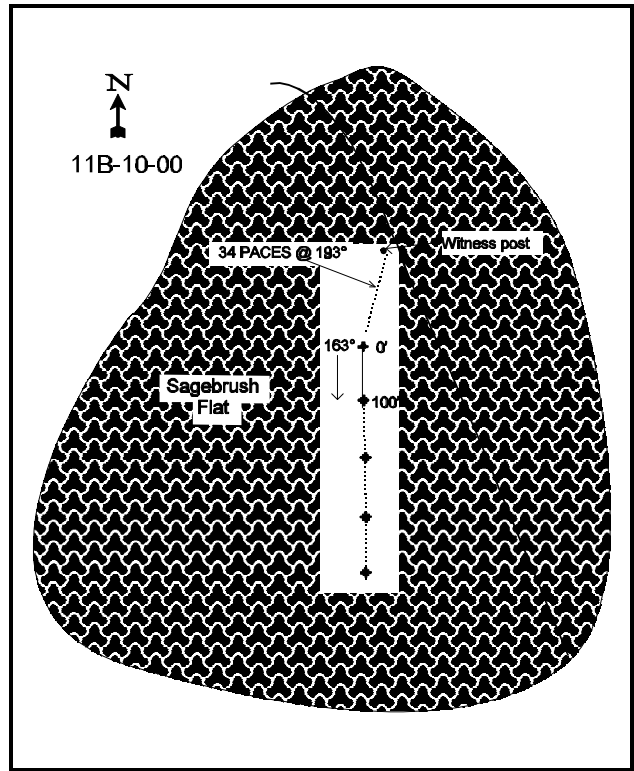
Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From East Carbon City, take SR-124 south for 2.3 miles to a fork with a sign to Horse Canyon Turn right and proceed 6.4 miles to a railroad tresses located above the Geneva Mine buildings. Continue 0.2 miles to another tresses. From this tresses continue up the canyon 0.6 miles. Stay right at the fork and go up 6.85 miles to a witness post on the right side of the road. From the witness post (a green fence post) go 100 feet into the sagebrush on a bearing of 230~ to a fence post with browse tag #7838 attached. This post marks the 0-foot end of the frequency baseline. The rest of the stakes are steel rebar.



Map Name: Lila Point



Diagrammatic Sketch

Township 16S , Range 14E , Section 23

DISCUSSION

Trend Study No. 11B-10 (32-14)

***This trend study site was not read in 2000. Text from the 1994 report has been retained in this report. Refer to the 1994 "Utah Big Game Trend Studies" report for maps and data tables.

The Upper Little Park Wash transect is located in critical deer winter range along the west edge of the Book cliffs at an elevation of approximately 7,000 feet. Beyond Little Park, the cliffs drop off abruptly to the low desert floor 800 feet below. The study area is in an open draw filled with basin big sagebrush and many active gullies of various sizes which were distributed throughout the flat. The sagebrush flat is surrounded by pinyon-juniper covered slopes and cliffs. Deer use has generally been moderate with heavier use occurring in hard winters. The nearby pellet group trend transect shows that for the period from 1982-1988, deer use averaged 53 deer days use/hectare/year, which was above average for the herd unit. After 1989 the pellet group transect was no longer read. Use in the area was very light in 1994. The Little Park area has been permitted for 54 cattle from May 26 to October 10, but this particular area is poor for cattle and there was little sign of livestock use in 1986. Since then, in 1992, there was a control burn and seeding in this narrow canyon bottom and associated sagebrush park of basin big sagebrush. Because of the difficulty in getting a good clean burn through the park, a bulldozer bladed the unburned and partially burned sagebrush into the numerous gullies that bisect the sagebrush park. Because of the light fluffy soils, the rangeland drill had difficulty getting the seed at the proper depth causing erratic germination and establishment of the seeded species, for few seeded species showed up in the 1994 readings.

Pressure from people is low and access is difficult during winter and wet conditions. Kaiser Steel has developed mine plans for their south lease on portions of Little Park public land. The development may become a reality if the economic climate is favorable in the future. Restrictions concerning surface occupancy and access into the Little Park winter range are expected (Ashcroft 1983) and would be necessary.

Soil on this gently sloping, southeast-facing site is deep and a light tan-grey color. It appears to contain a high percentage of clay. Small rock fragments are common throughout the profile. Rocks and mud piles are found on the surface, evidence of sedimentation and deposition from the surrounding pinyon-juniper slopes. Some erosion occurs from the site due to the rather sparse understory and bare spots. This has been turned around after the bulldozer treatment and subsequent seedling with a rangeland drill. Before the work was done to the soil surface, pavement cover was almost 10%. After the treatment it is almost zero (.24%). The numerous small gullies, one large active gully, and rills that ran through the sagebrush park are now filled in. Litter cover, since the treatment, declined from 50% to only 27%.

Basin big sagebrush is the key browse species on the site. It was so large and dense in the past that it was difficult to walk through. The average height of mature plants was three and half feet. The large available plants showed light to moderate utilization by deer. Insect damage, in the form of numerous galls and speckled leaves, was evident on some of the plants in 1986. Overall vigor and growth of these plants was only fair in this closed stand which was at an ecological dead end. Density of mature plants was 3,198 plants/acre in 1986 with an estimated cover of 70%. Two years after the treatment, sagebrush density was actually higher at 9,080 plants/acre, but percent cover is now down to about only 2% with 60% of the population classified as young plants. Vigor is good and percent decadency has declined from 65% to 0%.

A few winterfat and saltbush can be found in the area. There has been minimal invasion by junipers into the flat. Junipers on the hillside provide cover and some forage with a few junipers highlined by deer. Resting cover is also good in the flat.

The dense sagebrush overstory in the past had greatly limited species diversity and distribution in the understory which was consequently very sparse. In 1986, cheatgrass prevailed in the small open spaces, while bottlebrush squirreltail, Indian ricegrass and some sheep fescue were found mixed in with the sagebrush. Utilization of grasses by livestock was difficult because of the dense sagebrush. Forbs were also sparse and were unimportant as forage. Since the treatment herbaceous plants dominate the site by providing 92% of the vegetation cover. As mentioned earlier, seeded species have not established very well but many seeded species were encountered during the 1994 reading. Cheat grass dominated the herbaceous understory and provides 67% of the herbaceous cover. Seeded and native perennial species will hopefully increase on the site.

Forbs are also dominated by annuals. The only seeded forb encountered was Lewis flax which had a quadrat frequency of only 6%. The most common forbs on the site are Russian thistle and annual stickseed.

1986 APPARENT TREND ASSESSMENT

Erosion and sedimentation are active forces on this site, leading to an apparent downward soil trend. Basin big sagebrush, the key browse species, has a high density, over-mature population that will probably experience continued decadence. There are abundant seedlings for replacement however, with a continued population turnover, it will eventually result in increased production. Range trend is considered to be stable. The lack of diversity in the herbaceous component does not indicate a healthy site, but is not critical in terms of deer winter range. An increase in the herbaceous vegetation would constitute a habitat improvement for deer that also use the area in the spring and fall. A patchy spring burn would open up the stand and offer an opportunity to seed species that would provide early green-up in the spring and valuable regrowth in the fall.

1994 TREND ASSESSMENT

Active erosion and sedimentation are no longer a problem after the burn and seeding treatment. Percent bare ground has increased slightly, but there is a better distribution of plant and litter cover. Ninety-two percent of the plant cover is contributed by the herbaceous species which is also more protective of the soils, therefore soil trend at this time would be considered improving. The browse trend is up because of the younger population which, as they become more mature, will be much more productive and vigorous for a critical winter range. The trend for the herbaceous understory is mixed. Nested frequency of herbaceous plants have increased nearly four fold since the treatment. However, 90% of the grass cover is now cheatgrass and 92% of the forb cover is made up of annuals. Through time, this should turn around as the perennial species become more dominant over the less desirable annual species. The area is now very susceptible to fire because of the prevalence of annual species. Nested frequency of perennial grasses and forbs is nearly the same as before the treatment. Due to the dominance of annuals, trend for herbaceous understory is down.

TREND ASSESSMENT

soils - stable to improving (4)

browse - up (5)

herbaceous understory - down because of the dominance of annual species (1)

Trend Study 11B-11-00

Study site name: Little Park Exclosure .

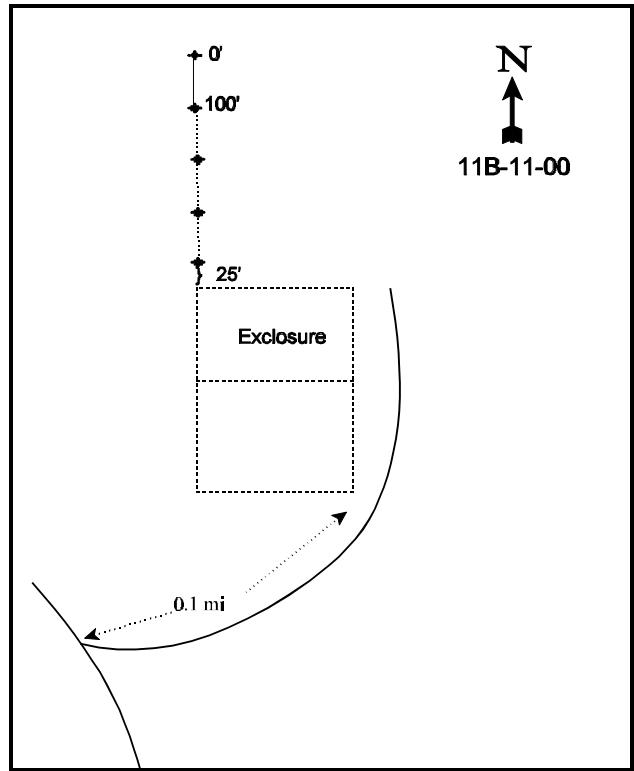
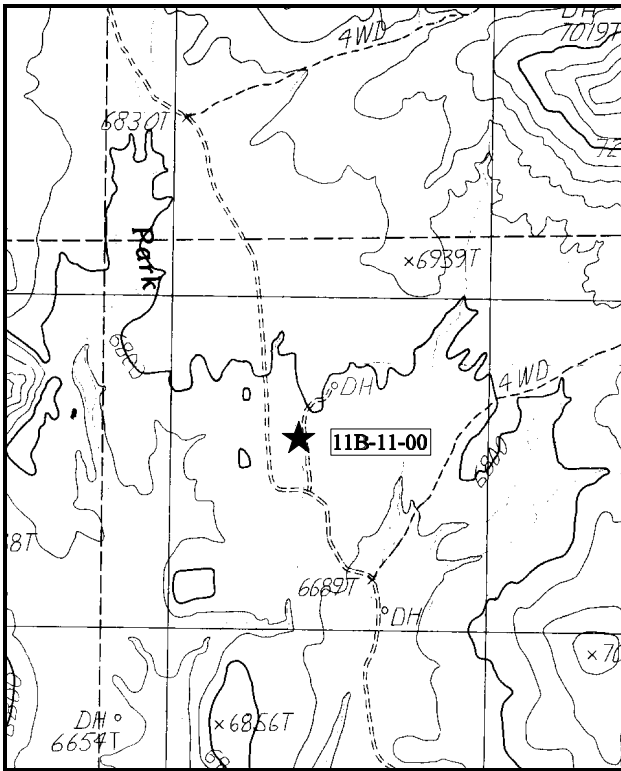
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of U-124 and the cutoff to Highway 6 travel up Horse Canyon 1.8 miles to a fork. Stay right and continue 8.2 miles to a fork on the left (east). Turn left and drive 0.1 miles to the northeast corner of the exclosure. Walk to the northwest corner of the exclosure to find the 400 foot stake 25 feet to the north. The other stakes, all rebar, are 100 feet apart. The stake at the 0-foot end of the baseline is marked with browse tag #7855.



Map Name: Lila Point

Diagrammatic Sketch

Township 16S , Range 14E , Section 25

UTM. 4361785.313 N, 559566.032 E

DISCUSSION

Trend Study No. 11B-11 (32-15)

The Little Park Exclosure study samples the sagebrush-grass vegetation type which provides critical winter range for deer in the Little Park area. This study site is in a small sagebrush opening surrounded by pinyon and juniper, which are spreading into the flat. The site has a gentle 2-3% slope with a southern aspect and an elevation of 6,800 feet. The transect was set up near the BLM's Little Park exclosure. Deer use appears light with a nearby pellet group transect averaging only 10 deer days use/acre (24 ddu/ha) between 1984-85 and 1989-90. Between 1990-91 and 1993-94, the number of deer days use declined to an average of only 5 (11 ddu/ha). This shows the continuing downward trend for deer use in the area. A pellet group transect read parallel to the trend study site baseline in 2000, estimated only 2 deer days use/acre (5 ddu/ha). However, rabbit pellets were very abundant. There was frequent sign of cattle and horses in the vicinity in 1986, but there was no sign of cattle grazing in 2000. The area is part of the BLM Little Park grazing allotment which is used as summer and fall range.

The reddish loam soil is moderately deep and loosely compacted on the surface. Effective rooting depth is estimated at just over 13 inches with a compacted hardpan at 6 to 7 inches in depth. Percent organic matter is low at just 1.3%. Phosphorus is also limited at only 4.5 ppm, where values less than 10 ppm may limit normal plant growth and development. There are few rocks or pavement on the surface or within the profile. Although the sagebrush and grass cover appears fairly dense, nearly half of the surface is bare soil. Erosion is taking place as evidenced by three small, but fairly deep gullies, and one large gully in the area. Also, soils are pedestaled around shrubs and bunch grasses.

The dominant browse species on this site is mountain big sagebrush with an estimated density of 2,800 plants/acre in 1986 and 2,780 in 2000. Mature plants are, on average, about two feet tall. Thirty-eight percent of the plants were heavily hedged in 1986, but use was mostly light in 1994 and 2000. The population has remained stable with respect to density since 1986, and although use has declined considerably since then, percent decadency has increased (29% in 1986 to 50% in 2000). Furthermore, the proportion of plants displaying poor vigor has steadily increased (0% in 1986 to 24% in 1994 and 2000). Some of the vigor problems with sagebrush appear to be partly due to competition with the abundant perennial grass understory. Grass cover has increased since 1994 from 14% to 21%. Another factor is the increasing pinyon-juniper overstory. Point-center quarter data from 2000 estimate 22 pinyon and 16 juniper trees/acre with average diameters of 2.4 and 3.4 inches respectively. However, shrub density strip data, which is more effective at estimating seedling and young tree density, estimates 240 pinyon and 100 juniper trees/acre. Very dry conditions in 2000 have obviously added to the problem with sagebrush health and vigor. Leader growth and seed production are currently ('00) poor.

Another preferred browse, winterfat, is present in low numbers (100 to 120 plants/acre). The population consists entirely of small mature plants which receive constant use. The only other abundant shrub is the increaser broom snakeweed which has increased in density from 260 plants/acre in 1994 to 900 plants/acre in 2000.

Perennial grasses are large, vigorous, and well established. Western wheatgrass, Salina wildrye, and needle-and-thread produce the most forage. Over 50% of the total vegetative cover is provided by grasses. The low-growing, warm season blue grama grass is also fairly abundant in scattered patches. It was so dry during the summer of 2000 that blue grama did not produce seed. It appears that Salina wildrye was not identified correctly in 1994 and was lumped with western wheatgrass. Currently ('00), Salina wildrye provides 61% of the grass cover.

Forbs are rather inconspicuous on the site, although 10 different species were encountered in 1986. Most are small and occur infrequently. The more common species, long-leaf phlox and tumbled mustard, are generally considered increasers with little forage value, especially on winter range.

1986 APPARENT TREND ASSESSMENT

The vegetative trend on the site appears stable. The key browse species, mountain big sagebrush, is vigorous and recruitment is adequate. There is a good balance with herbaceous vegetation. The threat to this site comes in the form of increasing pinyon and juniper which could significantly affect the amount of quality winter browse available. Although encroachment appears rapid, it takes several decades to form a closed canopy. Considering the importance of these openings, management objectives might include some type of pinyon-juniper removal. Although prone to erosion, the soil trend currently appears stable with increased litter and vegetative cover.

1994 TREND ASSESSMENT

The trend for soils is stable to slightly improving with a decrease in percent bare ground. More importantly, the herbaceous understory provides more than 60% of the total vegetational cover which gives much better protection to the soil than that of overstory cover. Tree canopy cover cannot protect the soils effectively from high intensity summer storm events. The browse trend is slightly down. The key browse species, mountain big sagebrush, has an almost unchanged population, but percent decadency has increased substantially (29% to 49%), and plants considered in poor vigor has increased (0% to 24%). Almost one plant in three were dead in 1994. All this points to a decreasing population. The only positive statistic for sagebrush is that the biotic potential (# of seedlings) is at 8%, which is good for sagebrush. This trend is most likely caused by the extended drought as use has decreased since 1986. The trend for the herbaceous understory is up for grasses and down for forbs. Combined sum of nested frequency of grasses and forbs has remained similar.

TREND ASSESSMENT

soil - stable to slightly improving (4)

browse - slightly down (2)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil continues to improve. Percent cover of bare ground has declined, while vegetative and litter cover have increased. In addition, cryptogamic cover has increased dramatically from 2% in 1994 to 15% in 2000. There is still some erosion occurring as evidenced by small active gullies around the site. Trend for the key browse species, mountain big sagebrush, continues to be slightly down. Density is still fairly stable and use is mostly light. However, percent decadence continues to be high (50%) and the proportion of plants displaying poor vigor remains high at 24%. In addition, nearly half of the decadent sagebrush sampled appear to be dying (680 plants/acre) and there are currently not enough young to replace them. This decline does not appear to be the result of use. Sagebrush in the nearby enclosure appear to have similar decadency and vigor problems which are likely due to competition with grasses and trees combined with many years of drought. A return to normal precipitation patterns will do much to reverse this trend. Trend for the herbaceous understory is mixed. Sum of nested frequency and cover of perennial grasses have increased, while nested frequency of forbs has declined. Since grasses make up a majority of the herbaceous cover, the herbaceous trend is considered up slightly.

TREND ASSESSMENT

soil - up slightly (4)

browse - slightly down (2)

herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 11

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	<i>Agropyron smithii</i>	_b 237	_{ab} 223	_a 162	83	73	60	10.46	5.23
G	<i>Agropyron spicatum</i>	-	-	6	-	-	2	-	.53
G	<i>Bouteloua gracilis</i>	_a 16	_b 37	_a 12	6	13	6	.50	.98
G	<i>Bromus japonicus</i> (a)	-	-	3	-	-	1	-	.38
G	<i>Elymus salina</i>	_a -	_a -	_b 141	-	-	52	-	12.75
G	<i>Oryzopsis hymenoides</i>	11	12	3	5	7	2	.23	.01
G	<i>Poa fendleriana</i>	_a -	_b 56	_b 48	-	26	19	2.58	.66
G	<i>Poa secunda</i>	-	-	1	-	-	1	-	.00
G	<i>Sitanion hystrix</i>	1	3	-	1	1	-	.03	.00
G	<i>Stipa comata</i>	8	4	14	6	1	7	.00	.33
Total for Annual Grasses		0	0	3	0	0	1	0	0.37
Total for Perennial Grasses		273	335	387	101	121	149	13.82	20.52
Total for Grasses		273	335	390	101	121	150	13.82	20.89
F	<i>Astragalus convallarius</i>	_b 30	_b 29	_a 4	13	14	2	.65	.06
F	<i>Cryptantha fulvocanescens</i>	_b 31	_b 26	_a -	15	13	-	.48	-
F	<i>Hedysarum boreale</i>	2	-	-	1	-	-	-	-
F	<i>Hymenoxys richardsonii</i>	_a 1	_a 1	_b 16	1	1	9	.00	.34
F	<i>Orobancha</i> spp.	3	-	-	1	-	-	-	-
F	<i>Phlox hoodii</i>	3	-	1	1	-	1	-	.00
F	<i>Phlox longifolia</i>	_c 207	_b 150	_a 50	78	56	23	.73	.16
F	<i>Schoenocrambe linifolia</i>	_b 18	_a 6	_a 1	11	3	1	.02	.00
F	<i>Sisymbrium altissimum</i> (a)	-	-	8	-	-	3	-	.33
F	<i>Sphaeralcea coccinea</i>	_b 19	_b 11	_a -	11	4	-	.07	-
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	0	8	0	0	3	0	0.32
Total for Perennial Forbs		315	223	72	133	91	36	1.96	0.57
Total for Forbs		315	223	80	133	91	39	1.96	0.90

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 11

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia tridentata vaseyana	71	73	9.33	11.33
B	Ceratoides lanata	5	5	.00	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	-	-
B	Gutierrezia sarothrae	4	15	.31	.10
B	Juniperus osteosperma	0	5	.04	.59
B	Leptodactylon pungens	0	2	-	.38
B	Opuntia spp.	5	7	.15	.18
B	Pinus edulis	0	9	-	1.29
Total for Browse		85	117	9.84	13.89

CANOPY COVER --

Herd unit 11B, Study no: 11

Species	Percent Cover
	'00
Juniperus osteosperma	.80
Pinus edulis	2

BASIC COVER --

Herd unit 11B, Study no: 11

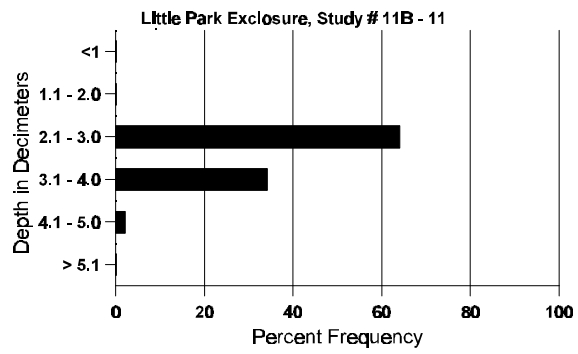
Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	321	298	7.75	25.00	35.85
Rock	92	8	.50	1.13	.16
Pavement	82	59	.75	1.41	.75
Litter	380	353	33.00	17.77	35.97
Cryptogams	99	231	4.25	1.75	14.98
Bare Ground	350	348	53.75	47.12	41.02

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 11, Study Name: Little Park Enclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.62	63.2 (12.68)	7.4	46.0	29.4	24.6	1.3	4.5	166.4	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 11

Type	Quadrat Frequency	
	'94	'00
Rabbit	37	46
Elk	-	1
Deer	31	6
Cattle	1	-

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
1862	N/A
-	-
26	2 (5)
-	-

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 11

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
	00	1	-	-	2	-	-	-	-	-	3	-	-	-	60		3	
Y	86	2	1	3	-	-	-	-	-	-	6	-	-	-	400		6	
	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
	00	7	-	-	4	-	-	-	-	-	11	-	-	-	220		11	
M	86	11	8	5	-	-	-	-	-	-	24	-	-	-	1600	22	22	24
	94	52	14	-	-	-	-	-	-	-	66	-	-	-	1320	22	36	66
	00	44	14	1	-	-	-	-	-	-	59	-	-	-	1180	21	33	59
D	86	2	1	8	-	1	-	-	-	-	12	-	-	-	800		12	
	94	39	14	17	-	-	-	-	-	-	35	-	-	35	1400		70	
	00	33	27	2	5	2	-	-	-	-	35	-	-	34	1380		69	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	860		43	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1080		54	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		26%			38%			00%			+ 2%							
'94		20%			12%			24%			- 3%							
'00		31%			02%			24%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	2800	Dec:	29%				
											'94	2860		49%				
											'00	2780		50%				
<i>Ceratoides lanata</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	3	-	-	1	1	-	-	-	-	5	-	-	-	100	10	9	5
	00	4	1	1	-	-	-	-	-	-	6	-	-	-	120	9	7	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		20%			00%			00%			+17%							
'00		17%			17%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'94	100		-				
											'00	120		-				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	0	8	18	0
	00	2	-	-	-	-	-	-	40	-	-	2
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>				<u>% Change</u>				
'86		00%	00%	00%								
'94		00%	00%	00%								
'00		00%	00%	100%								
Total Plants/Acre (excluding Dead & Seedlings)					'86	0	Dec:	-				
					'94	0		-				
					'00	40		-				
<i>Gutierrezia sarothrae</i>												
Y	86	-	-	-	-	-	-	-	0			0
	94	3	-	-	-	-	-	-	60			3
	00	1	-	-	-	-	-	-	20			1
M	86	1	-	-	-	-	-	-	66	11	6	1
	94	10	-	-	-	-	-	-	200	7	9	10
	00	41	-	-	-	-	-	-	820	6	7	41
D	86	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	60			3
X	86	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>				<u>% Change</u>				
'86		00%	00%	00%				+75%				
'94		00%	00%	00%				+71%				
'00		00%	00%	02%								
Total Plants/Acre (excluding Dead & Seedlings)					'86	66	Dec:	0%				
					'94	260		0%				
					'00	900		7%				
<i>Juniperus osteosperma</i>												
Y	86	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	40			2
M	86	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	-	-	-	-	60	-	-	3
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>				<u>% Change</u>				
'86		00%	00%	00%								
'94		00%	00%	00%								
'00		00%	00%	00%								
Total Plants/Acre (excluding Dead & Seedlings)					'86	0	Dec:	-				
					'94	0		-				
					'00	100		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Leptodactylon pungens																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	10	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	80		-			
Opuntia spp.																		
Y	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	16	5
	'00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	3	8	5
D	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	'00	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
X	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			+25%							
'00		00%			00%			25%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'94	120		17%			
												'00	160		25%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
S	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	2	-	-	-	-	-	2	-	-	4	-	-	-	80		4
Y	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'00	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'00	6	-	-	-	-	-	-	-	-	6	-	-	-	120	-	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'94		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-		
												'94	0		-		
												'00	240		-		

Trend Study 11B-12-00

Study site name: Williams Draw.

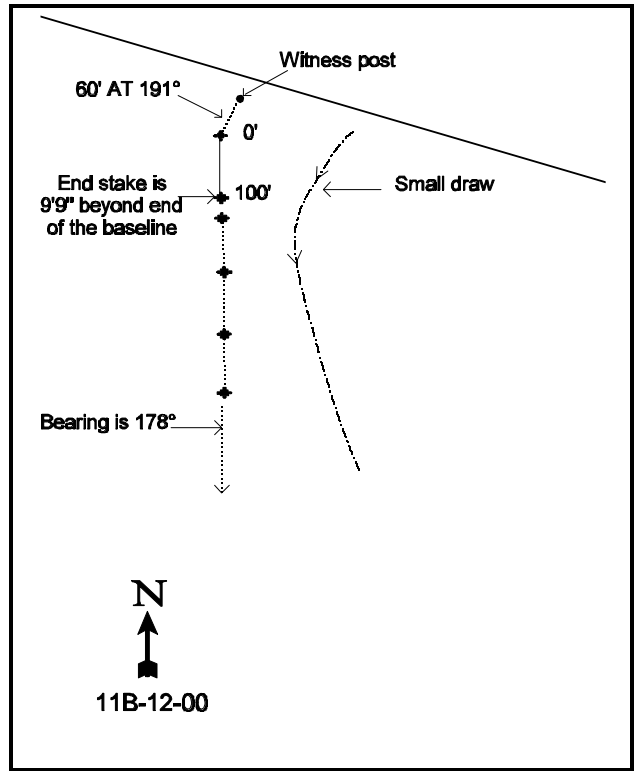
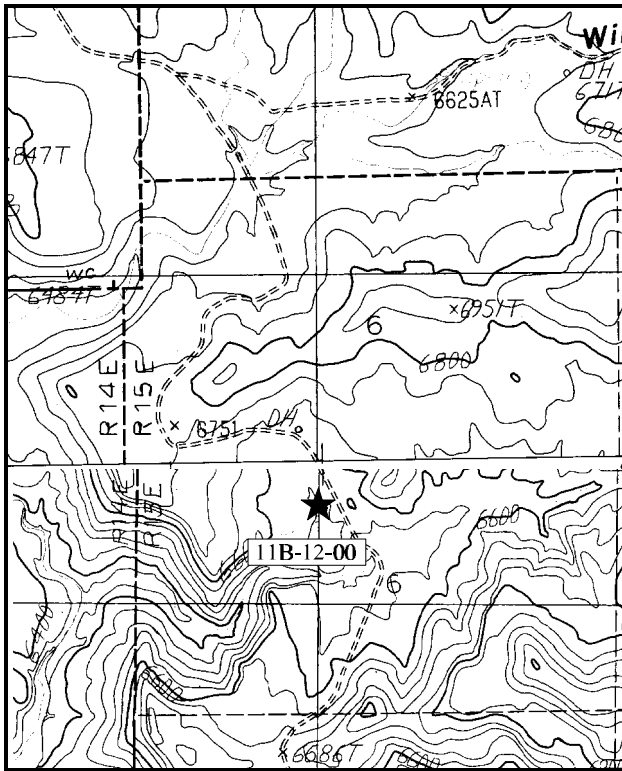
Range type: Mixed Mountain Brush.

Compass bearing: frequency baseline 168°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Geneva coal mine at the mouth of Horse Canyon, go 0.6 miles past the buildings to a fork. Bear right and proceed 6.85 miles up on top to the Upper Little Park Wash transect. Pass this transect and continue 1.35 miles to the fork at the Little Park Deer Exclosure sign. Continue on the main road for 1.45 miles to the “Williams Draw Spring” sign. Stay right and proceed 1.1 miles to a witness post (green fence post tagged #7836) located down off the right side of the road. From the witness post, walk 60 feet south (191°) down the slope to the start of the baseline, which is marked by a 2-foot tall rebar post. The rebar stake at the end of the baseline is actually 9 feet 9 inches past the 100-foot end of the tape. The first density plot is 49 feet bearing 76° from the baseline end stake.



Map Name: Woodside

Diagrammatic Sketch

Township 17S, Range 15E, Section 6

DISCUSSION

Trend Study No. 11B-12 (32-16)

*** This trend study site was not read in 2000. Text from the 1994 report has been retained in this report. Refer to the 1994 "Utah Big Game Trend Studies" report for maps and data tables.

The Williams Draw study is located in a pinyon-Juniper mixed mountain brush type on the southern end of the Little Park area. Aspect is easterly with an elevation of 6,500 feet. The moderately sloping, rolling land drains to the south and east into Little Park Wash. It is surrounded by rocky broken cliffs to the west and north. Water can be found nearby at Williams Draw Spring. While there is no sign of a continuous fire, numerous lightning strikes have hit the large conifers. The pinyon and juniper provides excellent cover for big game. Deer pellet groups are common, especially around the cliffrose. There are almost twice as many rabbit pellet groups as deer on this site. There appears to be little livestock use, not surprising with a total herbaceous cover of less than 1%.

There is a predominance of the pinkish-white sandstone bedrock which creates a rocky and somewhat shallow site. However, there are depressions and cracks in the rocks which provides small areas of moderately deep loose soil with an associated build-up of litter and loose sand underneath the trees and shrubs. The soil is composed mainly of sand and is very shallow in most places. There is good development of cryptogams within protected micro sites. Vegetative cover is low, especially from the herbaceous understory, but bare soil is only at 12%. This situation leads to naturally occurring erosion and sedimentation with the high amounts of slick-rock cover often associated with high intensity summer storms. Except for in the larger washes, erosion doesn't appear to be a factor in plant establishment, as many are growing in the numerous small gullies.

Large old juniper and pinyon characterize this woodland site with respective densities of 246 and 274 trees/acre. Average basal diameter of pinyon is about 5 inches, while that of juniper is just over 9 inches. About 40% of the pinyon's are less than one inch in diameter. There is light utilization of the available juniper. The key browse species for the site is true mountain mahogany, curlleaf mountain mahogany, and cliffrose. The cliffrose is quite vigorous and moderately hedged, but about half of the plants are 7-8 feet tall and new growth is largely unavailable. There has been a severe high lining effect from heavy utilization on some of the plants. Curlleaf mahogany, an evergreen shrub, has been heavily hedged and appears less vigorous than the true mountain mahogany, but this would be expected at this elevation for the curlleaf mountain mahogany does better at higher elevations and the extended drought would be more detrimental to a plant growing on a marginal site. There are also some littleleaf mountain mahogany and vigorous hybrids in the population in the area. There are scattered seedlings of most all these palatable species. Other utilized browse species include green ephedra, snowberry, and to a lesser extent serviceberry. None of these desirable species are particularly abundant, but together the 6 species provide a fair amount of forage and a total density of 860 shrubs/acre. The most commonly encountered key browse species was green ephedra with 480 plants/acre.

Due to the poor soil and moderately dense pinyon-Juniper overstory, the herbaceous component is limited on this site. Grasses are very sparse, with a few individuals of bottlebrush squirreltail, Indian ricegrass and blue grama. They provide very limited forage and little soil protection. A variety of forbs, mainly composites, are found on the site. Forb quadrat frequency is low and the small, low-growing plants provide only minimal forage potential. All the herbaceous species together provide less than one percent of the vegetative cover.

1986 APPARENT TREND ASSESSMENT

Compared to most shallow, rocky, pinyon-juniper sites, this one is especially healthy and diverse for browse species. The several valuable browse species are generally vigorous, although density overall is low. There is

some recruitment for the browse species. Browse utilization appears moderate and sustainable. Therefore, vegetative trend is stable. Although total ground cover is poor, the soil has a well-developed cryptogam cover and litter build-up is increasing. It is reasonable to always expect some erosion on this type of site. Soil trend is stable.

1994 TREND ASSESSMENT

When compared to other slick-rock pinyon-juniper woodlands, 12% bare ground and over 40% litter cover is excellent. Trend for soils is stable. The browse trend is also stable with a good variety of shrub species and most having good numbers of young plants. The percent decadence for most browse species has improved, but is still moderately high for a few species. This site is very limiting with the shallow restricted soils in association with the extended drought for so many years. The herbaceous understory is almost non-existent (<1%). Trend is stable for perennial species, but overall it is poor for herbaceous species.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable for perennial species, but overall poor abundance (3)

Trend Study 11B-14-00

Study site name: Prickly Pear .

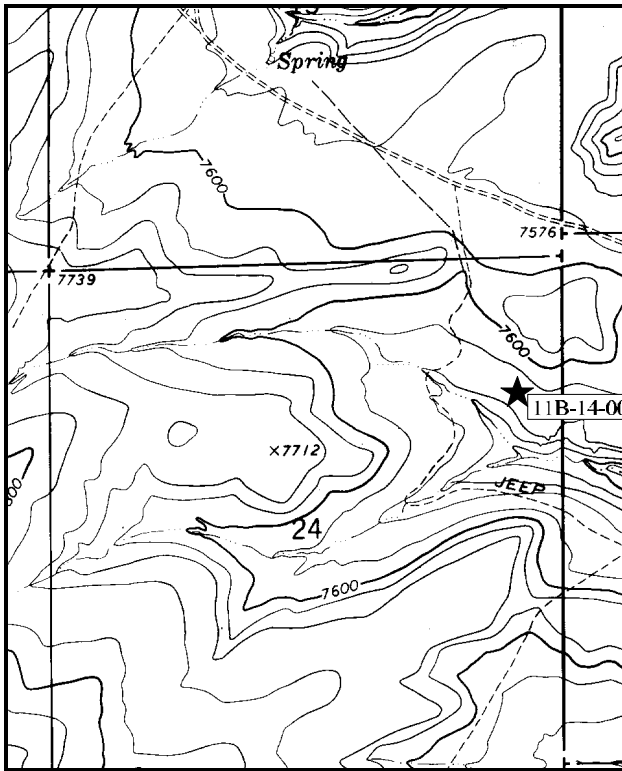
Range type: Chained, Seeded P-J .

Compass bearing: frequency baseline 96°M .

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). No Rebar on belts.

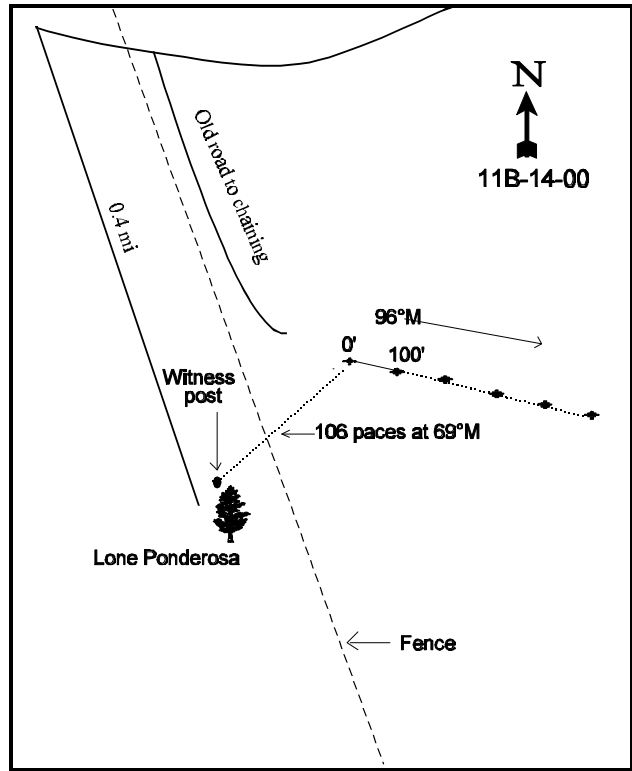
LOCATION DESCRIPTION

In Wellington at the intersection of Highway 6 and Nine Mile Canyon Road drive 42 miles northeast down Nine Mile Canyon to the Prickly Pear turnoff. Turn right (south) and travel up Prickly Pear Canyon 7.5 miles to a fork just beyond a fence. Turn south (left) and travel 0.4 miles to a large Ponderosa pine tree on the east side of the road. A witness post is just north of the tree. From the witness post walk 106 paces at 69°M crossing the fence to the 0 foot base line post. The base line runs at an azimuth of 96°M.



Map Name: Carrant Canyon

Township 12S , Range 14E , Section 24



Diagrammatic Sketch

UTM. 4401517.367 N, 560898.939 E

DISCUSSION

Trend Study No. 11B-14 (32-20)

The Prickly Pear study was established in 1994, and is located at the head of Prickly Pear Canyon at 7,540 feet in elevation on a southwest aspect. The transect is near the edge on a slightly sloping flat narrow ridge that runs west to east into Nine-Mile Canyon. It was not selected necessarily because of current elk use, but for the anticipated increase in elk use in the coming years. The importance of the site to elk is evidenced by a pellet group frequency in 1994 of 21% compared to only 8% for deer. Pellet group frequency was much lower in 2000, perhaps due to the mild winter of 1999-2000. A pellet group transect taken along the study site baseline in 2000 estimates 22 elk, 9 cow and 8 horse days use/acre (54 edu/ha, 23 cdu/ha and 20 hdu/ha). No deer pellet groups were encountered. The area was chained and seeded in the mid-1970's and is currently grazed by livestock as part of the Stone Cabin allotment which is grazed on a deferred rotation schedule from May through September. Herbaceous production is poor and grasses on the site were heavily utilized by livestock in 2000.

The soil is moderately deep and rocky with an estimated effective rooting depth of just over 14 inches. It has a clay loam texture with slightly alkaline pH of 7.6. Phosphorus is limited at just 2 ppm, as values less than 10 ppm have been shown to limit normal plant growth and development. Small shale fragments and larger flat pieces of sandstone are common on the surface and throughout the soil profile. Combined rock and pavement produced 22% cover in 1994 and 30% cover in 2000. Percent cover of bare ground is high and litter cover is low, with most litter coming from pinyon and juniper debris from the chaining. Some erosion is taking place but it is minimized by the slight slope combined with the armored nature of the soil surface.

Browse is very limited on this site with browse cover values of only 3% in 1994 and 5% in 2000. Total vegetative cover is not very high at only 12% to 13%. Similar sites have on average more than twice the vegetative cover as the Prickly Pear site. The herbaceous understory is also limited with a cover value of only about 9%. Site potential appears to be low when compared to other comparable sites within the Range Creek unit. Key browse on this site consist of small numbers of true mountain mahogany and rubber rabbitbrush. Mahogany is estimated at 220 plants/acre in 2000 with over half of the population showing moderate to heavy use on both readings. Even with moderate to heavy use, vigor is good. No seed was produced in 2000 likely due to the extremely dry conditions. Rubber rabbitbrush also has a relatively small population (480 plants/acre in 1994 and 320 in 2000). They were heavily utilized in 1994. However, current ('00) use is mostly light to moderate. The most common shrub on the site is corymbid eriogonum with a density of around 2,000 plants/acre. These shrubs show little use.

Released pinyon and juniper trees are growing back within the chaining. Point-center quarter data from 2000 estimate 92 pinyon and 31 juniper trees/acre. Most trees are small with an average basal diameter estimated at 3.3 inches for pinyon and 3.6 inches for juniper. Five percent of the juniper trees sampled were mature chained trees that are still alive.

The herbaceous understory is poor, producing only 9% cover. The only fairly common grasses include Salina wildrye and crested wheatgrass which produce over 80% of the meager grass cover. Forbs are diverse but the only common species are indicative of shallow soil. The most common species include: stemless goldenweed, fineleaf hymenopappus, bladderpod, gumweed aster and desert phlox. There is little useful forage produced by these forbs.

1994 APPARENT TREND ASSESSMENT

Soil trend appears to be in stable, but poor condition, with a high percentage of bare ground and rock, and a low cover value for litter. The browse component is poor with very low densities and poor vigor. The herbaceous

understory has one of the lowest cover values for this kind of site, but it still has a fair amount of grass production from Salina wildrye and crested wheatgrass. Because of the low abundance for both crested wheatgrass and smooth brome, both seeded when this woodland was chained, this low density could mostly be explained because of the prolonged drought we have had in the past 8 years.

2000 TREND ASSESSMENT

Trend for soil is stable, but remains in poor condition. Relative cover values for vegetation, litter, and bare ground are similar to 1994 estimates. There is some erosion occurring but it is minimized by the gentle terrain combined with the armored nature of the soil surface. Trend for browse is also stable. Density of desirable browse species, mountain mahogany and rabbitbrush, are low yet stable. Vigor is generally good and percent decadence low. Density of other less desirable shrubs on the site also appear to be stable. The only negative aspect of the browse trend is the number of pinyon and juniper trees released on the chaining. They are not currently abundant and do not produce much cover, but they will eventually regain dominance of the site, especially without a vigorous herbaceous understory. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of both grasses and forbs.

TREND ASSESSMENT

soil - stable, but poor condition (3)

browse - stable (3)

herbaceous understory - declining slightly with continued drought (2)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 14

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
G	Agropyron cristatum	69	62	23	24	1.30	1.31
G	Agropyron spicatum	-	*9	-	3	-	.33
G	Bromus inermis	5	*-	3	-	.01	-
G	Carex spp.	13	11	7	4	.25	.45
G	Elymus salina	128	118	43	40	3.40	2.82
G	Oryzopsis hymenoides	2	2	1	2	.00	.03
G	Stipa comata	7	-	2	-	.01	-
G	Stipa lettermani	3	-	1	-	.03	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		227	202	80	73	5.03	4.96
Total for Grasses		227	202	80	73	5.03	4.96
F	Antennaria rosea	-	5	-	2	-	.01
F	Arenaria fendleri	3	-	2	-	.03	-
F	Castilleja spp.	2	-	1	-	.00	-
F	Draba spp. (a)	-	3	-	1	-	.00
F	Euphorbia spp.	10	*-	4	-	.02	-
F	Haplopappus acaulis	27	*50	13	25	.50	1.36
F	Helianthella uniflora	20	15	8	6	.12	.08
F	Hymenoxys acaulis	56	*15	19	6	.24	.10
F	Hymenopappus filifolius	54	30	21	14	1.20	.32
F	Lesquerella spp.	135	*37	51	16	.45	.13
F	Machaeranthera canescens	14	*-	6	-	.03	-
F	Machaeranthera grindelioides	53	68	22	30	.28	.74
F	Penstemon spp.	-	13	-	7	-	.04
F	Penstemon spp.	8	-	5	-	.05	-
F	Penstemon palmeri	5	-	2	-	.01	-
F	Phlox hoodii	150	123	65	58	.80	1.13
F	Physaria spp.	2	*14	1	7	.00	.03
F	Townsendia incana	13	12	6	6	.05	.05
F	Unknown forb-perennial	37	*-	13	-	.16	-
Total for Annual Forbs		0	3	0	1	0	0.00
Total for Perennial Forbs		589	382	239	177	3.99	4.02
Total for Forbs		589	385	239	178	3.99	4.02

* Indicates significant difference at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 14

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Cercocarpus montanus	8	7	.69	1.50
B	Chrysothamnus nauseosus	13	10	.28	.15
B	Chrysothamnus viscidiflorus	2	3	.00	-
B	Ephedra viridis	3	1	-	-
B	Eriogonum corymbosum	37	45	.85	1.22
B	Gutierrezia sarothrae	15	12	.10	.08
B	Juniperus osteosperma	0	1	-	.03
B	Pinus edulis	0	4	1.26	1.52
Total for Browse		78	83	3.21	4.50

CANOPY COVER --

Herd unit 11B, Study no: 14

Species	Percent Cover
	'00
Pinus edulis	.80

BASIC COVER --

Herd unit 11B, Study no: 14

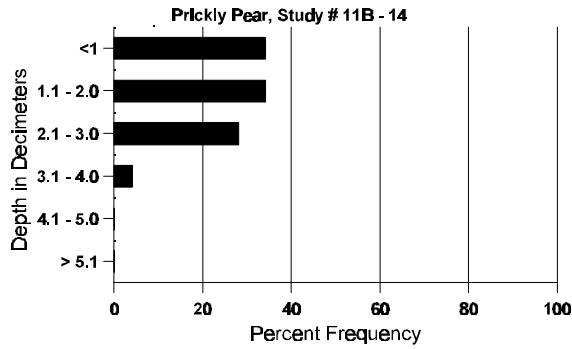
Cover Type	Nested Frequency		Average Cover %	
	'94	'00	'94	'00
Vegetation	360	310	12.62	13.89
Rock	388	226	15.38	13.51
Pavement	432	399	6.16	16.37
Litter	456	357	19.67	23.13
Cryptogams	2	7	.00	.06
Bare Ground	443	420	34.38	42.35

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 14, Study Name: Prickly Pear

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.20	64.6 (16.30)	7.6	31.6	36.8	31.6	3.5	2.0	201.6	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 14

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre	Days Use per Acre (ha)
			'00	'00
Rabbit	10	8	531	N/A
Horse	-	2	96	N/A
Elk	21	7	287	23 (57)
Cow	-	-	113	10 (25)
Deer	8	1	-	-

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 14

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																		
M	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	45	61	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'00	0		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	94	3	4	2	-	-	-	-	-	-	9	-	-	-	180	29	36	9
	00	5	-	2	-	2	2	-	-	-	11	-	-	-	220	32	47	11
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		44%			22%			00%			+18%							
'00		18%			36%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	180	Dec:	-			
												'00	220		-			
Chrysothamnus nauseosus																		
Y	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	16	-	2	-	-	-	-	-	-	18	-	-	-	360	22	24	18
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240	20	23	12
D	94	2	-	3	-	-	-	-	-	-	1	-	-	4	100		5	
	00	2	1	-	-	-	-	-	-	-	2	-	-	1	60		3	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		04%			21%			17%			-33%							
'00		13%			00%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	480	Dec:	21%			
												'00	320		19%			
Chrysothamnus viscidiflorus																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	8	2
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	7	2
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+33%							
'00		00%			00%			33%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	0%			
												'00	60		33%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	16	19	
	00	-	-	1	-	-	-	-	-	-	1	-	-	-	20	16	10	
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		33%			00%			00%			-67%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	33%			
												'00	20		0%			
<i>Eriogonum corymbosum</i>																		
S	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	94	29	4	-	-	-	-	-	-	-	33	-	-	-	660		33	
	00	28	1	-	-	-	-	-	-	-	29	-	-	-	580		29	
M	94	52	7	-	-	1	-	-	-	-	60	-	-	-	1200	11	16	
	00	56	3	-	-	-	-	2	-	-	60	-	1	-	1220	9	13	
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	17	-	-	2	-	-	-	-	-	10	5	-	4	380		19	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		13%			00%			00%			+14%							
'00		04%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1880	Dec:	1%			
												'00	2180		17%			
<i>Gutierrezia sarothrae</i>																		
Y	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	30	-	-	-	-	-	-	-	-	30	-	-	-	600	5	6	
	00	24	-	-	-	-	-	-	-	-	24	-	-	-	480	4	6	
D	94	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			03%			-37%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	760	Dec:	5%			
												'00	480		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Juniperus osteosperma																	
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-		
												'00	20		-		
Pinus edulis																	
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-		
												'00	80		-		

Trend Study 11B-15-00

Study site name: Twin Hollow .

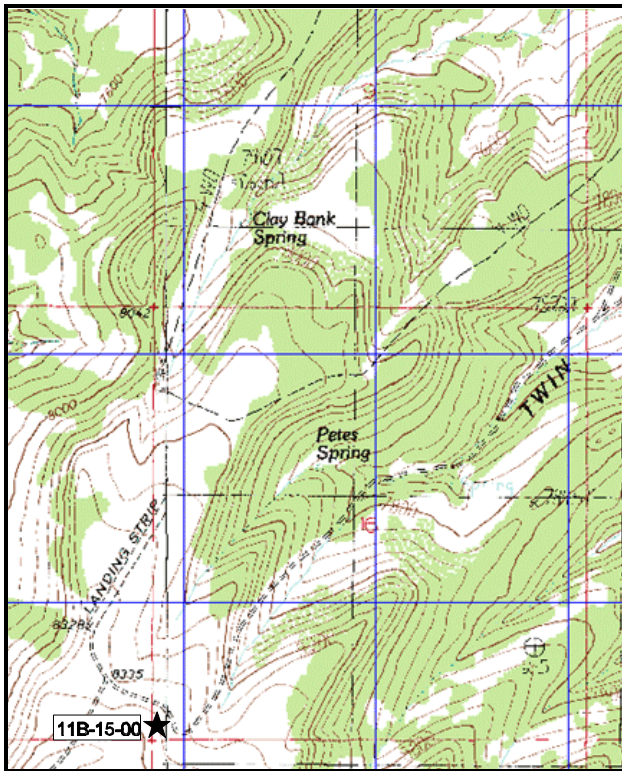
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 197°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

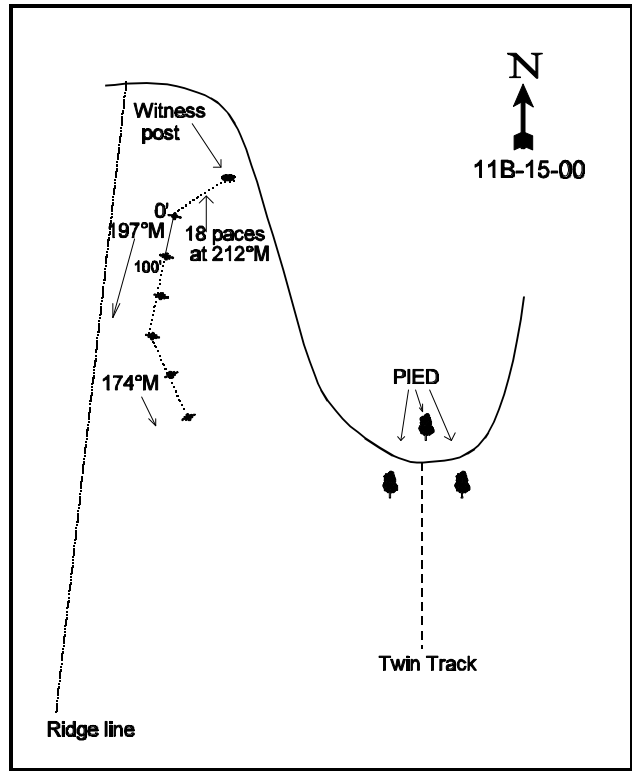
LOCATION DESCRIPTION

On the Nine Mile Canyon road, continue 3.35 miles past the turn to Prickly Pear Canyon. Turn right (south) and drive up Cottonwood Canyon. Continue 1.7 miles to a cattle guard. Drive an additional 5 miles to a gate. At the gate turn right and drive 4.95 miles to a fork. Continue straight 1.5 miles to a Y intersection (left is twin track) On the south side of the intersection is a large lone pinyon pine tree. Continue on the main road another 0.1 mile to a witness post on the left side of the road. The 0 foot stake is 18 paces away at a bearing of 212°M.



Map Name: Bruin Point

Township 13S , Range 15E , Section 15



Diagrammatic Sketch

UTM. 4393183.655 N, 564281.231 E

DISCUSSION

Trend Study No. 11B-15 (32-21)

The Twin Hollow site was established in 1994 to monitor critical winter range for elk and a transitional range for deer in most winters. It samples a mountain brush type at an elevation of 7,900 feet, just off a small ridge with a slight southeast aspect. Slope is 23% to 25%. Pellet group transect data taken during the 2000 reading estimate 68 elk and only 5 deer days use/acre (168 edu/ha and 12 ddu/ha). Most of the elk pellet groups were concentrated on a ridge to the west of the study site baseline. The area is also utilized by a small band of wild horses with pellet group data estimating 12 horse days use/acre (30 hdu/ha) in 2000.

Soil on the site is moderately deep (the deepest of all 11B sites), but quite variable as evidenced by the presence of both black sagebrush and mountain big sagebrush. Average effective rooting depth is estimated at just over 17 inches. It is deeper along the first 200 feet of the baseline then becomes more shallow and rocky. Serviceberry and mountain mahogany dominate on the deeper soil, while black and mountain big sagebrush are much more numerous on the more shallow soil. The few mahogany and serviceberry found on the more shallow soil are stunted. Parent material is sandstone. Soil texture is a loam with neutral soil reaction (pH of 7.0). Phosphorus is limited at only 3.5 ppm, as values less than 10 ppm may have been shown to limit normal plant growth and development. There is little rock on the surface except for some gravel and large flat rocks predominately at the end of the baseline. There is little sign of erosion with a very high cover value for vegetation with excellent litter cover. Another positive characteristic of the vegetative cover is that over 40% of the cover is made up of herbaceous plants which protect the soils much better from high intensity summer storms.

The browse composition is good with 9 species sampled in 1994 and 2000. Serviceberry, mountain big sagebrush, and true mountain mahogany, provide 73% of the browse cover. All three species show light to moderate use, stable densities, low decadence, and generally good vigor. Poor vigor on serviceberry in 2000 was the result of very dry conditions which caused leaves to yellow and drop off prematurely. Leader growth in 2000 averaged about 10 inches for serviceberry, 13 inches for mahogany and 4 inches for mountain big sagebrush.

Black sagebrush is found in areas with more shallow soil and it appears that it is hybridizing with the mountain big sagebrush. Other common understory shrubs include: dwarf and stickleaf low rabbitbrush, snowberry, and broom snakeweed. There are also a few bitterbrush on the site which are only lightly browsed.

The herbaceous understory composition is excellent with 44 species encountered in 1994 and 37 in 2000. Nine species of grasses were found, but only two, bluebunch wheatgrass, and Salina wildrye are abundant. These two grasses currently ('00) provide 83% of the grass cover. Forbs are diverse and provide nearly as much cover as grasses. Total forb cover was higher in 1994, but due to the extremely dry conditions in 2000, forb cover declined from 11% to 8%. Common forbs include bastard toad flax, sulfur eriogonum, and desert phlox which currently ('00) provide 76% of the forb cover in 2000. No use was apparent on any of the grasses or forbs during the 2000 reading.

1994 APPARENT TREND ASSESSMENT

Even with the moderately high percent of bare ground (21%), with the high amounts of both litter cover and vegetative cover, trend for this site appears stable. Trend for the browse species also appears stable with high cover values, good diversity, excellent health, and vigor for all key species. The herbaceous understory is diverse, abundant, and in good condition.

2000 TREND ASSESSMENT

Trend for soil is slightly improved. Nested frequency of vegetation and litter declined slightly but cover of both increased. In addition, herbaceous cover increased slightly compared to 1994. Trend for the key browse species, serviceberry, mountain big sagebrush, and true mountain mahogany, is stable. Use on these shrubs is light to moderate, vigor is good, and decadence low. The populations have remained at similar densities compared to 1994. Trend for the herbaceous understory is down slightly. Even though cover of grasses increased since 1994 (9% to 13%), sum of nested frequency declined. However, the dominant grasses, bluebunch wheatgrass and Salina wildrye, did not change significantly in frequency. Due to the extremely dry conditions, cover and nested frequency of forbs declined. This trend should reverse itself with a return to normal precipitation patterns.

TREND ASSESSMENT

soil - up slightly (4)

browse - stable (3)

herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 15

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
G	Agropyron spicatum	159	178	56	61	1.77	6.01
G	Carex spp.	9	5	4	2	.02	.15
G	Elymus cinereus	-	5	-	1	-	.15
G	Elymus salina	142	123	48	43	4.34	4.78
G	Koeleria cristata	24	*2	12	2	.19	.06
G	Oryzopsis hymenoides	7	-	4	-	.07	-
G	Poa fendleriana	62	58	24	21	1.33	.77
G	Sitanion hystrix	26	*3	9	3	.26	.04
G	Stipa columbiana	23	15	8	7	.57	.40
G	Stipa lettermani	57	*16	18	6	.74	.65
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		509	405	183	146	9.32	13.03
Total for Grasses		509	405	183	146	9.32	13.03
F	Androsace septentrionalis (a)	4	5	2	1	.01	.00
F	Arabis spp.	3	1	1	1	.00	.00
F	Arenaria fendleri	9	5	3	4	.06	.04
F	Astragalus convallarius	18	*1	9	1	.07	.00
F	Astragalus miser	1	-	1	-	.00	-
F	Aster spp.	24	*8	11	3	.18	.04
F	Astragalus spp.	11	2	6	1	.03	.03

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
		F	Balsamorhiza sagittata	-	-	-	-
F	Castilleja flava	36	*11	16	6	.15	.05
F	Chenopodium album (a)	2	-	1	-	.00	-
F	Chaenactis douglasii	15	*-	7	-	.04	-
F	Chenopodium spp. (a)	5	-	2	-	.01	-
F	Chenopodium fremontii (a)	7	-	3	-	.04	-
F	Comandra pallida	150	*201	53	75	2.10	3.40
F	Collinsia parviflora (a)	65	*10	26	6	.38	.08
F	Crepis acuminata	-	3	-	1	-	.03
F	Cryptantha spp.	-	1	-	1	-	.00
F	Erigeron eatonii	110	*18	43	8	.44	.11
F	Erigeron flagellaris	16	14	10	7	.18	.08
F	Erigeron spp.	-	5	-	3	-	.01
F	Eriogonum racemosum	54	*9	16	4	1.12	.07
F	Eriogonum umbellatum	150	115	50	53	2.83	1.30
F	Hymenoxys acaulis	-	1	-	1	-	.03
F	Hymenoxys richardsonii	5	-	3	-	.06	-
F	Ipomopsis aggregata	15	2	5	2	.07	.01
F	Linum lewisii	30	*-	12	-	.06	-
F	Lithospermum spp.	16	*8	9	3	.32	.18
F	Machaeranthera canescens	12	*-	7	-	.08	-
F	Machaeranthera grindelioides	30	2	11	1	.18	.03
F	Microsteris gracilis (a)	-	-	-	-	-	-
F	Oenothera spp.	33	*-	14	-	.36	-
F	Penstemon caespitosus	90	*-	31	-	.91	-
F	Penstemon spp.	3	*38	2	11	.01	.15
F	Penstemon watsonii	29	22	10	12	.25	.70
F	Phlox austromontana	50	58	18	22	1.11	1.65
F	Phlox longifolia	58	*27	23	12	.11	.21
F	Polygonum douglasii (a)	41	-	14	-	.07	-
F	Taraxacum officinale	4	8	2	4	.03	.04
Total for Annual Forbs		124	15	48	7	0.51	0.08
Total for Perennial Forbs		972	560	373	236	10.82	8.26
Total for Forbs		1096	575	421	243	11.33	8.35

* Indicates significant difference at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Amelanchier utahensis	25	35	4.98	7.68
B	Artemisia frigida	1	0	-	-
B	Artemisia nova	23	24	1.37	.73
B	Artemisia tridentata vaseyana	71	68	6.51	10.85
B	Cercocarpus montanus	41	41	6.06	6.55
B	Chrysothamnus depressus	16	20	.80	.19
B	Chrysothamnus viscidiflorus	84	47	1.26	.67
B	Gutierrezia sarothrae	27	14	.48	.12
B	Opuntia spp	2	1	-	-
B	Purshia tridentata	2	2	-	.38
B	Symphoricarpos oreophilus	52	45	2.41	2.78
B	Tetradymia canescens	2	0	.03	-
Total for Browse		346	297	23.93	30.00

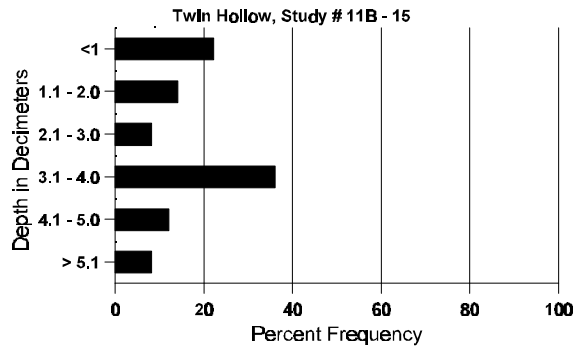
BASIC COVER --
Herd unit 11B, Study no: 15

Cover Type	Nested Frequency		Average Cover %	
	'94	'00	'94	'00
Vegetation	427	392	42.89	48.85
Rock	174	66	2.13	1.44
Pavement	178	152	.41	2.82
Litter	486	476	44.90	62.65
Cryptogams	2	-	.00	0
Bare Ground	332	238	21.18	17.28

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 15, Study Name: Twin Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.13	61.8 (17.01)	7.0	44.0	31.4	24.6	4.6	3.5	291.2	0.7

Stoniness Index



PELLET GROUP FREQUENCY -- Herd unit 11B, Study no: 15

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre	Days Use per Acre (ha)
			00	00
Rabbit	5	1	191	N/A
Horse	4	4	139	N/A
Elk	11	13	887	69 (169)
Deer	5	5	61	5 (12)

BROWSE CHARACTERISTICS -- Herd unit 11B, Study no: 15

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	94	1	1	-	1	-	-	-	-	-	3	-	-	-	60			3
	00	7	2	-	1	-	-	-	-	-	9	-	1	-	200			10
M	94	51	4	-	-	-	-	-	-	-	55	-	-	-	1100	42	49	55
	00	15	3	-	8	14	-	7	-	-	20	-	26	1	940	44	51	47
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	1	-	-	-	-	-	-	-	1	20			1
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		10%			00%			00%			- 2%							
'00		34%			00%			50%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1180	Dec:	2%			
												'00	1160		2%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia frigida</i>																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-			
												'00	0		-			
<i>Artemisia nova</i>																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	94	5	2	-	2	-	-	-	-	-	9	-	-	-	180			9
	00	3	1	-	-	-	-	-	-	-	4	-	-	-	80			4
M	94	26	4	-	1	-	-	-	-	-	31	-	-	-	620	11	13	31
	00	49	-	-	6	-	-	-	-	-	55	-	-	-	1100	10	14	55
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		15%			00%			00%			+31%							
'00		02%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	820	Dec:	2%			
												'00	1180		0%			
<i>Artemisia tridentata vaseyana</i>																		
S	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	94	32	1	-	3	-	-	-	-	-	36	-	-	-	720			36
	00	31	-	-	-	-	-	-	-	-	31	-	-	-	620			31
M	94	305	7	1	1	-	-	3	-	-	317	-	-	-	6340	16	17	317
	00	229	27	-	1	-	-	-	-	-	257	-	-	-	5140	16	22	257
D	94	3	3	2	3	1	-	-	-	-	7	-	-	5	240			12
	00	23	7	-	-	-	-	1	-	-	26	-	1	4	620			31
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		03%			.82%			01%			-13%							
'00		11%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	7300	Dec:	3%			
												'00	6380		10%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
S	94	17	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
	00	148	-	-	30	-	-	-	-	-	178	-	-	-	3560		178	
Y	94	52	8	-	4	-	-	-	-	-	64	-	-	-	1280		64	
	00	46	19	-	7	-	-	-	-	-	72	-	-	-	1440		72	
M	94	27	22	-	1	-	-	-	-	-	50	-	-	-	1000	44	48	
	00	24	8	1	2	12	2	2	-	-	50	-	1	-	1020	46	47	
D	94	12	1	-	-	-	-	-	-	-	3	-	-	10	260		13	
	00	1	-	-	1	1	-	-	-	-	2	-	-	1	60		3	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		24%			00%			08%			- 1%							
'00		32%			02%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2540	Dec:	10%			
												'00	2520		2%			
Chrysothamnus depressus																		
Y	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	82	-	-	-	-	-	-	-	-	82	-	-	-	1640	5	6	
	00	61	1	-	1	-	-	-	-	-	63	-	-	-	1260	3	5	
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	-	-	2	40		2		
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			-24%							
'00		02%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1700	Dec:	0%			
												'00	1300		3%			
Chrysothamnus viscidiflorus																		
Y	94	16	-	-	-	-	-	-	-	-	16	-	-	-	320		16	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	235	-	-	22	-	-	4	-	-	261	-	-	-	5220	8	7	
	00	63	-	-	5	-	-	7	-	-	75	-	-	-	1500	11	10	
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	4	-	-	-	-	-	-	-	-	-	-	4	80		4		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			-72%							
'00		00%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	5560	Dec:	0%			
												'00	1580		5%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
Y	94	7	-	-	1	-	-	-	-	-	8	-	-	-	160		8	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	59	-	-	-	-	-	-	-	-	59	-	-	-	1180	6	5	
	00	39	-	-	-	-	-	-	-	-	39	-	-	-	780	4	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			-42%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1340	Dec:	-			
												'00	780		-			
Opuntia spp.																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	11	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			-50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	0%			
												'00	20		100%			
Purshia tridentata																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	18	40	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	-			
												'00	40		-			
Symphoricarpos oreophilus																		
Y	94	7	-	-	1	-	-	-	-	-	8	-	-	-	160		8	
	00	12	-	-	-	-	-	-	-	-	11	-	1	-	240		12	
M	94	53	3	-	52	-	-	4	-	-	109	-	-	3	2240	12	19	
	00	43	-	-	10	-	-	9	-	-	61	-	1	-	1240	10	18	
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	4	-	-	-	-	-	-	-	-	-	-	-	4	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		03%			00%			02%			-36%							
'00		00%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2420	Dec:	1%			
												'00	1560		5%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Tetradymia canescens																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	7	2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	10	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	-			
												'00	0		-			

Trend Study 11B-16-00

Study site name: Steer Ridge .

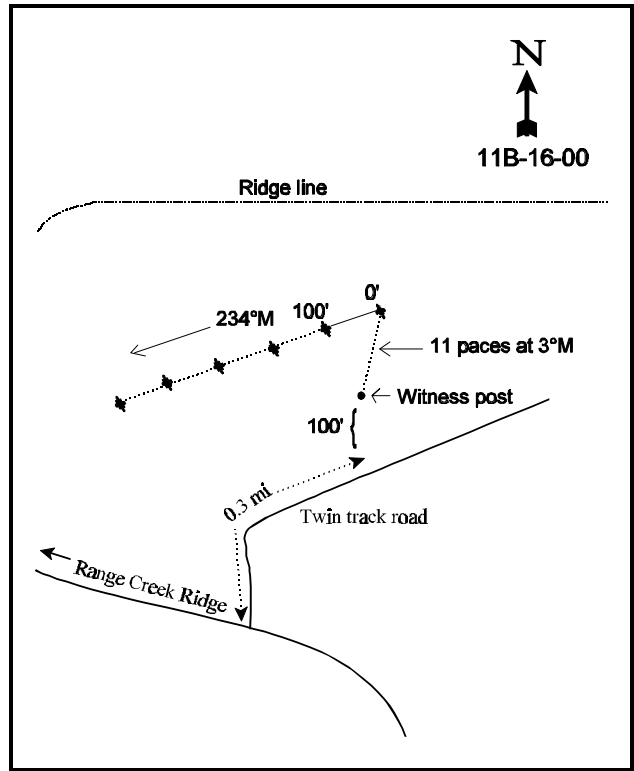
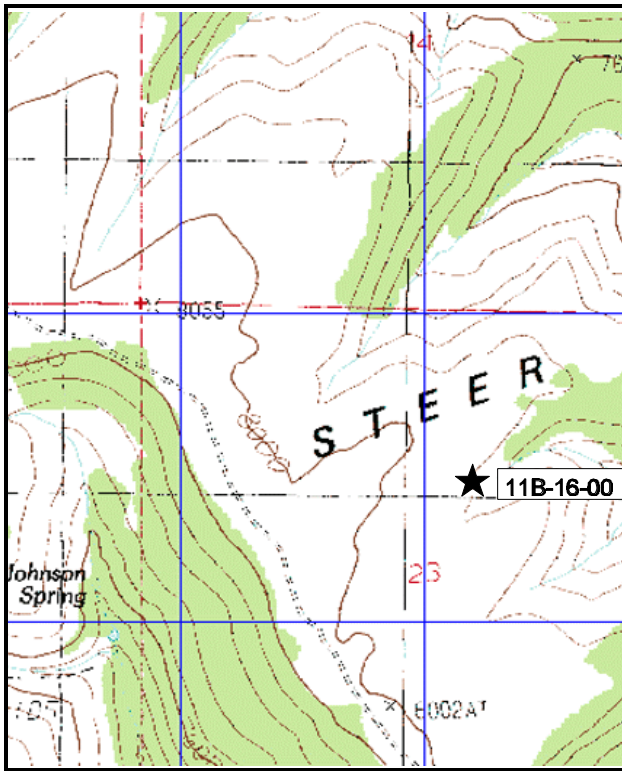
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 234°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Go through an intersection beyond another cattle guard and go 3.1 miles to a fork. Stay right and travel another 2.9 miles to a fork and turn left just before a gate. Proceed 0.1 miles to a gate. Continue 4.2 miles to a fork. Stay left and continue an additional 1.3 miles to another gate. Continue 5.1 miles and turn left on a twin track road. Drive north 0.3 miles to a witness post 100 ft off the left side of the road. The 0 ft stake is 11 paces away at 3°M and is marked with browse tag number 32 DWR. The baseline runs at an azimuth of 234°M.



Map Name: Steer Ridge Canyon

Diagrammatic Sketch

Township 14S , Range 16E , Section 23

UTM. 4383080.755 N, 578010.174 E

DISCUSSION

Trend Study No. 11B-16 (32-22)

The Steer Ridge trend study was established in 1994. It samples a mountain shrub community near the end of Steer Ridge, only a few miles from the Green River. Elevation of the site is 7,800 feet which slopes slightly to the south. The mountain brush community type here is noticeably shorter in stature than that of the Twin Hollow study. The area is used heavily by wintering elk and deer. Deer are forced to move to lower elevations when snows get deeper, but elk are often seen in the area all winter. Pellet group data from 2000 estimate 82 elk and 19 deer use days/acre (203 edu/ha and 47 ddu/ha). There was also some light use by horses and cattle in 1994, although there has been no livestock use since.

The soils on this site are moderately shallow and rocky with bed rock found at a depth of only 10 to 12 inches. Average effective rooting depth is estimated at just 10 inches. There appears to be enough cracks in the rock to allow deeper rooted shrubs like serviceberry, bitterbrush, and mountain big sagebrush to becoming establish. The deepest soil readings occurred near the base of shrubs. Parent material is sandstone and soil texture is a sandy clay loam with a neutral soil reaction (pH of 7.2). Phosphorus is limited at 5.5 ppm, as values less than 10 ppm have been shown to limit normal plant growth and development. The soil profile is rocky throughout with surface rock having a cover of 9% in 1994 and 15% in 2000. Vegetative and litter cover are moderately low for a high elevation site. This suggests a lower site potential due to the more shallow soil than would normally be expected for a site at this elevation.

Key browse on this site consist of mountain big sagebrush and bitterbrush which provided 84% of the total shrub cover in 1994 and 85% in 2000. The bitterbrush have mostly good vigor with a density of 1,120 plants/acre and only 9% classified as decadent in 2000. They are a shorter growth form averaging just over 2 feet in height with a crown diameter of 4.5 feet. Use is mostly light to moderate. Mountain big sagebrush has a moderate density of 2,160 plants/acre ('00). It shows a higher percent decadency which has increased from 13% in 1994 to 22% in 2000. Use is mostly light to moderate. It appears that the abundant perennial grass component combined with drought may be negatively affecting the sagebrush. This is more pronounced in the shallow draw bottoms where perennial grasses are more abundant and where most of the sagebrush appear to be decadent and dying with little apparent reproduction. The more shallow soil and reduced site potential makes this area a more marginal site for mountain big sagebrush. Very high abundance of ants, associated with the presence of aphids, also appears to be effecting the vigor of some sagebrush plants. However, reproduction is adequate to maintain the stand.

Serviceberry provides an additional 8% of the total browse cover with a small population of 160 plants/acre ('00). These shrubs are more heavily utilized than sagebrush or bitterbrush. Individual serviceberry are smaller in stature due to the shallow, rocky soil. Average height is only 31 inches making many plants all available to hedging. Other common shrubs include dwarf and mountain low rabbitbrush. There are also a few scattered rubber rabbitbrush, mountain mahogany, snowberry, and gray horsebrush.

The herbaceous understory is abundant and diverse with about 60% of the total vegetative cover coming from the herbaceous species. What makes this site better than most is that there are several co-dominant grass species including; thickspike, bluebunch wheatgrass, mutton bluegrass, and needle-and-thread. This abundance of key grass species would be advantageous for elk winter use. Forbs are diverse but they do not provide very much forage. The 25 species sampled in 1994 and 27 species in 2000 provide only about 3.5% cover.

1994 APPARENT TREND ASSESSMENT

Soil trend for the site appears stable with good herbaceous vegetative cover (60% of the vegetative cover) which provides the best protection from high intensity summer storms. The trend for key browse would also appear

stable with good age distributions, excellent vigor, and low rates of decadency which are not bad for the length and severity of the current drought. The herbaceous understory is also very good, with excellent production from more than five species of grasses. The forb component has many species (25), but only contributes 11% of the total vegetative cover.

2000 TREND ASSESSMENT

Trend for soil is improving with increases in vegetative and litter cover combined with a decline in cover of bare ground. Herbaceous vegetation, which better protects the soil from high intensity storms, accounts for nearly 60% of the total vegetative cover. Trend for browse is stable with stable populations of mountain big sagebrush and bitterbrush. Use of these shrubs is light to moderate, vigor is good, and percent decadence is low. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses declined slightly but cover increased from 14% to almost 18%. Nested frequency of mutton bluegrass increased significantly while the less desirable Salina wildrye declined significantly. Prairie junegrass, a warm season species, was abundant in 1994, but decreased significantly in 2000 as well. It appears that the extremely dry conditions this summer have contributed to this decline. Sum of nested frequency of perennial forbs also declined slightly with only two species, sego lily and desert parsley, declined significantly. Total cover of forbs is almost identical to 1994.

TREND ASSESSMENT

soil - up slightly (4)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 16

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
		G	Agropyron dasystachyum	146	160	43	55
G	Agropyron spicatum	151	147	52	45	4.19	4.91
G	Bouteloua gracilis	-	4	-	2	-	.18
G	Bromus tectorum (a)	-	1	-	1	-	.00
G	Elymus salina	69	*25	20	10	2.32	.63
G	Koeleria cristata	86	*5	29	2	1.81	.03
G	Oryzopsis hymenoides	32	*9	11	3	.28	.19
G	Poa fendleriana	72	*187	29	62	1.15	4.67
G	Poa secunda	27	39	10	14	.17	.24
G	Sitanion hystrix	1	1	1	1	.00	.03
G	Stipa comata	67	78	22	31	1.95	3.06
G	Stipa lettermani	27	*-	11	-	.72	.00
Total for Annual Grasses		0	1	0	1	0	0.00
Total for Perennial Grasses		678	655	228	225	14.25	17.73
Total for Grasses		678	656	228	226	14.25	17.73
F	Agoseris glauca	12	6	7	5	.06	.05
F	Antennaria spp.	14	8	6	2	.13	.15
F	Arabis spp.	3	-	1	-	.00	-
F	Arenaria fendleri	10	-	3	-	.18	-
F	Astragalus convallarius	-	3	-	1	-	.00
F	Aster spp.	-	5	-	2	-	.01
F	Astragalus spp.	3	7	1	3	.01	.34
F	Balsamorhiza sagittata	7	3	4	3	.86	.33
F	Calochortus flexuosus	17	*-	6	-	.05	-
F	Castilleja linariaefolia	23	22	9	10	.14	.12
F	Chenopodium fremontii (a)	1	-	1	-	.00	-
F	Chenopodium leptophyllum (a)	5	-	2	-	.01	-
F	Comandra pallida	4	*18	2	10	.03	.32
F	Collinsia parviflora (a)	-	4	-	2	-	.01
F	Crepis acuminata	10	9	5	4	.07	.19
F	Eriogonum alatum	13	9	6	3	.08	.09
F	Erigeron eatonii	18	14	7	7	.16	.27
F	Erigeron spp.	-	1	-	1	-	.00
F	Eriogonum umbellatum	23	14	9	6	.29	.08
F	Gayophytum ramosissimum (a)	2	4	1	2	.00	.01
F	Linum lewisii	-	*7	-	4	-	.02

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
		F	Lithospermum ruderale	12	5	5	2
F	Lomatium spp.	33	*1	11	1	.08	.00
F	Oenothera spp.	-	3	-	1	-	.00
F	Penstemon caespitosus	10	2	5	2	.24	.04
F	Penstemon spp.	2	2	2	2	.01	.01
F	Phlox longifolia	58	53	22	25	.11	.32
F	Polygonum douglasii (a)	45	*16	21	7	.10	.03
F	Sphaeralcea coccinea	78	62	32	26	.77	.67
F	Taraxacum officinale	-	3	-	1	-	.03
F	Tragopogon dubius	-	-	-	-	.00	-
F	Trifolium spp.	-	6	-	2	-	.01
Total for Annual Forbs		53	24	25	11	0.12	0.05
Total for Perennial Forbs		350	263	143	123	3.50	3.29
Total for Forbs		403	287	168	134	3.63	3.34

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 16

T y p e	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
		B	Amelanchier utahensis	4	5
B	Artemisia tridentata vaseyana	78	62	3.79	6.40
B	Cercocarpus montanus	0	0	-	-
B	Chrysothamnus depressus	52	33	1.45	.74
B	Chrysothamnus viscidiflorus lanceolatus	16	15	.29	.18
B	Gutierrezia sarothrae	3	1	.00	-
B	Opuntia spp.	1	0	.00	-
B	Purshia tridentata	43	41	6.48	6.65
B	Symphoricarpos oreophilus	2	2	.03	.00
B	Tetradymia canescens	7	4	.03	.18
Total for Browse		206	163	12.13	15.35

BASIC COVER --

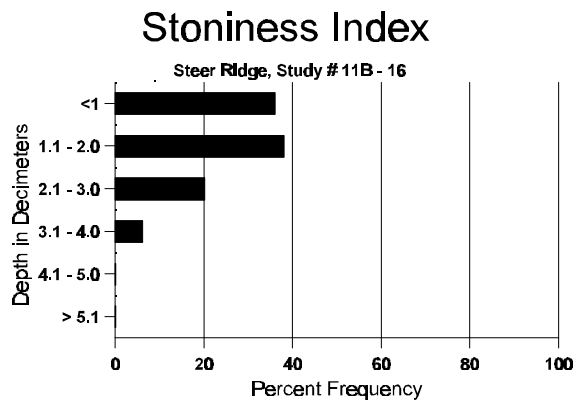
Herd unit 11B, Study no: 16

Cover Type	Nested Frequency		Average Cover %	
	'94	'00	'94	'00
Vegetation	526	410	38.01	41.91
Rock	304	177	6.60	6.08
Pavement	264	302	2.01	9.07
Litter	369	475	20.10	46.68
Cryptogams	12	19	.06	.30
Bare Ground	361	341	20.32	18.44

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 16, Study Name: Steer Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.82	66.8 (12.68)	7.2	52.0	25.4	22.6	3.3	5.5	176.0	0.7



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 16

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre (00)	Days Use per Acre (ha)
Rabbit	7	7	-	-
Horse	1	-	-	-
Elk	44	53	1061	82 (202)
Deer	37	21	252	20 (48)
Cattle	2	-	-	-

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 16

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																		
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	94	2	1	-	-	-	-	-	-	3	-	-	-	60	30	42	3	
	00	3	1	-	-	3	-	-	-	5	-	2	-	140	31	46	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		20%			00%			00%			+38%							
'00		50%			00%			25%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	100	Dec:	-			
												'00	160		-			
Artemisia tridentata vaseyana																		
S	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2		
	00	3	-	-	-	-	-	-	-	3	-	-	-	60		3		
Y	94	26	-	-	-	-	-	-	-	26	-	-	-	520		26		
	00	14	2	-	1	-	-	-	-	15	1	1	-	340		17		
M	94	75	11	4	3	-	-	-	-	93	-	-	-	1860	19	26	93	
	00	37	19	2	8	1	-	-	-	62	5	-	-	1340	17	26	67	
D	94	3	14	-	-	-	1	-	-	15	-	-	3	360		18		
	00	17	6	-	1	-	-	-	-	11	5	-	8	480		24		
X	94	-	-	-	-	-	-	-	-	-	-	-	-	460		23		
	00	-	-	-	-	-	-	-	-	-	-	-	-	200		10		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		18%			04%			02%			-21%							
'00		26%			02%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2740	Dec:	13%			
												'00	2160		22%			
Cercocarpus montanus																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	0	38	38	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	37	44	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'00	0		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus depressus																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	94	151	14	-	2	-	-	2	-	-	169	-	-	-	3380	6	9	169
	00	72	1	-	-	-	-	-	-	-	73	-	-	-	1460	4	7	73
D	94	3	-	-	-	-	-	-	-	-	-	-	-	3	60		3	
	00	11	-	-	-	-	-	-	-	-	7	-	-	4	220		11	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		08%			00%			02%			-48%							
'00		01%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	3440	Dec:	2%			
												'00	1780		12%			
Chrysothamnus nauseosus hololeucus																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	24	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'00	0		-			
Chrysothamnus viscidiflorus lanceolatus																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	23	1	-	-	-	-	-	-	-	24	-	-	-	480	10	12	24
	00	18	-	-	4	-	-	-	-	-	22	-	-	-	440	10	10	22
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		04%			00%			00%			- 8%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	500	Dec:	0%			
												'00	460		4%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	6	8	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	7	0
D	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			-67%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	0%			
												'00	20		100%			
<i>Opuntia spp.</i>																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	23	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-			
												'00	0		-			
<i>Purshia tridentata</i>																		
Y	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	00	3	-	-	-	-	-	-	-	-	2	-	1	-	60			3
M	94	37	9	-	1	9	-	-	-	-	56	-	-	-	1120	20	51	56
	00	25	12	-	-	10	1	-	-	-	46	2	-	-	960	26	56	48
D	94	1	-	2	-	4	-	-	-	-	7	-	-	-	140			7
	00	2	1	-	1	1	-	-	-	-	3	-	1	1	100			5
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		31%			03%			00%			-20%							
'00		43%			02%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1400	Dec:	10%			
												'00	1120		9%			
<i>Symphoricarpos oreophilus</i>																		
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	20	41	3
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	15	29	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'94		00%			00%			00%			-33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	-			
												'00	40		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Tetradymia canescens																	
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	94	6	1	-	-	-	-	-	-	-	7	-	-	-	140	8 12	7
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60	8 13	3
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		13%			00%			00%			-50%						
'00		25%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	160	Dec:	0%		
												'00	80		25%		

SUMMARY

WILDLIFE MANAGEMENT UNIT 11B (32) - RANGE CREEK

Of the 15 trend study sites read in 1994, thirteen were re-read in 2000. All but one site, Upper Cottonwood (11B-6), samples deer and/or elk winter ranges. Lower elevation winter ranges north and east of Price were sampled with trend studies, Deadman (11B-1), Airport Bench (11B-2), Airport (11B-3), Coal Creek (11B-4) and 'B' Canyon (11B-5). All of these sites except Airport and B Canyon, had a stable or slightly improved soil trend. Browse trends were slightly down at Deadman and down at Airport Bench. Both sites sample old pinyon-juniper chainings. These sites support very limited preferred browse and increasing pinyon and juniper trees. B-Canyon, another old chaining, had a downward browse trend due to a wildfire which burned the area in 1996. Browse trends at Airport and Coal Creek are up. Herbaceous understories showed stable to improved trends on all sites except Deadman and Coal Creek. These 2 studies have little herbaceous production. Wildlife use on most of these low elevation winter ranges appears to be down compared to earlier readings. This may be due to the mild winters of the past few years.

Higher elevation winter ranges on the Range Creek Mountains include: Cottonwood (11B-7), Cedar Corral (11B-8), Cedar Ridge (11B-9), Prickly Pear (11B-14), Twin Hollow (11B-15) and Steer Ridge (11B-16). All of these sites have a stable or slightly upward soil trends but conditions are judged poor at Prickly Pear. Browse trends are slightly down at Cottonwood and up slightly at Cedar Ridge. All other sites displayed a stable browse trend. Herbaceous trends are slightly down at Cedar Corral, Prickly Pear and Twin Hollow, stable at Cedar Ridge and Steer Ridge, and improving at Cottonwood.

Winter range trend studies on the south end of the unit include: Upper Little Park Wash (11B-10), Little Park Enclosure (11B-11) and Williams Draw (11B-12). Due to a declining trend of deer use on these areas, only one site, Little Park Enclosure, was reread in 2000. Soil conditions and the herbaceous trend were slightly improved since 1994 but the browse trend was slightly down.

One summer range trend study, Upper Cottonwood (11B-6), was read on the unit. It samples a meadow surrounded by aspen, Douglas fir, and sub-alpine fir trees. Soil, browse, and herbaceous trends are stable.

Soils on Unit 11B have an average soil temperature of 58°F which is relatively cool compared to many winter range sites in the other units. This lower average soil temperature may also be the reason why cheatgrass is not dominant on any of these study sites. Many winter range sites throughout the state with higher soil temperatures (70° F) are dominated by cheatgrass and other annuals. All sites except for Airport (11B-3) and Upper Cottonwood (11B-6) had low levels of soil phosphorus, less than 10 ppm, which has been shown to limit normal plant growth and development. Potassium levels were high on all sites.

Browse trends were down or slightly down on 5 of the 13 sites sampled in 2000 (39%). Herbaceous trends were down on only 3 of the 13 sites (23%). However, due to the extremely dry conditions sum of nested frequency of perennial forbs declined on 10 of the 13 sites (77%).

TREND SUMMARY

Site No. and Name	Category	1994	2000
11B-1 Deadman	soil	1	3
	browse	4	2
	herbaceous understory	2	3
11B-2 Airport Bench	soil	1	4
	browse	2	1
	herbaceous understory	1	4
11B-3 Airport	soil	2	2
	browse	5	5
	herbaceous understory	3	3
11B-4 Coal Creek	soil	3	3
	browse	5	5
	herbaceous understory	4	4
11B-5 B Canyon	soil	3	2
	browse	4	1
	herbaceous understory	3	5
11B-6 Upper Cottonwood	soil	4	3
	browse	2	3
	herbaceous understory	4	3
11B-7 Cottonwood	soil	4	4
	browse	3	2
	herbaceous understory	4	4
11B-8 Cedar Corral	soil	3	4
	browse	4	3
	herbaceous understory	2	2
11B-9 Cedar Ridge	soil	5	4
	browse	5	4
	herbaceous understory	3	3







(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up
(5) = up, est = site established, NR = site not read

Site No. and Name	Category	1994	2000
11B-10 Upper Little Park	soil	4	NR
	browse	5	NR
	herbaceous understory	1	NR
11B-11 Little Park Exclosure	soil	4	4
	browse	2	2
	herbaceous understory	3	4
11B-12 Williams Draw	soil	3	NR
	browse	3	NR
	herbaceous understory	3	NR
11B-14 Prickly Pear	soil	est	3
	browse	est	3
	herbaceous understory	est	2
11B-15 Twin Hollow	soil	est	4
	browse	est	3
	herbaceous understory	est	2
11B-16 Steer Ridge	soil	est	4
	browse	est	3
	herbaceous understory	est	3

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up
(5) = up, est = site established, NR = site not read

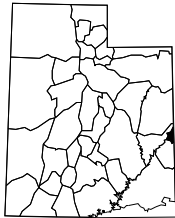
Management Unit 13B

Legend

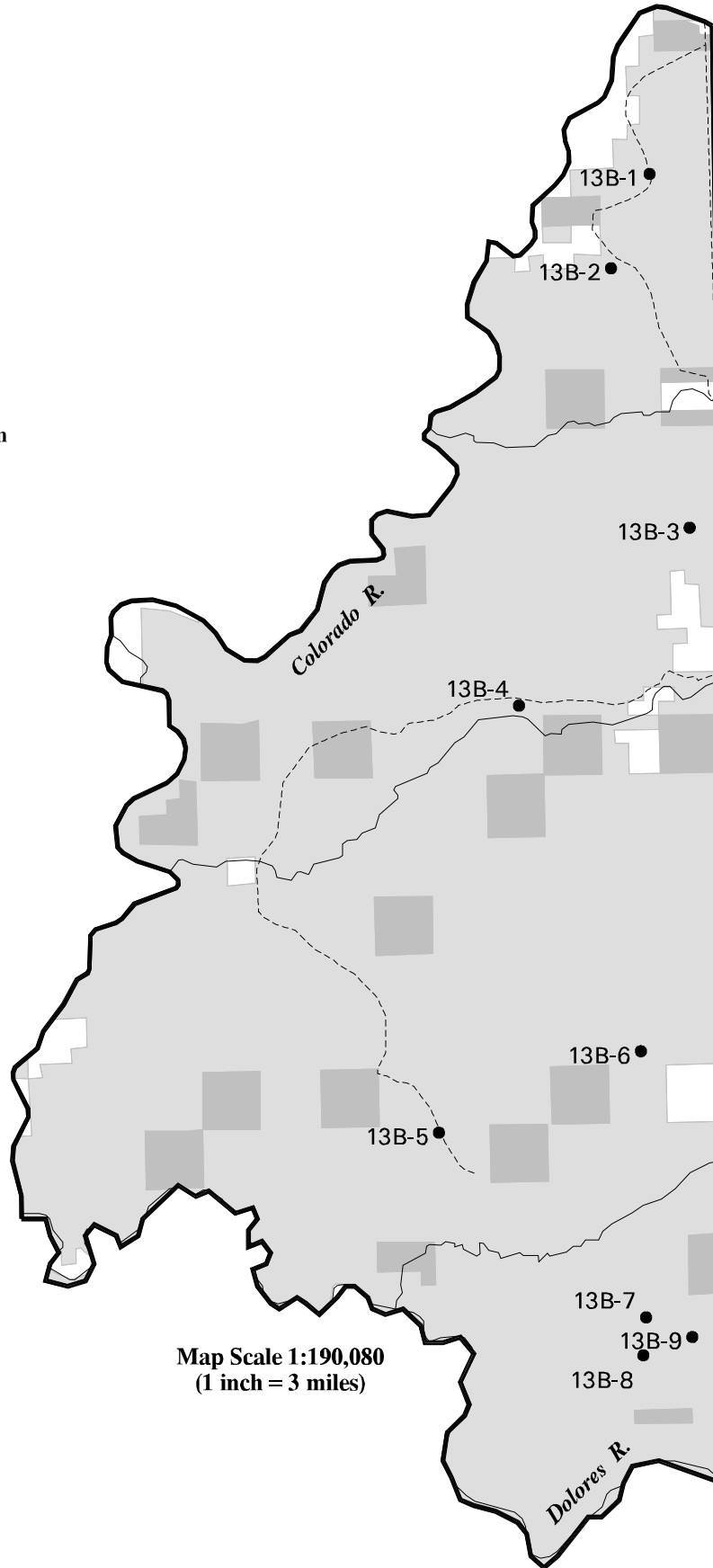
-  BLM
-  State of Utah
-  Private
-  Transect Location
-  Road
-  Perennial Stream



Unit Location



Map Scale 1:190,080
(1 inch = 3 miles)



WILDLIFE MANAGEMENT UNIT 13B (34)-DOLORES TRIANGLE

BOUNDARY DESCRIPTION

Grand County - Boundary begins at the Colorado River and Utah-Colorado state line; then southwest along the Colorado River to the Dolores River; east along the Dolores River to the state line; north along the state line to the Colorado River and beginning point.

Herd Unit Description

The Dolores Triangle unit is formed by the Colorado River, the Dolores River, and the Colorado-Utah state line. Topography is varied with relatively flat mesas above 7,000 feet, large rocky rough canyons and broken country at the middle elevations, with low desert along the Colorado River. Four drainages dominate the area. Granite Creek flows into the Dolores River; Ryan Creek, Coates Creek, and Little Dolores River empty into the Colorado River. There are ranches scattered throughout the area, while Fruita and Grand Junction, Colorado are the closest municipalities. Access to the unit is through Colorado by way of Glade Park or by fording the Dolores River near its confluence with the Colorado River at Dewey. However, fluctuating water levels and undeleted bottom contours make crossing hazardous. The unit is comprised of 94,100 acres of winter range and 17,520 acres are classified as non-range. There isn't any habitat within this unit that would be classified as "real" summer range. The Bureau of Land Management manages 88% (82,900 acres) of the herd unit. The State of Utah owns 9% (8,600 acres) of the winter range and 3% (2,600 acres) is privately owned.

The Dolores Triangle unit serves as winter range for deer which spend the remainder of the year in Colorado's Pinon Mesa area. Few deer reside in the unit year-round, the few that do are found along the Colorado River. Concentration areas for deer during normal winters are Steamboat Mesa, Lower Steamboat Mesa, Fish Park, Big Triangle, Ryan Park, and Granite Park. Only during severe winters with abnormally heavy snowfall are deer forced to disperse into the lower desert range where forage quality is poor. Severe winter range and normal winter range are not separated into different categories because much of the land to the east is too high for normal winter range. Therefore, the whole unit could be considered critical. The many scattered ranches with agricultural land throughout the herd unit offer valuable forage to the deer in the spring and fall.

Coles and Pederson (1968) identified and described five vegetation types which make up the winter range on the unit. The desert shrub type is dominated by blackbrush which occupies the lower portions of this winter range. This type is most important during severe winters although few desirable forage species are found within this type. The grass type is found in the Granite Park and Steamboat Mesa areas. These were once large sagebrush parks, but have undergone a conversion to grasses (much of it cheatgrass) with overgrazing during the wrong time of the year (fall and/or spring), wildfires (reoccurring more often with the increase in weedy species), and sagebrush treatments. Formerly, these areas were important deer wintering areas which now receive increasing use by elk. The sagebrush type is found above the desert shrub and up to and within the pinyon-juniper woodlands. It provides important browse to both deer and livestock. The pinyon-juniper type, like the grass type, has undergone some changes due to competition with the mature trees, extended drought, and with some past years of heavy use. An understory of cliffrose and black sagebrush has diminished somewhat through the years and is the least productive vegetative type on the unit. The pinyon-juniper type is common on the slopes and higher mesas. The pinyon-juniper-sagebrush type occupies the upper portions of the winter range and provides important cover and forage for wildlife. In the past few years many wildfires have burned large acreages of this type.

Livestock Grazing

Livestock grazing is the single-most important land use in the area. Winter sheep use began in the early 1900's. Now, most of the AUM's (about 7,500) the BLM allocates for livestock use is for cattle, although some winter sheep use still occurs. Pinyon-juniper's evolving dominance along with excessive use by livestock and big game have led to deteriorating range conditions. Both livestock and deer numbers were reduced in the past to help improve the range. Although some problems still exist, range conditions appear to be slowly improving according to Jense et al. 1986. However with mostly drouth conditions since then, those conditions have deteriorated, especially at the lower elevations.

This unit presents some unique deer and elk management problems. Since this unit functions primarily as winter range for big game which spend the remainder of the year in Colorado, any effective management requires coordinated efforts with Colorado's Department of Game and Fish. Also, since deer and elk are present mostly in the winter when snow depth may complicate access to the area, obtaining population data is often difficult. Because the presence of deer and elk depends on weather conditions prior to and during the hunt, hunting as a management tool is not always effective. If heavy snows have driven the deer onto the unit, hunter access is usually a problem. Thus, the number of deer harvested and percent hunter success is often more related to weather conditions than to deer abundance.

Big Game Trends

Beginning in 1969, the deer herd unit showed a significant drop in bucks harvested. Between 1969 and 1975, either-sex general season and control hunts accounted for an average yearly harvest of 403 bucks and 207 does. Previously, from 1955 through 1968, the buck harvest averaged near 1,500 bucks/year. Under buck only hunting regulations between 1976 and 1985, the average harvest was 89 bucks/year. In 1983, control hunts for does were implemented and have accounted for an average of 122 does/year through 1990. Antlerless permits have not been utilized since 1990. The buck harvest dropped again in 1987 and in 1990 the herd unit was made a draw unit with 26-27 hunters afield and an average of 22 bucks/year harvested through 1995. Current management objectives are a harvest of 100 bucks/year with an antlerless harvest as needed.

Elk that winter in this area come from Colorado's unit 40, which is managed for quality hunting. There have been minimal numbers of elk harvested by Utah hunters in this unit. Basically, Colorado would like to gradually increase these elk numbers from an estimated 1,700 animals now to 3,000 animals sometime in the distant future. About 50% of the elk population use Utah as winter range and are expected to continue to do so. The current management objectives are to maintain an optimum elk herd population, while not degrading the health of the range and hopefully complement Colorado's management goals.

Trend Study Description

Nine interagency range trend studies were established during June 1986. The study sites were selected the previous month by local interagency personnel. The studies were read again in May of 1995, and 2000.

Trend Study 13B-1-00

Study site name: Lower Westwater Dolores.

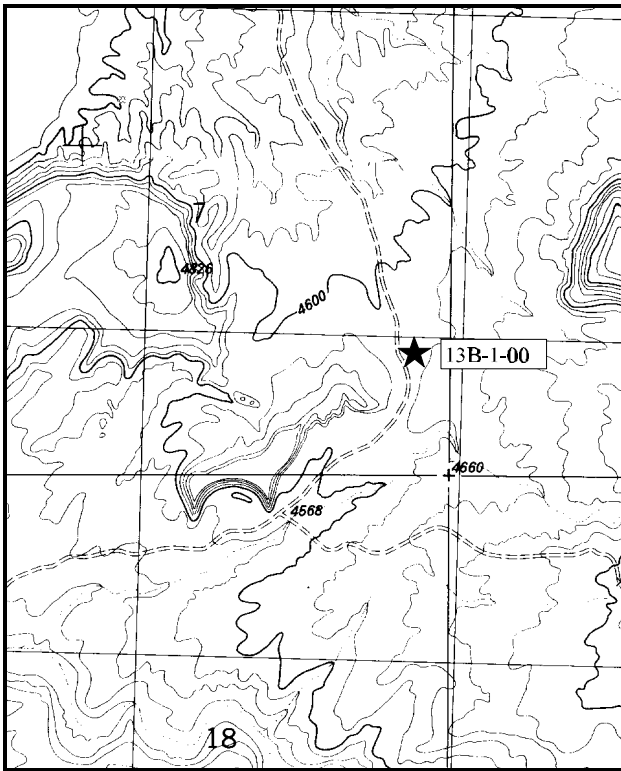
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

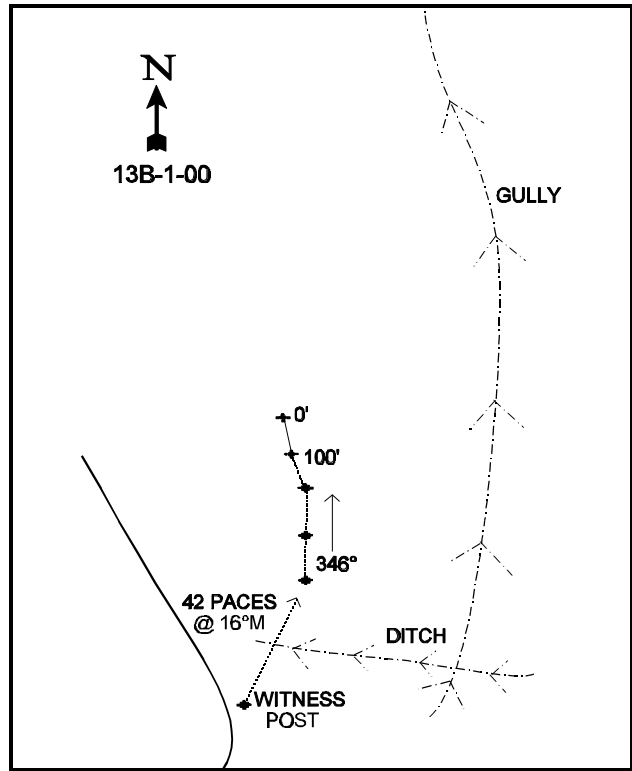
LOCATION DESCRIPTION

From the intersection of the DS Road and A Road west of Glade Park, Colorado, go down A Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles along the fence to another gate (permission and key necessary to get through gates). Continue 5.6 miles to the state line. Go another 0.4 miles to a cabin. Turn right along the edge of a field and go 0.2 miles to a wire gate and another .05 to a pipe gate. Go 3.1 miles to transect 13B-2-00 (Upper Westwater Dolores). Continue 0.5 miles to a fork near a sheep corral. Keep right. Continue 1.25 miles to a wire gate, then another 0.85 miles to the witness stake, a 2 ½ foot tall fencepost off the right side of the road on top of the road cut. From the witness post, walk 42 paces at 16°M to the 400-foot baseline stake.



Map Name: Westwater 4SE

Township 20S, Range 26E, Section 7



Diagrammatic Sketch

UTM. 4327183.657 N, 666823.360 E

DISCUSSION

Trend Study No. 13B-1 (34-1)

The Lower Westwater-Dolores transect is in a remote area that is basically accessible only through Colorado. The study is in a big sagebrush dominated open valley surrounded by slick rock cliffs and domes of sandstone. It is on a 10% west-facing slope, nearly 2 miles from the Colorado River at an elevation of 4,500 feet. The land is administered by the BLM out of the Grand Junction office in Colorado. The allotment is grazed by cattle and horses from November through May. This is a poor time to graze the area with respect to wildlife, when forage they are depending on is cheatgrass which makes up over 80% of the grass cover and has to have fall precipitation to germinate which it did not get in 1999. Deer pellet group quadrat frequency was moderate at 31% in 1995 and 39% in 2000. The pellet-group transect read in 2000 showed 79 deer days use/acre (195 ddu/ha), 12 elk days use/acre (30 edu/ha), and 27 cow days use/acre (67 cdu/ha).

The soil is protected fairly well by the combination of vegetation and litter. Litter was moderately abundant in 1995, mostly coming from annuals, with a cover value estimated at 51%. With drought, litter has now gone down to 35%. The vegetation and litter provide fairly good cover for the soil with no currently apparent erosion problems. However, pedestalling around the sagebrush is about 5 to 7 inches. Soil is deep with an average effective rooting depth of 19 inches. There is a compacted layer of fine sands and clay at about 6 inches, which becomes less compacted beyond 14 inches. Almost without exception, the shrub interspaces had more shallow effective rooting depths than near the base of the shrubs. The soil is classified as a sandy loam and moderately alkaline (8.2 pH). Soil temperature was moderately high at 64° F, which would favor the annuals during dry summers. Phosphorus could be limiting with a value of only 3.9ppm, where 10ppm is thought minimal for normal plant growth and development. The soil has a fine texture on the surface, but is composed mostly of sand. No rock or pavement was encountered on the surface or in the profile.

The key browse species on this site is basin big sagebrush with some apparent hybrids with Wyoming big sagebrush. This stand exhibits a distinctly clumped dispersion pattern with a dense understory of annual species. Some sagebrush display a clubbed appearance and have more character traits of Wyoming sagebrush, while others not clubbed and obviously not as preferred, have more traits of basin big sagebrush. The population structure has greatly changed since the last readings. In 1986, 88% of the population were young plants and no mature plants were reported. In 1995, only 1% of the population were young while 66% were mature. Currently ('00) it is just below 2%, still too low to maintain the population. Percent decadency has increased from 12% in 1986 to 32% in 1995, and 53% in 2000 with no seedlings reported for any year. It is very difficult to get seedlings established with the intense competition from the annual grasses and forbs. Basically there are no safe sites for them to become established, especially with the moderately high soil temperatures which will dry the soils out quickly in the summer. In 1995, 79% of the decadent population was classified as dying and the number of dead plants in the population (1,920 plants/acre) numbers more than the living. Currently, the number of decadent plants classified as dying has gone down slightly to 48%, however there are still more dead than live plants. Twenty-six percent of the population are classified as having poor vigor in 1995 and 2000. Cover from the Wyoming big sagebrush contributed only 8% of the total vegetative cover in 1995 and 12% in 2000. Mature plants in 1995 averaged 24 inches in height with a crown of 30 inches, now both of these measurements have decreased significantly to an average height and crown of 19 and 26 inches respectively. This is another indication of what extended drought does to sagebrush. Measurements of height and crown were not taken in 1986 because there were no mature plants reported at that time.

Other browse species include broom snakeweed and spiny hopsage which are in very low densities. Green ephedra was present in low numbers and heavily hedged in 1986 and appeared to be dying off. None were sampled in 1995. On the opposing slope, there is a vigorous stand of sand sagebrush, a few decadent spiny hopsage and a few scattered juniper.

In 1995, annual species (both grasses and forbs) contributed to 76% of the total vegetative cover on this site. Cheatgrass alone provided 61% of the total vegetative cover and 86% of the total grass cover. This changed little with the 2000 reading. There are very few perennial herbaceous species present which contribute to only a small percent of the herbaceous cover (17% for both 1995 and 2000). The most abundant perennial grass, galleta (a warm season grass) has significantly declined in nested frequency since 1988 and now only provides 12% of the total grass cover. Forbs accounted for 21% of the vegetative cover in 1995 with most being small annual species. Now the forbs account for only 11% of the vegetative cover, and again most are small annual species.

1986 APPARENT TREND ASSESSMENT

The soil trend is stable, although there is signs of some soil movement when the litter and/or cryptogam cover is disturbed. The vegetative condition and trend is somewhat puzzling. There appears to have been a sagebrush die-off in recent years. This was not because of grazing pressure because of only light to moderate use in the past. It was probably more of a response to the excessively wet years of 1983-85. Basin big sagebrush naturally experiences a fairly rapid turnover in generations, and it seems to be occurring on this site at the present time. There appears to be a sufficient proportion of young plants to maintain shrub density at an acceptable level. Trend therefore appears to be stable.

1995 TREND ASSESSMENT

Due to abundant protective ground cover, decrease in percent bare ground, and no apparent erosion problems, soil trend is considered stable. Although, most of the soil cover comes from annual species and litter. Although the abundant cover of annuals helps to protect the soil, it is very detrimental to the health of the community to have such a high amount of fine fuels present. It is just a matter of time before a fire will totally destroy the sagebrush population in the immediate area. Due to the poor age class structure, large numbers of dead plants and high decadence which has almost tripled to 36% since 1986, trend for the key browse species is down. To further aggravate this situation, 79% of the decadent plants are classified as dying. The lack of seedlings in the area is a function of extended drought conditions as well as intense competition with the winter annuals even when there could have been adequate precipitation for establishment. Herbaceous understory, while it does provide ground cover, has the potential to carry a very destructive fire. Therefore, the herbaceous understory trend is down.

TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - down (1) because it is mostly annuals

2000 TREND ASSESSMENT

With continued drought, there has been a significant drop in protective ground cover from 51% to 35%. This decrease has been mitigated somewhat by the increase of cryptogamic cover from 2 to 12%. However, the percent bare soil has increased from 18% to almost 39%. There still does not appear to be any apparent erosion problems, but soil trend would have to be slightly down with the current changes in protective cover and that most of the protective cover comes from annual species and litter. Although the abundant cover of annuals helps to protect the soil, it is very detrimental to the health of the community to have such a high amount of fine fuels present. It is just a matter of time before a fire will totally destroy the sagebrush population in the immediate area. Due to the poor age class structure, large numbers of dead plants and high decadence which has continued to increase (12% in 1986, 32% in 1995, and 53% in 2000), trend for the key browse species continues to be down. To further worsen this situation, percentage of decadent plants that are classified as

dying continues to be high at almost 50%. The lack of seedling establishment in the area was mentioned in 1995. This is a function of extended drought conditions as well as intense competition with the winter annuals even when normal precipitation occurs. The moderately high soil temperatures favors annuals, particularly winter annuals. Herbaceous understory, while it does provide ground cover, has the potential to carry a very destructive fire. Therefore, the herbaceous understory trend is down.

TREND ASSESSMENT

soil - slightly down (2)

browse - down (1)

herbaceous understory - down (1) because it is mostly annuals

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	_b 384	_a 334	-	100	97	12.39	12.20
G	Hilaria jamesii	_c 206	_b 114	_a 75	71	41	33	1.99	1.83
G	Oryzopsis hymenoides	-	-	1	-	-	1	-	.15
G	Sitanion hystrix	9	-	-	4	-	-	-	-
G	Sporobolus cryptandrus	_a 1	_a -	_b 23	1	-	10	-	.77
G	Vulpia octoflora (a)	-	46	48	-	18	25	.09	.27
Total for Annual Grasses		0	430	382	0	118	122	12.48	12.47
Total for Perennial Grasses		216	114	99	76	41	44	1.99	2.75
Total for Grasses		216	544	481	76	159	166	14.47	15.23
F	Astragalus spp.	_b 12	_{ab} 4	_a -	5	2	-	.01	-
F	Chenopodium fremontii (a)	-	_a -	_b 39	-	-	19	-	.14
F	Chaenactis stevioides	-	3	-	-	1	-	.00	-
F	Cryptantha spp.	_a -	_b 12	_a -	-	7	-	.03	-
F	Draba nemorosa (a)	-	_a 3	_b 14	-	1	7	.00	.03
F	Erodium cicutarium (a)	-	_a 35	_b 75	-	12	27	.45	1.25
F	Lappula occidentalis (a)	-	1	6	-	1	4	.00	.04
F	Lepidium densiflorum (a)	-	120	25	-	47	16	.79	.18
F	Leucelene ericoides	_{ab} 26	_c 56	_a 15	11	28	7	1.12	.13
F	Machaeranthera canescens	-	-	1	-	-	1	-	.00
F	Navarretia intertexta (a)	-	_b 61	_a 18	-	25	9	.13	.07
F	Oenothera albicaulis (a)	-	_b 9	_a -	-	4	-	.02	-
F	Plantago patagonica (a)	-	_b 191	_a 10	-	67	7	.61	.06
F	Sisymbrium altissimum (a)	-	_b 156	_a 24	-	68	15	.93	.24
F	Sphaeralcea parvifolia	-	7	5	-	5	2	.02	.01

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
	Total for Annual Forbs	0	576	211	0	225	104	2.95	2.05
	Total for Perennial Forbs	38	82	21	16	43	10	1.20	0.14
	Total for Forbs	38	658	232	16	268	114	4.16	2.20

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 1

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata tridentata	41	29	1.69	2.39
B	Gutierrezia sarothrae	2	1	-	-
	Total for Browse	43	30	1.69	2.39

BASIC COVER --

Herd unit 13B, Study no: 1

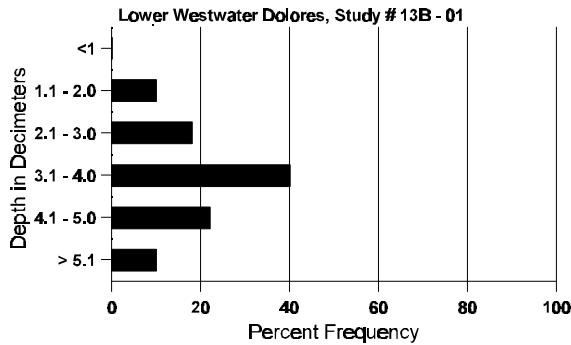
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	395	353	11.50	29.78	22.89
Rock	-	-	0	0	0
Pavement	-	-	.25	0	0
Litter	399	366	50.50	51.34	34.70
Cryptogams	150	264	18.50	2.17	12.19
Bare Ground	285	335	19.25	17.96	38.54

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 1, Study Name: Lower Westwater Dolores

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.98	63.8 (18.11)	8.2	71.0	16.4	12.6	0.0	3.9	118.4	0.1

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 13B, Study no: 1

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	12	10	-	N/A
Elk	-	-	157	12 (30)
Deer	31	39	1027	79 (195)
Cattle	3	4	183	27 (68)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 1

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		1	2	
Artemisia tridentata tridentata																		
Y	86	25	40	1	-	-	-	2	-	-	65	3	-	-	4533			68
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	43	6	-	-	-	-	-	-	-	49	-	-	-	980	24	30	49
	00	7	11	9	-	1	-	-	-	-	28	-	-	-	560	19	26	28
D	86	-	1	3	-	5	-	-	-	-	8	1	-	-	600			9
	95	17	5	2	-	-	-	-	-	-	5	-	-	19	480			24
	00	3	15	6	2	5	-	2	-	-	17	-	-	16	660			33
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1920			96
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1640			82
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		60%			05%			00%										
'95		15%			03%			26%			-21%							
'00		52%			24%			26%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	5133	Dec:	12%			
												'95	1480		32%			
												'00	1240		53%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
<i>Grayia spinosa</i>												
M	'86	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	0	17	26	0
	'00	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)							'86	0	Dec:	-		
							'95	0		-		
							'00	0		-		
<i>Gutierrezia sarothrae</i>												
Y	'86	-	-	-	-	-	-	-	0		0	
	'95	1	-	-	-	-	-	-	20		1	
	'00	-	-	-	-	-	-	-	0		0	
M	'86	-	-	-	-	-	-	-	0	-	-	0
	'95	1	-	-	-	-	-	-	20	12	12	1
	'00	1	-	-	-	-	-	-	20	5	-	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%		-50%				
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)							'86	0	Dec:	-		
							'95	40		-		
							'00	20		-		
<i>Opuntia spp.</i>												
M	'86	1	-	-	-	-	-	-	66	6	7	1
	'95	-	-	-	-	-	-	-	0	-	-	0
	'00	-	-	-	-	-	-	-	0	7	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)							'86	66	Dec:	-		
							'95	0		-		
							'00	0		-		

Trend Study 13B-2-00

Study site name: Upper Westwater-Dolores .

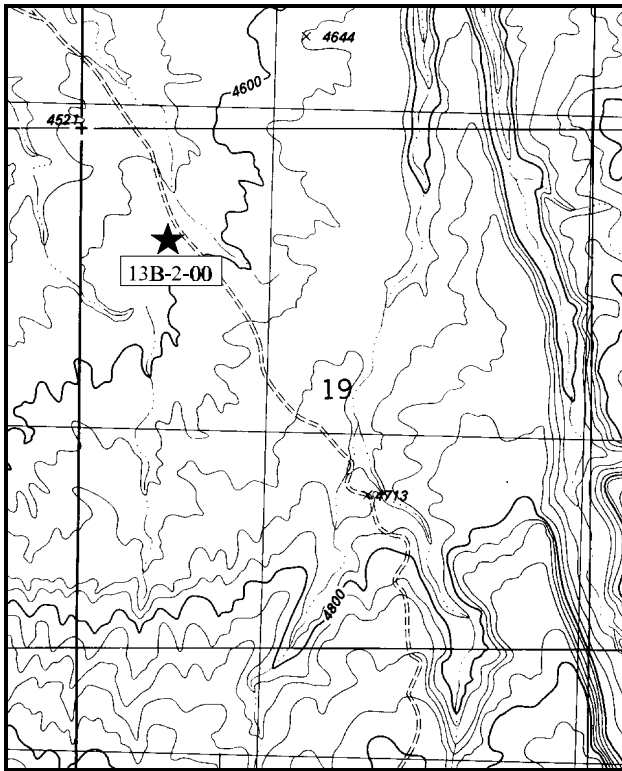
Range type: Burn .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

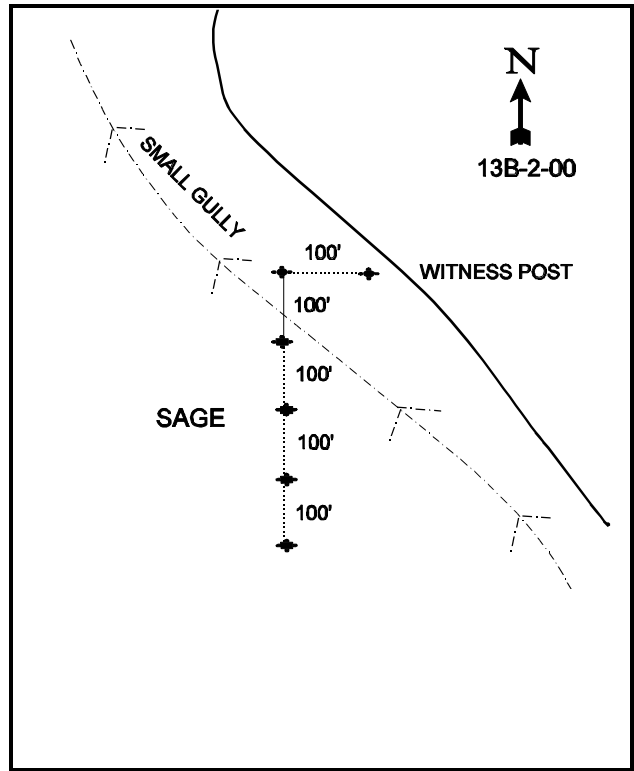
LOCATION DESCRIPTION

From the intersection of the DS Road and A Road west of Glade Park, Colorado, go down A Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles to a locked gate (necessary to obtain permission and key). Continue 5.6 miles through the valley to the state line. Proceed 0.4 miles to a cabin, turn right and go along the edge of a field 0.2 miles to a wire gate. Go 0.05 miles to a locked pipe gate, and then 3.1 miles on the main road to the transect. There is a witness post (rebar) off the left side of the road 10-15 feet. The 0-foot baseline stake, a rebar tagged #7957, is 100 feet due west of the witness post.



Map Name: Westwater 4SE

Township 20S , Range 26E , Section 19



Diagrammatic Sketch

UTM. 4324545.753 N, 665745.123 E

DISCUSSION

Trend Study No. 13B-2 (34-2)

Like study no. 13B-1, the Upper Westwater study is in the northeast portion of the Dolores Triangle. It samples a big sagebrush flat surrounded by juniper woodland and nearby sandstone cliffs. The Colorado River is approximately 2 miles to the west. The site is at 4,600 feet with a 3-5% slope and a northwest exposure. The area is grazed by cattle in winter and early spring (2,791 AUM's are presently allocated on the allotment). The number of deer pellet groups found at the site are low in number and scattered. Since 1986, the site has burned leaving only a few scattered sagebrush stumps and no living sagebrush plants. The pellet-group transect in 2000 estimated 8 deer days use/acre (20 ddu/ha) (winter use) and 51 cow days use/acre (126 cdu/ha) (winter and spring use). This appears to be excessive livestock use for a burned, depleted area that is made up of almost totally annual, weedy species (96-99% of the total vegetative cover is made up of annual weeds).

The soil is a reddish, sandy loam, which appears to be moderately deep. It is a sandy loam with a neutral pH (7.2). Effective rooting depth is a little more than 14 inches with a moderately high soil temperature (66° F). Phosphorus could be a limiting factor at 8.4 ppm, where 10 is thought necessary for normal plant development and growth. Litter cover was fairly abundant (59%) in 1995, but was essentially contributed by only annual species. This kind of cover characteristically can be lost with drought, as illustrated by the fact that with a very dry winter and summer of 1999-2000, litter cover is now only about half what it was before (59% vs 36%). There was a low amount of bare soil (14%) in 1995, due to the high amounts of cover from litter and annual vegetation. However, now ('00) bare soil has more than doubled to 29%. No rock and very little pavement was sampled. Cryptogamic crust development is evident. It only contributed to 3% cover in 1995, increasing to almost 17% in 2000.

In the past, basin big sagebrush was the dominate browse species with an estimated density of 2,199 plants/acre. Sometime after the 1986 reading the sagebrush population was lost to a wildfire with annual species now dominating the site. The fire appears to have burned very hot with the fine fuels provided by annual species leaving very little sign that sagebrush once dominated the site. There is no indication that the sagebrush population is going to return in the future. Other associated browse species (four-wing saltbush and spiny hopsage) are also gone with no signs of becoming reestablished at this time. Around the periphery of the site, there are still some juniper trees that were singed by the fire, but appear to be recovering.

Annual cheatgrass dominated the understory in 1986. Although dense that year, the cheatgrass appeared to be affected by a fungus that in many areas of the state had greatly reduced seed production during the wet years of 1983-85. Since the destructive wildfire, annual plant species account for as much as 96-99% of the total vegetative cover on the site. Grasses provide 70% of the vegetative cover, with forbs providing the remaining 30%. In 1995, the dominate grass was cheatgrass, which accounted for 57% of the total vegetative cover and sixweeks fescue, also present, contributing 11% vegetative cover. These two grasses combined account for two-thirds of the total vegetative cover and provide great quantities of fine fuel. Galleta and purple threeawn are present but in very low numbers. Tumblemustard and woolly Indian wheat are the predominant forbs on the site and also contribute to the high fuel loads of the site. Currently ('00), because of the dry fall and winter, much of the cheatgrass did not germinate. It has dropped in aerial cover from 16% in 1995 to less than 1% in 2000.

1986 APPARENT TREND ASSESSMENT

Vegetative trend appears stable. The basin big sagebrush is healthy and it has adequate reproduction. An increase in species diversity for shrubs would be desirable to supplement the sagebrush. However, a more palatable species would be severely hedged even though browsing pressure is low on this site. The juniper appear to be increasing, but are not in densities that would form a closed canopy. There is little sign of erosion

and the soil trend appears stable although an increase in perennial grass species would provide needed diversity and a more reliable ground cover than annual cheatgrass. The high amount of annuals makes this community very susceptible to fire and loss of the all the browse component.

1995 TREND ASSESSMENT

Annual vegetation and litter provide ample cover to the soil. Although the soil is protected, they also provide abundant fine fuel to carry another destructive fire. Therefore, soil trend is stable but with poor cover composition. The recent fire removed all browse species from the area and there are apparently no seedlings at this time. The browse trend is down. Deer will likely use this area in the spring when the plants are succulent, but can no longer rely on the area as a source for browse species in moderate or severe winters. The herbaceous understory trend is down because of the poor composition. Perennial species diversity and abundance need to increase for the site to stabilize which will mitigate the effects of future wildfires.

TREND ASSESSMENT

soil - stable (3)

browse - down (1), loss of browse to wildfire

herbaceous understory - down (1), mostly composed of annual species

2000 TREND ASSESSMENT

Annual vegetation and litter still provide fair cover for the soil. Although the soil has some protection, the annual species also provide abundant fine fuel to carry another fire. The amount of bare soil has increased (from 14% to 29%) with significantly lower vegetation and litter cover values. Therefore, soil trend is down because of the continued dominance of annual species and much higher amounts of bare soil. There are still no signs of any kind of browse reproduction on this site which is not surprising in light of the severe competition for soil moisture from the dominance of annual species and the moderately high soil temperatures which is very disadvantageous to the sagebrush seedlings to ever become established through the summer. It would be safe to say that we will not see sagebrush reestablished here in our lifetime. The browse trend is obviously down. Deer will likely use this area in the spring when the plants are succulent, but can no longer rely on the area as a source for browse species in moderate or severe winters. The herbaceous understory trend is down because of the poor cover composition. Perennial species diversity and abundance need to increase for the site to stabilize which could mitigate the effects of future wildfires.

TREND ASSESSMENT

soil - down (1)

browse - down (1), loss of browse to wildfire

herbaceous understory - down (1), mostly composed of annual species

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 2

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Aristida purpurea</i>	a-	a ²	b ⁶	-	1	3	.03	.21
G	<i>Bromus tectorum</i> (a)	-	b ³⁷¹	a ¹⁸⁷	-	99	68	16.27	.89
G	<i>Hilaria jamesii</i>	45	40	33	16	14	14	.65	.95
G	<i>Sporobolus cryptandrus</i>	a-	a-	b ¹⁵	-	-	8	-	.93
G	<i>Vulpia octoflora</i> (a)	-	a ²⁷⁷	b ³²⁶	-	89	96	3.01	5.39
Total for Annual Grasses		0	648	513	0	188	164	19.29	6.29
Total for Perennial Grasses		45	42	54	16	15	25	0.69	2.09
Total for Grasses		45	690	567	16	203	189	19.98	8.38
F	<i>Astragalus</i> spp.	a-	b ¹⁵	a-	-	6	-	.08	-
F	<i>Calochortus nuttallii</i>	-	3	-	-	1	-	.00	-
F	<i>Chenopodium fremontii</i> (a)	-	a-	b ¹²	-	-	7	-	.03
F	<i>Cryptantha</i> spp.	-	1	-	-	1	-	.00	-
F	<i>Draba</i> spp. (a)	-	a-	b ²⁴	-	-	8	-	.04
F	<i>Eriogonum cernuum</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Erodium cicutarium</i> (a)	-	a ⁴⁴	b ²¹³	-	19	64	.14	9.74
F	<i>Erigeron</i> spp.	-	2	-	-	1	-	.00	-
F	<i>Lepidium densiflorum</i> (a)	-	b ⁷⁰	a ¹⁰	-	31	5	.15	.05
F	<i>Machaeranthera</i> spp	a-	b ⁶	a-	-	3	-	.01	-
F	<i>Navarretia intertexta</i> (a)	-	b ⁵¹	a ¹¹	-	26	5	.15	.02
F	<i>Plantago patagonica</i> (a)	-	b ²⁷⁶	a ⁶	-	89	3	1.93	.01
F	<i>Salsola iberica</i> (a)	-	a-	b ¹⁰	-	-	4	-	.02
F	<i>Sisymbrium altissimum</i> (a)	-	b ³⁰⁷	a ²⁴¹	-	98	87	5.85	3.69
F	<i>Sphaeralcea coccinea</i>	a ²	c ⁵⁴	b ²⁵	1	25	12	.27	.72
Total for Annual Forbs		0	750	527	0	264	183	8.25	13.62
Total for Perennial Forbs		2	81	25	1	37	12	0.38	0.72
Total for Forbs		2	831	552	1	301	195	8.63	14.35

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 2

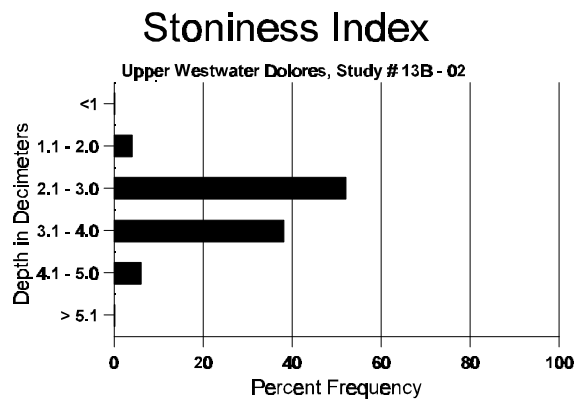
T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Gutierrezia sarothrae</i>	0	1	-	.03
Total for Browse		0	1	0	0.03

BASIC COVER --
Herd unit 13B, Study no: 2

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	393	371	10.50	47.54	26.79
Rock	3	3	0	.00	.00
Pavement	-	9	0	0	.01
Litter	399	370	69.50	59.21	36.02
Cryptogams	195	272	3.50	3.03	16.78
Bare Ground	293	355	16.50	13.90	29.22

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 2, Study Name: Upper Westwater Dolores

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.44	65.6 (17.87)	7.2	56.0	26.0	18.0	0.4	8.4	163.2	0.5



PELLET GROUP FREQUENCY --
Herd unit 13B, Study no: 2

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	9	2	00	00
Deer	10	9	-	-
Cattle	9	25	104	8 (20)
			609	51 (126)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 2

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata tridentata</i>																		
Y	86	10	-	-	-	-	-	-	-	-	10	-	-	-	666			10
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400	28	27	6
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	17	-	-	-	-	-	-	-	-	17	-	-	-	1133			17
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	2199	Dec:	52%			
												'95	0		0%			
												'00	0		0%			
<i>Gutierrezia sarothrae</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	12	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			100%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	0		0%			
												'00	20		100%			

Trend Study 13B-3-00

Study site name: Fish Park .

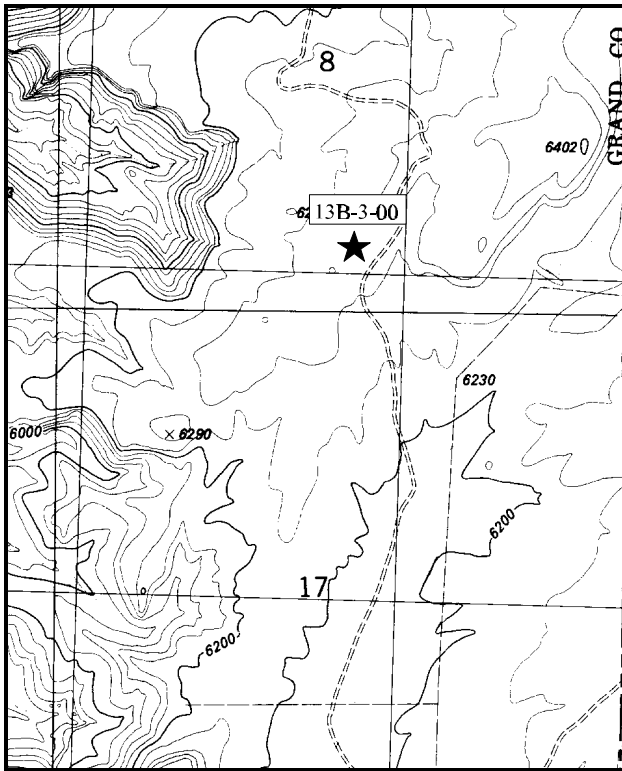
Range type: Chained, Seeded P-J .

Compass bearing: frequency baseline 255°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

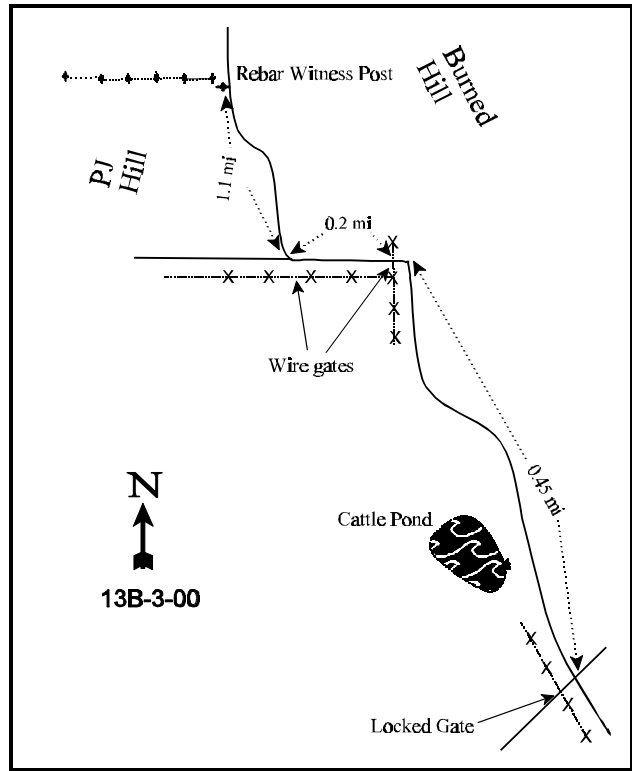
LOCATION DESCRIPTION

Starting from the turnoff to the Picture Gallery Ranch (approximately 0.75 miles west of the Utah-Colorado state line out of Glade Park, CO), turn right off the main road and drive 0.1 mile to a fork. Take the right (upper) fork, go 1.2 miles to a ranch. Just past the first house, turn right and proceed northeast towards a hill. You are heading basically north-northwest towards the Juniper-covered hills. At 0.6 miles beyond the house, go through a gate and continue north 0.4 miles to another gate. Call Bell Chesnick at (970) 245-4636 to open this gate. After going through the locked gate turn left and go 4.5 miles to another wire gate. Go through the wire gate and continue 0.2 miles. Turn right onto a faint road that has been seeded over. This turn is opposite a gate in the fence. Continue 1.1 miles gradually climbing the hill. The road becomes very rocky toward the top. Pass a fencepost which is not the witness post. Once in the P-J look for a rebar witness post on the left side of the road. The 0-foot baseline stake, a rebar tagged #7874, is 150 feet west of the witness post.



Map Name: Marble Canyon

Township 21S , Range 26E , Section 8



Diagrammatic Sketch

UTM 4317290 N, 667945.851 E

DISCUSSION

Trend Study No. 13B-3 (34-3)

The Fish Park study is at an elevation of 6,300 feet on the upper, eastern edge of a 2,600 acre BLM chaining and seeding completed in 1968. To the south and east are the pastures and fields in Fish Park. The gentle west-sloping country is cut by intermittent canyons which flow directly into the Colorado River. To accommodate the increased sample size and stay within the same vegetative type, the transect had to be repositioned. The chaining is part of the Fish Park allotment, which is administered by the Grand Junction BLM office. Livestock grazing pressure appears moderately light in the study area. Deer pellet groups were rarely encountered. This coincides with the nearby pellet group trend transect located in Fish Park at an elevation of 6,200 feet. It estimated an average of 11 deer days use/acre (27 ddu/ha) from 1985 through 1995. The average for the whole herd unit is 15 deer days use/acre (37 ddu/ha) for the same period. A pellet-group transect read along the study site baseline in 2000 estimated 14 deer days use/acre (6 ddu/ha), less than 1 elk days use/acre (<1edu/ha), and 3 cow days use/acre (1 cdu/ha). Rabbit pellet group quadrat frequency was quite high in 1995, which could account for much of the utilization. Currently quadrat frequency less than half what it was then.

The soil is a loam with a neutral soil reaction (pH of 6.8). Effective rooting depth is almost 16 inches over a bedrock of sandstone. The soil surface contains very few rocks or pavement, although there are large amounts of rock throughout the profile to about 16 inches. Both phosphorus and potassium are low (5.9 ppm and 61 ppm) and could be a limiting factor where 10 ppm of phosphorus and 70 ppm of potassium are considered minimal for normal plant development and growth. There is good vegetative cover on this site with some scattered bare interspaces between clumps of basin big sagebrush and pinyon-juniper trees. In the bare interspaces, erosion doesn't appear to be a problem. Annual plants and slight erosion can be found near the roadside where the soil has been disturbed.

The size of the pinyon-juniper trees have noticeably increased since 1986 as evidenced by comparing photographs from each year. The point-center quarter method estimated 73 juniper and 13 pinyon trees/acre in 2000. These densities are moderately low for a 27 year old chaining and very similar to the readings done in 1995. Much of the herbaceous understory on this site appears to be around the drip line of the mature trees.

Basin big sagebrush is the key browse species on this chained site. Browse seed was provided by the Division, which included big sagebrush and four-wing saltbush. However, which sagebrush subspecies included in the seed mix is not clear because both *Artemisia tridentata tridentata* and *Artemisia tridentata wyomingensis* are present on the site. Basin big sagebrush appears dominant, therefore the data tables refers to all sagebrush as basin big sagebrush. In general, the sagebrush is lightly hedged, and vigorous with good seed production. The age structure has shifted from a young population to a more mature population. Sixty three percent of the plants were classified as mature in 1995, compared to only 24% in 1986. Currently ('00) it is up to 75%. The percentage of plants classified as decadent decreased in 1995, but has since increased slightly up to 9%. This is still very low compared to any other site in this unit. The percentage of seedlings in the population has varied from highs in the low 40's to currently where it is almost 20% which is still relatively high. In 1995, average height of sagebrush had increased to nearly two and one half feet with crown measurements averaging three and one-half feet. By 2000, these measurements have decreased slightly with the continued drought. Broom snakeweed and cactus are present, and shown to have increased slightly yet these populations together make up less than 1% total cover.

The sum of nested frequency for perennial grasses has decreased from 1986 to 1995, however it increased slightly in 2000. Crested wheatgrass and galleta were the dominate perennial grasses in 1995 which made up 50% of the total grass cover in 1995. The decrease in crested wheatgrass is most likely due to summer drought. The annual species, cheatgrass and sixweeks fescue, account for nearly all of the rest of the grass cover. With

the dry fall of 1999 and the dry winter and summer of 2000, cheatgrass did not do well, neither did sixweeks fescue. Their cover decreased by more than 80% in 2000.

Forbs occur infrequently and account for only a small amount of the total vegetative cover (6% to 5%). Alfalfa was reported as large and vigorous in 1986, yet with the extended drought, it was not sampled in 1995 or 2000. Other forbs sampled include: timber milkvetch, longleaf phlox, scarlet globemallow, and woolly milkvetch. Nested frequency for all grasses and forbs increased since 1986, but this is due to annual species that were present in 1986, but not included in the data. In 2000 these values decreased, mostly because of the loss of many annuals with the dry winter and summer. Sum of nested frequency for perennial herbaceous life-forms increased slightly for grasses and slightly down for forbs. Overall it appears to be stable.

1986 APPARENT TREND ASSESSMENT

The area is currently in good condition. All signs indicate it will stay that way except for the possible gradual increase in juniper and pinyon. Selective hedging on the more palatable big sagebrush subspecies, Wyoming big sagebrush, may affect its reproductive potential. The pinyon and juniper are not dense enough to warrant chaining, but other treatments such as selective application of herbicides, roller-chopping, or individual tree cutting could be practical alternatives. The entire chaining is in similar condition and treatment should be considered within the next 20 years. The soil appears stable because of good vegetation and litter cover.

1995 TREND ASSESSMENT

Vegetative cover and litter cover are moderately high with each having high nested frequency values indicating good distribution of protective cover, which appears to provide adequate soil protection. In areas where bare interspaces appear, there are no signs of erosion, therefore soil trend is considered stable. The sagebrush community has shifted to a more mature population with good biotic potential and a decreased percentage of decadent plants. These combined factors indicate an upward browse trend. If the sagebrush population continues to expand it will begin to significantly affect herbaceous understory when cover starts to exceed 15%. Sum of nested frequency of perennial grasses has decreased with nearly half of the grass cover coming from annuals. Forbs are infrequent and add very little to the herbaceous understory. This leads to a slightly downward herbaceous understory trend. The decrease in perennials is likely due to the extended drought as well as competition with annuals and browse species.

TREND ASSESSMENT

soil - stable (3)

browse - upward (5)

herbaceous understory - slightly down (2)

2000 TREND ASSESSMENT

Vegetative and litter cover are still moderately high. The amount of bare soil has increased slightly with the extremely dry year, however the ratio of the distribution of protective cover to bare soil is still more than 3:1, indicating that there is still very good protection from erosion. In areas where bare interspaces appear, there are no signs of erosion, and this is usually where crested wheatgrass occurs. Soil trend is considered stable at this time. The sagebrush community has shifted to an even more mature population where 75% are classified as mature. Biotic potential is still moderately high at 19% and percentage of decadent plants has risen slightly, but still lower than 10%. All these combined factors indicate a stable browse trend. The perennial herbaceous understory sum of nested frequency has increased with only about 14% of the grass cover coming from annuals, whereas in 1995 they made up nearly 50% of the grass cover. The winter and summer have been so dry that the annuals did not become normally established. Forbs are infrequent and add little to the herbaceous understory.

The sum of nested frequency for the perennial component has gone down slightly. The increase of perennial grasses more than compensates for the slight losses to the perennial forbs. The trend for the herbaceous understory is stable.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 3

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Agropyron cristatum	_b 169	_a 115	_b 171	57	42	68	3.70	5.76
G	Bromus tectorum (a)	-	_b 278	_a 125	-	84	47	4.42	.77
G	Hilaria jamesii	76	97	65	27	37	25	3.12	.49
G	Poa fendleriana	_a -	_b 38	_b 24	-	15	10	1.05	.12
G	Sitanion hystrix	_b 9	_{ab} 1	_a -	4	1	-	.00	-
G	Sporobolus cryptandrus	-	-	2	-	-	1	-	.00
G	Stipa comata	_b 70	_a 8	_a 21	28	5	11	.02	.35
G	Vulpia octoflora (a)	-	_b 186	_a 77	-	60	29	1.23	.36
Total for Annual Grasses		0	464	202	0	144	76	5.65	1.13
Total for Perennial Grasses		324	259	283	116	100	115	7.91	6.74
Total for Grasses		324	723	485	116	244	191	13.57	7.88
F	Agoseris glauca	-	2	-	-	1	-	.00	-
F	Astragalus convallarius	10	14	9	7	6	4	.44	.12
F	Astragalus mollissimus	_a -	_b 13	_a 4	-	7	2	.18	.06
F	Castilleja linariaefolia	-	2	-	-	1	-	.03	.03
F	Carduus nutans (a)	-	2	-	-	1	-	.00	-
F	Cryptantha fulvocanescens	5	-	-	2	-	-	-	-
F	Cymopterus spp.	-	2	-	-	1	-	.00	-
F	Descurainia pinnata (a)	-	_b 22	_a 1	-	9	1	.04	.00
F	Draba nemorosa (a)	-	_b 95	_a 6	-	36	2	.20	.01
F	Erigeron pumilus	5	8	8	2	5	5	.02	.05
F	Gayophytum ramosissimum (a)	-	_b 31	_a -	-	11	-	.08	-
F	Gilia hutchinifolia (a)	-	_b 43	_a -	-	17	-	.08	-
F	Haplopappus acaulis	-	3	-	-	1	-	.00	-
F	Ipomopsis aggregata	-	1	-	-	1	-	.03	-
F	Lappula occidentalis (a)	-	_b 18	_a -	-	7	-	.06	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Lepidium densiflorum (a)	-	_b 21	_a 2	-	9	1	.04	.00
F	Lithospermum spp.	-	6	-	-	2	-	.01	-
F	Lygodesmia spinosa	-	2	-	-	1	-	.00	-
F	Medicago sativa	_b 4	_a -	_a -	3	-	-	-	-
F	Microsteris gracilis (a)	-	-	2	-	-	1	-	.00
F	Petradoria pumila	_a -	_a -	_b 8	-	-	3	-	.06
F	Phlox hoodii	_a -	_a -	_b 23	-	-	8	-	.26
F	Phlox longifolia	87	92	91	35	36	35	.33	.69
F	Plantago patagonica (a)	-	_b 114	_a 51	-	39	18	.27	.21
F	Polygonum douglasii (a)	-	_b 9	_a -	-	4	-	.02	-
F	Sisymbrium altissimum (a)	-	_b 8	_a -	-	3	-	.01	-
F	Sphaeralcea coccinea	_{ab} 23	_b 30	_a 14	10	14	6	.27	.32
F	Streptanthus cordatus	-	1	-	-	1	-	.00	-
F	Trifolium spp.	-	3	-	-	1	-	.00	-
Total for Annual Forbs		0	363	62	0	136	23	0.82	0.24
Total for Perennial Forbs		134	179	157	59	78	63	1.34	1.60
Total for Forbs		134	542	219	59	214	86	2.17	1.84

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 3

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata tridentata	56	63	11.60	16.71
B	Gutierrezia sarothrae	8	17	.05	.64
B	Juniperus osteosperma	0	7	6.21	6.83
B	Opuntia spp.	4	4	.38	.30
B	Pinus edulis	0	3	2.67	5.52
Total for Browse		68	94	20.93	30.02

CANOPY COVER --

Herd unit 13B, Study no: 3

Species	Percent Cover
	'00
Juniperus osteosperma	7
Pinus edulis	3

BASIC COVER --

Herd unit 13B, Study no: 3

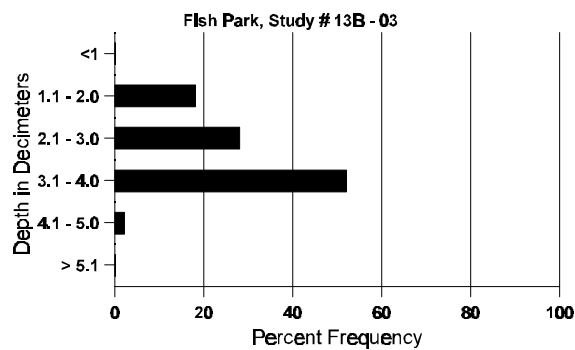
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	370	323	16.50	37.57	40.97
Rock	34	12	0	.12	.33
Pavement	28	25	0	.04	.18
Litter	396	363	68.50	44.53	48.42
Cryptogams	182	192	0	5.65	10.93
Bare Ground	294	284	15.00	24.65	31.86

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 3, Study Name: Fish Park

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.51	57.2 (16.06)	6.8	48.0	30.0	22.0	1.0	5.9	60.8	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 13B, Study no: 3

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	48	20	766	N/A
Elk	-	-	9	1 (2)
Deer	3	7	183	14 (35)
Cattle	5	1	35	3 (8)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 3

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total						
		1	2	3	4										
<i>Artemisia tridentata tridentata</i>															
S	86	28	-	-	-	-	-	-	28	-	-	-	933		28
	95	18	-	-	54	-	-	-	72	-	-	-	1440		72
	00	38	-	-	-	-	-	-	38	-	-	-	760		38
Y	86	48	-	-	-	-	-	-	47	-	-	1	1600		48
	95	39	-	-	18	-	-	-	51	-	6	-	1140		57
	00	16	-	-	16	-	-	-	32	-	-	-	640		32
M	86	11	5	-	-	-	-	-	16	-	-	-	533	24 20	16
	95	98	3	-	1	-	-	-	102	-	-	-	2040	29 42	102
	00	83	53	12	4	-	-	-	152	-	-	-	3040	28 38	152
D	86	4	-	-	-	-	-	-	3	-	1	-	133		4
	95	2	-	1	-	-	-	-	3	-	-	-	60		3
	00	8	5	4	-	1	-	-	14	-	-	4	360		18
X	86	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	40		2
	00	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>							
'86		07%		00%		03%		+30%							
'95		02%		.61%		04%		+20%							
'00		29%		08%		02%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	2266	Dec:	6%		
										'95	3240		2%		
										'00	4040		9%		
<i>Gutierrezia sarothrae</i>															
S	86	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	1	-	-	-	-	-	-	1	-	-	-	20		1
Y	86	3	-	-	-	-	-	-	3	-	-	-	100		3
	95	3	-	-	-	-	-	-	3	-	-	-	60		3
	00	-	-	-	-	-	-	-	-	-	-	-	0		0
M	86	12	-	-	-	-	-	-	12	-	-	-	400	7 8	12
	95	7	-	-	-	-	-	-	7	-	-	-	140	10 12	7
	00	82	-	-	-	-	-	-	82	-	-	-	1640	7 9	82
D	86	1	-	-	-	-	-	-	1	-	-	-	33		1
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	0		0
X	86	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>							
'86		00%		00%		00%		-62%							
'95		00%		00%		00%		+88%							
'00		00%		00%		00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	533	Dec:	6%		
										'95	200		0%		
										'00	1640		0%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	61	44	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	4	-	-	-	-	-	2	1	-	7	-	-	-	140	-	-	7
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	-			
												'95	0		-			
												'00	160		-			
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180	4	18	9
	00	19	-	-	-	-	-	-	-	-	19	-	-	-	380	4	10	19
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			10%			+47%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	200		10%			
												'00	380		0%			
Pinus edulis																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	-	-	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	100		-			

Trend Study 13B-4-00

Study site name: Red Cliffs .

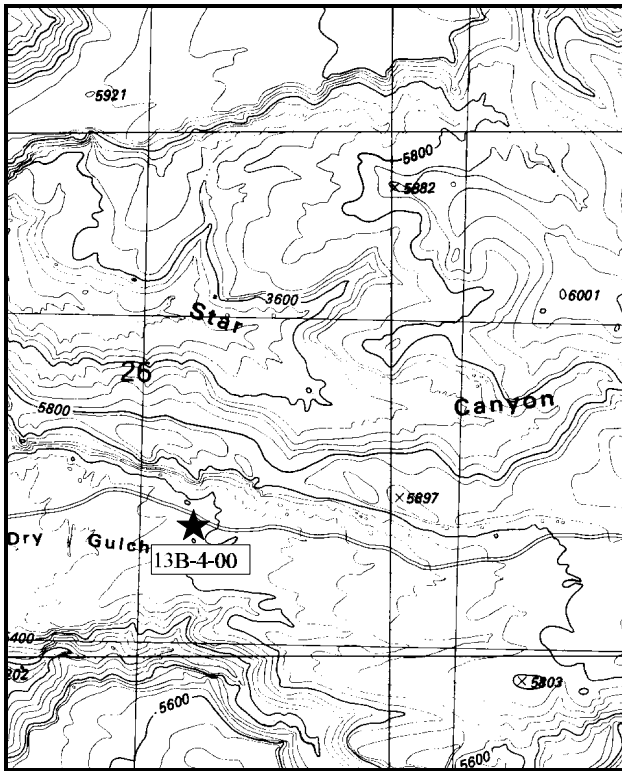
Range type: Blackbrush .

Compass bearing: frequency baseline 250°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (86ft). Belt rebar placement: belt 2@1ft, belt 3@2ft, belt 5@5ft.

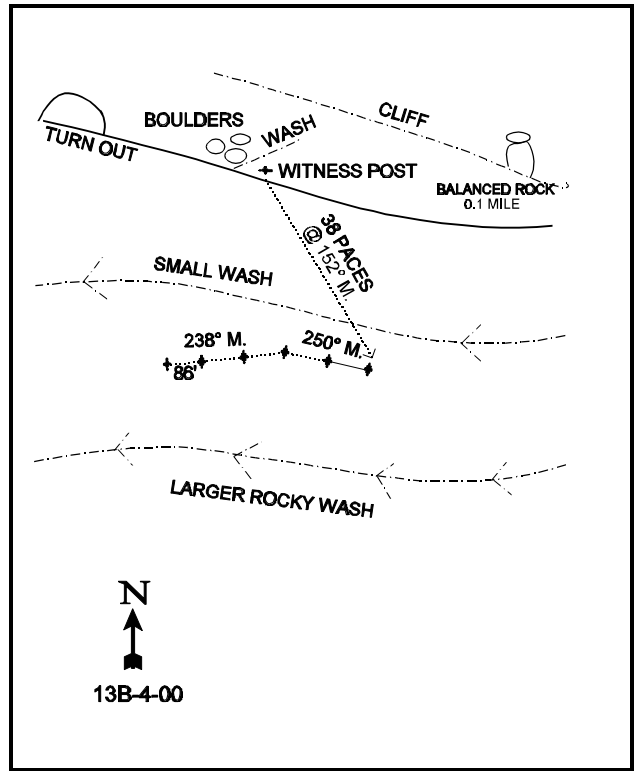
LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park, go west 2.1 miles on the Coates Creek Road to a cattle guard. Continue on the main road 2.1 miles to a P-J area bordered on the right by large sandstone cliffs. Here you will find a witness stake (fence post) on the right (north) side of the road. The baseline starts 140 feet south (across the road) from the witness post. A short rebar, tagged #7816, marks the 0-foot end.



Map Name: Marble Canyon

Township 21S , Range 25E , Section 26



Diagrammatic Sketch

UTM 4312310 N, 663114 E

DISCUSSION

Trend Study No. 13B-4 (34-4)

The Red Cliffs transect is located along the Coates Creek Road at an elevation of 5,630 feet. The area is dominated by pinyon-juniper and blackbrush. Steep orange sandstone cliffs are located just north and across the road from the site. The transect samples slightly rolling topography with exposures varying from north to south and west. Overall, the area drains to the west. There is a stock pond down the wash about one-tenth of a mile from the transect, although livestock do not appear to utilize this site. Deer and rabbit pellet groups are usually common in the area. To accommodate the increased sample size and stay within the same vegetative type, the position of the transect extension was slightly altered. A pellet-group transect run parallel to the baseline in 2000 indicated 44 deer days use/acre (18 ddu/ha), cow and elk were not sampled.

The moderately shallow soil is light orange in color and is composed of very fine particles which is loosely compacted on the surface. The soil texture is a sandy clay loam with a soil reaction that is mildly alkaline (pH 7.6). The amount of phosphorus in the soil (5.9ppm) could be a limiting factor where 10ppm is minimal for normal plant growth and development. Blackish rock and pavement is scattered throughout the site with an estimated combined cover of about 20%. More than half of the vegetative cover is contributed by blackbrush. An additional 14% of the total cover is contributed by annual grasses and forbs. Litter cover, estimated at 23% in 1995, is now down to 21%. Most of the litter is mostly beneath the crown of blackbrush. The bare soil interspaces between the blackbrush plants is protected by a few annuals, but a cryptogamic crust offers most of the cover in these interspaces. Some slight erosion, as well as pedestaling under the shrubs, was noted in 1995 and 2000.

The key browse species on this site is blackbrush which provided 50% of the vegetative cover in 1995, and currently contributes 58% of the total vegetative cover. Age class structure has changed little since 1986. This is a mature population (93-94%) with few young (2-3%) or decadent plants (4-5%). There were no seedlings encountered in either 1986 or 1995, however a few were classified in 2000 (biotic potential of <1%). Hedging is light to moderate and plants exhibit good vigor. Four percent of the population was classified as decadent in 1995 compared to 11% in 1986. Currently ('00) it has gone up to only 5%. Several other browse species were present but infrequently encountered. These include: broom snakeweed, Wyoming big sagebrush, cliffrose, prickly pear cactus, spiny hopsage, and green ephedra. Point-center quarter data in 2000 estimated 33 juniper trees/acre and 8 pinyon trees/acre.

Grasses and forbs combined for 35% of the vegetative cover in 1995, but with the very dry winter and summer, they only contribute to 17% of the total vegetative cover in 2000. Of the four grasses encountered, cheatgrass provided 90% of the grass cover in 1995. At this time it has decreased to 70% of the grass cover. It is still fairly abundant and found in nearly every quadrat, 96% vs 84% quadrat frequency respectively for 1995 and 2000. The remaining grasses include: mutton bluegrass, red threeawn, and needle-and-thread grass. Perennial forbs are rarely found, with an annual *Astragalus sp.* accounting for 95% of the forb cover in 1995. Because of the very dry winter and summer, this species was not found and the forb cover is now less than 1%.

1986 APPARENT TREND ASSESSMENT

The vegetative appears stable. Because of its abundance, blackbrush is the key browse species on this critical winter range. The browse density and population characteristics represent a healthy stand that appears to be stable. The site has potential to support a diverse perennial grass component. The soil trend appears to be slightly down due to some signs of erosion. Cryptogams are especially important on this site in reducing soil loss on the north-facing slope.

1995 TREND ASSESSMENT

The soil trend appears stable at this time, but in poor condition. The interspaces between the shrubs are protected by cryptogamic crusts which hold the soil in place. Although, if these crusts are disturbed, erosion will likely be accelerated. Vegetation and litter are associated mostly with the shrubs and provide some soil cover. Blackbrush has a stable population with increased vigor and decreased decadency. Other browse species don't appear to be expanding, therefore, the browse trend is stable. Perennial species in the interspaces would be more dependable at stopping erosion. Herbaceous understory is almost exclusively annual species. There is not really a concern for destructive fires because the annual species are mostly associated with the shrub crowns, leaving the interspaces with little fuel to carry a fire. Cryptogams still provide an important protective ground cover for this blackbrush community. The decrease in perennial nested frequency and the overall lack of perennial species leads to a slightly downward herbaceous understory trend.

TREND ASSESSMENT

soil - stable (3), but only fair condition

browse - stable (3)

herbaceous understory - slightly downward (2)

2000 TREND ASSESSMENT

The soil trend appears to continue to be stable at this time, but still in poor condition. The interspaces between the shrubs are protected by cryptogamic crusts (which have increased by 25% since 1995) which help to hold the soil in place. Although, if these crusts are disturbed, erosion will likely be accelerated with high intensity summer storms. Vegetation and litter cover are associated mostly with the shrubs which provide some soil cover. Blackbrush continues to have a fairly stable population with improved vigor and stable decadency. Other browse species don't appear to be increasing, therefore the browse trend continues to be stable. Perennial species in the interspaces would be more dependable at stopping erosion, however the herbaceous understory currently provides less than 1% total cover. There is no real concern for destructive fires because the annual species are mostly associated with the shrub crowns, leaving the interspaces with little fine fuels to carry a fire. Cryptogams still provide an important protective ground cover for this blackbrush community. Currently cryptogams provide 20% cover. There is a slight increase in the sum of nested frequency of perennial grasses but nested frequency of perennial forbs remained stable. There is, however, an overall lack of perennial species on this site. Annuals make up almost 75% of the total herbaceous cover. Trend is considered stable but in poor condition.

TREND ASSESSMENT

soil - stable (3), but only fair condition

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 4

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Aristida purpurea</i>	3	3	6	2	2	2	.30	.06
G	<i>Bromus tectorum</i> (a)	-	_b 336	_a 264	-	96	84	4.56	2.24
G	<i>Oryzopsis hymenoides</i>	-	-	5	-	-	2	-	.03
G	<i>Poa fendleriana</i>	_b 110	_a 21	_a 11	39	10	7	.15	.13
G	<i>Poa secunda</i>	_a -	_a -	_b 31	-	-	14	-	.68
G	<i>Sitanion hystrix</i>	5	-	-	2	-	-	-	-
G	<i>Sporobolus cryptandrus</i>	3	-	-	1	-	-	-	-
G	<i>Stipa comata</i>	-	3	-	-	1	-	.03	-
G	<i>Vulpia octoflora</i> (a)	-	_a -	_b 24	-	-	10	-	.05
Total for Annual Grasses		0	336	288	0	96	94	4.56	2.28
Total for Perennial Grasses		121	27	53	44	13	25	0.48	0.91
Total for Grasses		121	363	341	44	109	119	5.04	3.20
F	<i>Astragalus nuttallianus</i> (a)	_a -	_b 242	_a -	-	80	-	6.36	-
F	<i>Calochortus nuttallii</i>	-	-	1	-	-	1	-	.00
F	<i>Cryptantha</i> spp.	-	2	-	-	1	-	.00	-
F	<i>Cymopterus</i> spp.	-	-	1	-	-	1	-	.00
F	<i>Draba nemorosa</i> (a)	-	_a 12	_b 33	-	5	17	.02	.08
F	<i>Erodium cicutarium</i> (a)	-	18	20	-	9	9	.19	.07
F	<i>Erigeron</i> spp.	-	1	-	-	1	-	.00	-
F	<i>Gilia hutchiniifolia</i> (a)	-	14	10	-	7	4	.03	.64
F	<i>Lappula occidentalis</i> (a)	-	3	-	-	2	-	.01	-
F	<i>Lepidium perfoliatum</i>	_a -	_b 12	_a -	-	5	-	.02	-
F	<i>Machaeranthera glabriusculas</i>	3	-	-	1	-	-	-	-
F	<i>Mentzelia</i> spp.	_a -	_a -	_b 20	-	-	7	-	.03
F	<i>Navarretia intertexta</i> (a)	-	_a -	_b 7	-	-	3	-	.01
F	<i>Phlox longifolia</i>	_a -	_b 9	_a -	-	3	-	.04	-
F	<i>Plantago patagonica</i> (a)	-	_b 8	_a -	-	3	-	.01	-
F	<i>Schoenocrambe linifolia</i>	-	1	-	-	1	-	.00	-
F	Unknown forb-annual (a)	-	2	-	-	1	-	.00	-
Total for Annual Forbs		0	299	70	0	107	33	6.64	0.81
Total for Perennial Forbs		3	25	22	1	11	9	.09	0.04
Total for Forbs		3	324	92	1	118	42	6.73	0.86

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 4

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia tridentata wyomingensis</i>	2	0	-	.84
B	<i>Chrysothamnus nauseosus albicaulis</i>	2	5	-	-
B	<i>Coleogyne ramosissima</i>	0	0	16.70	13.51
B	<i>Ephedra viridis</i>	81	72	-	-
B	<i>Grayia spinosa</i>	0	1	-	.38
B	<i>Gutierrezia sarothrae</i>	0	1	.04	.15
B	<i>Juniperus osteosperma</i>	3	2	4.65	4.22
B	<i>Opuntia spp.</i>	1	0	.03	.15
B	<i>Pinus edulis</i>	2	5	.38	-
B	<i>Sclerocactus</i>	0	11	-	.06
Total for Browse		91	97	21.80	19.30

CANOPY COVER --

Herd unit 13B, Study no: 4

Species	Percent Cover '00
<i>Juniperus osteosperma</i>	3

BASIC COVER --

Herd unit 13B, Study no: 4

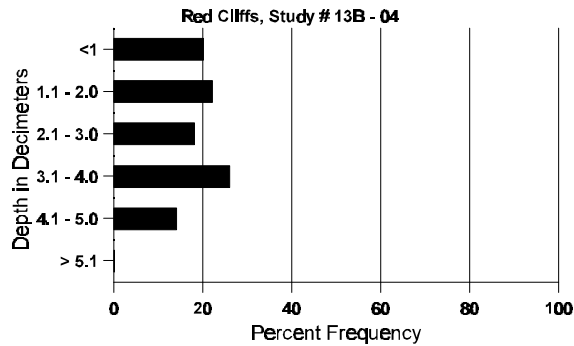
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	360	300	13.75	33.59	24.73
Rock	201	188	16.25	11.28	13.46
Pavement	49	221	3.00	.08	6.66
Litter	375	331	25.00	23.32	20.85
Cryptogams	275	266	23.50	15.57	20.23
Bare Ground	297	327	18.50	25.61	30.77

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 4, Study Name: Red Cliffs

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
13.81	58.6 (13.46)	7.6	60.0	19.4	20.6	0.7	5.8	147.2	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 13B, Study no: 4

Type	Quadrat Frequency	
	'95	'00
Rabbit	23	11
Deer	34	29

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
122	N/A
566	44 (108)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 4

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
		1	2	3	4		1	2		
<i>Artemisia tridentata wyomingensis</i>										
Y	86	-	-	-	-	-	-	-	0	0
	95	-	-	-	-	-	-	-	0	0
	00	1	-	-	-	-	-	-	20	1
M	86	-	-	-	-	-	-	-	0	0
	95	-	1	-	-	-	-	-	20	26 41
	00	1	1	2	-	-	-	-	80	27 44
D	86	-	-	-	-	-	-	-	0	0
	95	1	-	-	-	-	-	-	20	1
	00	-	-	-	-	-	-	-	0	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'86		00%		00%		00%				
'95		50%		00%		00%		+60%		
'00		20%		40%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	0%	
						'95	40		50%	
						'00	100		0%	
<i>Chrysothamnus nauseosus hololeucus</i>										
M	86	-	-	-	-	-	-	-	0	- -
	95	-	-	-	-	-	-	-	0	- -
	00	-	-	-	-	-	-	-	0	15 42
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'86		00%		00%		00%				
'95		00%		00%		00%				
'00		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-	
						'95	0		-	
						'00	0		-	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
D	86	2	-	-	-	-	-	-	133	2
	95	-	-	-	-	-	-	-	0	0
	00	-	-	-	-	-	-	-	0	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'86		00%		00%		00%				
'95		00%		00%		00%				
'00		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'86	133	Dec:	100%	
						'95	0		0%	
						'00	0		0%	

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
<i>Coleogyne ramosissima</i>												
S	86	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	20		1	
Y	86	6	-	-	-	-	-	-	400		6	
	95	5	1	-	-	-	-	-	120		6	
	00	3	-	-	1	-	-	-	80		4	
M	86	22	33	2	82	5	-	-	9600	15	16	144
	95	138	41	4	28	3	-	-	4280	16	30	214
	00	13	6	-	161	20	-	-	4000	15	26	200
D	86	3	5	6	1	3	-	-	1200			18
	95	6	-	-	2	-	-	-	160			8
	00	6	-	-	4	-	-	-	200			10
X	86	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	60			3
	00	-	-	-	-	-	-	-	120			6
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		27%		05%		11%		-59%				
'95		20%		02%		01%		- 6%				
'00		12%		00%		01%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	11200	Dec:	11%			
						'95	4560		4%			
						'00	4280		5%			
<i>Ephedra viridis</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	0	26	33	0
	00	1	-	-	-	-	-	-	20	26	43	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'95	0		-			
						'00	20		-			
<i>Grayia spinosa</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	1	-	-	-	20	23	59	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'95	0		-			
						'00	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	10	5	1
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	10	12	5
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	13	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%			+34%							
'95		00%			00%			00%			-60%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	66	Dec:	-				
											'95	100		-				
											'00	40		-				
<i>Juniperus osteosperma</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	1	-	-	2	-	-	-	40	22	48	2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	0		-				
											'00	60		-				
<i>Opuntia spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	26	2
	00	11	-	-	-	-	-	-	-	-	11	-	-	-	220	5	23	11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+82%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	40		-				
											'00	220		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Sclerocactus																		
M	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	7	3	1
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	3	1
	'00	8	-	-	5	-	-	-	-	-	13	-	-	-	260	5	3	13
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	20		-			
												'00	260		-			

Trend Study 13B-5-00

Study site name: Buckhorn Draw .

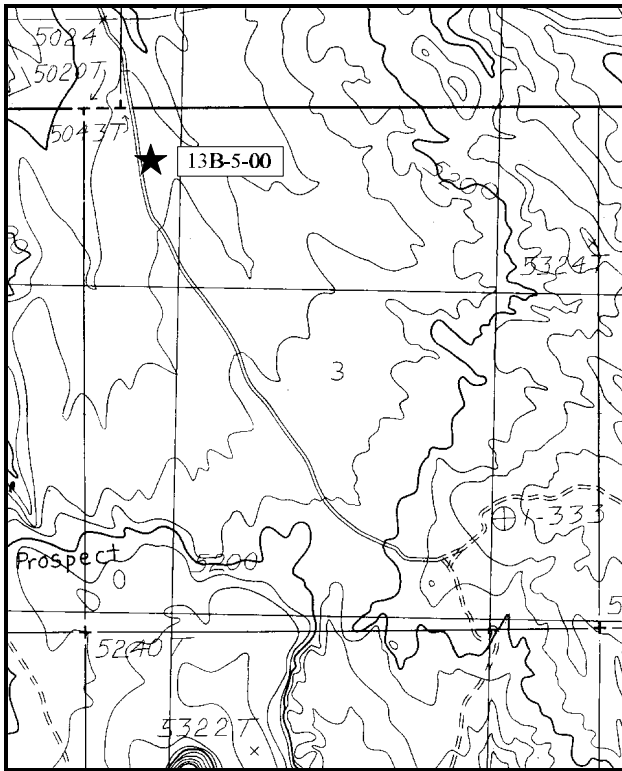
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

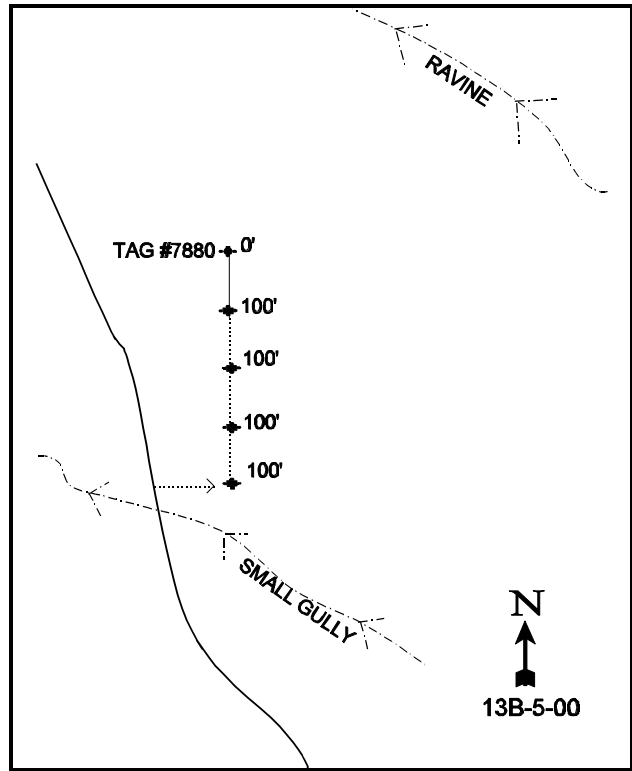
LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park travel 2.1 miles to a cattle guard. Continue west 2.1 miles to the Red Cliffs transect(13B-4-00). Continue west on the main road 4.0 miles to a fork. Stay left and go 2.4 miles to Coates Creek. Cross the creek and continue 0.6 miles to a fork. Stay left, go 2.5 miles to a cattle guard. Proceed 3.5 miles to another cattle guard. Go 0.3 miles past the cattle guard and stop. The transect is on the left (east) side of the road. The 0-foot end of the baseline (found 400 feet north) is also marked by a fence post, tagged #7880. All other plot markers are short rebar stakes.



Map Name: Blue Chief Mesa

Township 23S , Range 25E , Section 3



Diagrammatic Sketch

UTM 4300371.278 N, 660935.108 E

DISCUSSION

Trend Study No. 13B-5 (34-5)

The Buckhorn Draw site is an open bench at an elevation of about 5,100 feet. It is gently sloping (8%) to the northwest. Deep washes to the east and west intermittently carry water and drain to the north. The area supports a mixed desert shrub community dominated by broom snakeweed, Wyoming big sagebrush, spiny hopsage and perennial grasses with some scattered junipers. It is grazed by cattle and used as winter range for deer and elk. The area is within the Buckhorn allotment. This is a very large allotment consisting of 12 pastures. Grazing occurs on a deferred rotational basis from October 1st to May 30th using a holistic grazing plan of high intensity and short duration. In 1986, the BLM estimated use of sagebrush to be heavy (60%-80%), but much of this could be cow use, because it is a winter cattle allotment. Deer pellet groups were scattered throughout the area at moderate levels as well as moderate numbers for rabbit, with low counts for cattle and very low numbers for elk. Pellet-group transects data from 2000 estimate 1 elk days use/acre (<1edu/ha), 27 deer days use/acre (11 ddu/ha), and 20 cow days use/acre (8 cdu/ha).

The soil is a fine sandy loam, well drained, and deep with an effective rooting depth of 19 inches. There is a compacted layer of fine silty sand at about 12 inches with a noticeable accumulation of calcium carbonate. The soil reaction is mildly alkaline (pH 7.6) with a moderately high soil temperature (60° F). The amount of phosphorus in the soil could be a limiting factor at only 2.3 ppm, where 10 ppm is thought minimal for normal plant growth and development. Percent bare ground decreased between 1986 to 1995. However, since then with severe drought, percent bare soil has increased to an all time high of 55%. Protective ground cover comes from an almost equal percent of vegetation and litter. Most of the vegetative cover is contributed by grasses. Forbs are of little consequence on this site as they only provide about 1- 3% of the total vegetative cover with most of the cover provided by annual species. No rock or pavement cover was encountered on the site. The gentle slope mitigates erosion from becoming excessive, although there is one small gully running southwest of the transect.

The key browse species are Wyoming big sagebrush and spiny hopsage. In the past (1986), Wyoming big sagebrush had about as many decadent plants as mature plants in the population. Then in 1995, there was a higher proportion of mature plants with as well as a decreased percentage of decadent plants (from 40% to 12%). In 1995, 1/3 of the population was classified as young with a slightly higher proportion of seedlings compared to 1986 (13% vs 20% biotic potential). Mature plants also increased in height and crown measurements nearly doubled. In 1986, use was extremely heavy with 87% of the plants sampled exhibiting heavy hedging. In 1995 and 2000, use is mostly light to moderate with heavy use at only 6%-9%.

The spiny hopsage population is mature with moderate to heavy hedging. In exceptionally dry years, spiny hopsage tends to lose its leaves which makes it difficult to determine its true condition. Vigor was classified as poor on all plants sampled in 1986. Currently ('00) only about 1/4 of the plants sampled displayed poor vigor. Spiny hopsage is utilized primarily in the spring by livestock and wildlife with its usefulness decreasing into the summer. Broom snakeweed remains the most abundant browse species. It has a mostly mature population with little biotic potential (# of seedlings) being expressed at this time. Other less abundant shrubs include; cactus, green ephedra, and blackbrush. Junipers are scattered throughout the area with the point-center quarter method estimating a density of only about 28 trees/acre.

Through the years only about 1-3% of the vegetative cover comes from forbs, most of which are annual species. Grass cover is higher on this site than many of the other sites in this unit. Grasses on average provide 56% of the vegetative cover with a majority coming from perennial species (on average almost 72% of the grass cover). Sand dropseed provides most of the perennial herbaceous cover on this site. The other common perennial grass is three-awn, a warm season grass that has poor forage value most of the year. It is an increaser and most often

indicates long term range deterioration. Indian ricegrass is present at a moderate density. Cheatgrass provided 36% of the grass cover in 1995 with a 100% quadrat frequency. Now with the currently very dry year (2000), it provides only about 20% of the grass cover and has a quadrat frequency of only 86%. All forbs combined do not contribute even 1% total cover for any year sampled.

1986 APPARENT TREND ASSESSMENT

The deteriorating population of the palatable spiny hopsage is an indication of a future downward browse trend. Sagebrush vigor is generally good, but this species may be harmed by increasing future use as hopsage becomes unavailable. Broom snakeweed is likely to increase, but numbers of this species fluctuate so much they are not a good indicator of trend. Little soil movement is detectable, although there is a large amount of bare soil in the interspaces. There is room for improvement in litter and vegetative cover. The soil trend appears to be stable at this time.

1995 TREND ASSESSMENT

The relative amount of bare soil has decreased since 1986, but is still moderately high. No signs of erosion are present now, but this is more likely due to the almost level terrain of the site which lends itself to a more stable soil trend. Although there is ample grass cover, most of the grasses are increasers or invaders. Since the nested frequency for perennial grasses has stayed nearly the same and forbs comprise less than 3% of the vegetative cover, the herbaceous understory is stable but characterized by a poor species composition. The browse trend is slightly up with a more vigorous spiny hopsage population. The Wyoming big sagebrush population has fewer decadent plants and a higher proportion are classified as young plants. The broom snakeweed population should be monitored and could easily increase with poor management.

TREND ASSESSMENT

soil - stable (3)

browse - slightly upward (4)

herbaceous understory - stable (3) but poor composition

2000 TREND ASSESSMENT

The relative amount of bare soil has increased since 1995, while relative percent cover of vegetation and litter declined. Trend for soil is considered slightly down. However, there are no signs of erosion present, but this is more likely due to the well drained characteristics of the sandy soil and almost level terrain of the site. The browse trend is stable with improvement to Wyoming big sagebrush but spiny hopsage is slightly down. The broom snakeweed population should be monitored and could easily increase with poor management. Since the nested frequency for perennial grasses has stayed nearly the same and forbs comprise less than 1% of the vegetative cover, herbaceous understory is stable.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 13B, Study no: 5

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Aristida purpurea</i>	68	73	75	27	33	30	2.42	3.20
G	<i>Bromus tectorum</i> (a)	-	_b 353	_a 237	-	100	86	4.07	2.65
G	<i>Oryzopsis hymenoides</i>	18	35	32	8	15	14	.20	.46
G	<i>Sporobolus cryptandrus</i>	156	137	160	63	56	61	4.66	6.79
G	<i>Vulpia octoflora</i> (a)	-	20	18	-	8	8	.04	.07
Total for Annual Grasses		0	373	255	0	108	94	4.11	2.72
Total for Perennial Grasses		242	245	267	98	104	105	7.28	10.46
Total for Grasses		242	618	522	98	212	199	11.40	13.18
F	<i>Calochortus nuttallii</i>	-	-	4	-	-	1	-	.00
F	<i>Cryptantha</i> spp.	_a -	_b 24	_a -	-	10	-	.05	-
F	<i>Cymopterus</i> spp.	_a -	_{ab} 6	_b 14	-	2	6	.01	.03
F	<i>Erodium cicutarium</i> (a)	-	_a 5	_b 12	-	2	6	.01	.03
F	<i>Eriogonum</i> spp.	-	15	-	-	6	-	.03	-
F	<i>Gilia</i> spp. (a)	-	-	3	-	-	1	-	.00
F	<i>Lappula occidentalis</i> (a)	-	-	1	-	-	1	-	.00
F	<i>Lepidium densiflorum</i> (a)	-	_b 37	_a 3	-	17	1	.08	.00
F	<i>Lygodesmia grandiflora</i>	_a -	_b 7	_{ab} 3	-	4	1	.04	.00
F	<i>Plantago patagonica</i> (a)	-	_b 147	_a 29	-	65	13	.32	.06
F	<i>Sphaeralcea coccinea</i>	_a -	_b 19	_a -	-	7	-	.06	-
Total for Annual Forbs		0	189	48	0	84	22	0.41	0.10
Total for Perennial Forbs		0	71	21	0	29	8	0.19	0.04
Total for Forbs		0	260	69	0	113	30	0.61	0.15

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 5

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata wyomingensis	31	28	.82	1.63
B	Coleogyne ramosissima	3	5	-	1.63
B	Grayia spinosa	33	28	3.76	4.67
B	Gutierrezia sarothrae	65	71	3.95	1.60
B	Opuntia spp.	4	8	.06	.33
B	Sclerocactus	0	1	-	-
Total for Browse		136	141	8.60	9.89

BASIC COVER --

Herd unit 13B, Study no: 5

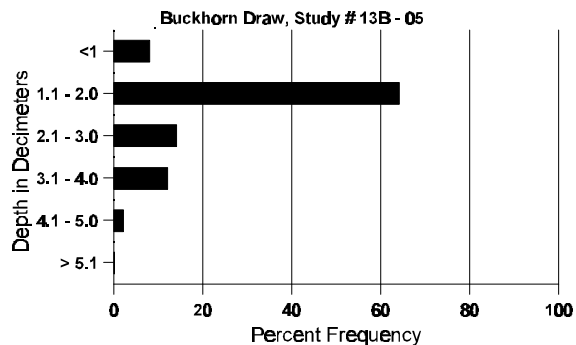
Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	357	300	8.50	24.78	23.74
Rock	-	-	0	0	0
Pavement	-	3	0	0	.00
Litter	382	355	42.00	25.71	24.92
Cryptogams	133	155	.75	2.11	5.05
Bare Ground	278	357	48.75	33.26	54.67

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 5, Study Name: Buckhorn Draw

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.87	60.4 (18.03)	7.6	64.0	18.0	18.0	0.3	2.3	99.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 13B, Study no: 5

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'95	'00	00	00
Rabbit	21	19	270	N/A
Elk	2	1	17	1 (2)
Deer	28	23	348	27 (67)
Cattle	5	9	235	20 (49)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 5

A G E	Y E A R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
<i>Artemisia tridentata wyomingensis</i>																		
S	86	1	1	-	-	-	-	-	-	-	1	1	-	-	66			2
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	-	-	2	-	-	-	-	-	-	2	-	-	-	66			2
	95	16	1	-	-	-	-	-	-	-	17	-	-	-	340			17
	00	4	-	-	5	-	-	-	-	-	9	-	-	-	180			9
M	86	-	1	6	-	-	-	-	-	-	7	-	-	-	233	11	13	7
	95	4	22	2	-	-	-	-	-	-	28	-	-	-	560	16	24	28
	00	25	11	3	3	2	-	-	-	-	44	-	-	-	880	17	22	44
D	86	-	1	5	-	-	-	-	-	-	6	-	-	-	200			6
	95	4	1	-	-	-	1	-	-	-	2	-	-	4	120			6
	00	-	1	-	2	-	2	-	-	-	4	-	-	1	100			5
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		13%			87%			00%			+51%							
'95		47%			06%			08%			+12%							
'00		24%			09%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	499	Dec:	40%			
												'95	1020		12%			
												'00	1160		9%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total								
		1	2	3	4		5	6		7	8	9	1	2	3	4	
Chrysothamnus nauseosus																	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	6	14	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-				
										'95	0		-				
										'00	0		-				
Chrysothamnus viscidiflorus stenophyllus																	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	18	35	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-				
										'95	0		-				
										'00	0		-				
Coleogyne ramosissima																	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	2	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	-	-	5	-	-	-	-	-	5	-	-	-	166	15	31	5
	95	-	-	-	1	1	-	-	-	2	-	-	-	40	27	50	2
	00	4	-	-	2	-	-	-	-	6	-	-	-	120	21	36	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			100%			00%			-64%						
'95		33%			00%			00%			+63%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	166	Dec:	-				
										'95	60		-				
										'00	160		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Ephedra viridis																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	27	27	0
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	0		-			
Grayia spinosa																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	-	4	22	4	-	-	-	26	-	4	-	600	17	33	30
	'00	5	1	-	-	-	-	-	-	-	6	-	-	-	120	18	33	6
D	'86	-	-	9	-	-	-	-	-	-	-	-	9	-	300			9
	'95	3	1	-	1	6	1	-	-	2	6	-	3	5	280			14
	'00	-	-	-	29	-	15	1	-	-	33	-	-	12	900			45
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			100%			100%			+66%							
'95		66%			16%			27%			+14%							
'00		02%			29%			24%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	300	Dec:	100%			
												'95	880		32%			
												'00	1020		88%			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4		1	2			
<i>Gutierrezia sarothrae</i>											
S	86	-	-	-	-	-	-	-	0		0
	95	3	-	-	2	-	-	-	100		5
	00	3	-	-	-	-	-	-	60		3
Y	86	26	-	-	-	-	-	-	866		26
	95	29	-	-	-	-	-	-	580		29
	00	35	-	-	-	-	-	-	700		35
M	86	171	1	-	-	-	-	-	5733	9 5	172
	95	131	-	-	3	-	-	-	2680	11 15	134
	00	157	-	-	-	-	-	-	3140	6 8	157
D	86	33	1	1	-	-	-	-	1166		35
	95	-	-	-	-	-	-	-	0		0
	00	11	-	-	-	-	-	-	220		11
X	86	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	840		42
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>% Change</u>						
'86		.85%	.42%	00%	-58%						
'95		00%	00%	00%	+20%						
'00		00%	00%	05%							
Total Plants/Acre (excluding Dead & Seedlings)						'86	7765	Dec:	15%		
						'95	3260		0%		
						'00	4060		5%		
<i>Juniperus osteosperma</i>											
M	86	1	-	-	-	-	-	-	33	63 63	1
	95	-	-	-	-	-	-	-	0	- -	0
	00	-	-	-	-	-	-	-	0	- -	0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>% Change</u>						
'86		00%	00%	00%							
'95		00%	00%	00%							
'00		00%	00%	00%							
Total Plants/Acre (excluding Dead & Seedlings)						'86	33	Dec:	-		
						'95	0		-		
						'00	0		-		
<i>Opuntia spp.</i>											
M	86	2	-	-	-	-	-	-	66	4 6	2
	95	6	-	-	-	-	-	-	120	6 17	6
	00	11	-	-	-	-	-	-	220	7 12	11
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>% Change</u>						
'86		00%	00%	00%	+45%						
'95		00%	00%	33%	+45%						
'00		00%	00%	00%							
Total Plants/Acre (excluding Dead & Seedlings)						'86	66	Dec:	-		
						'95	120		-		
						'00	220		-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Sclerocactus																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	3	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	20		-			

Trend Study 13B-6-00

Study site name: Ryan Creek .

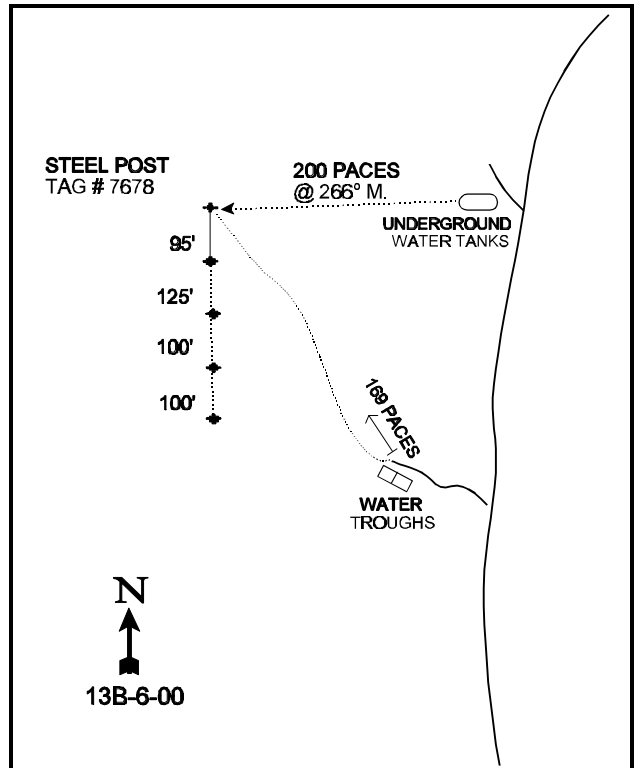
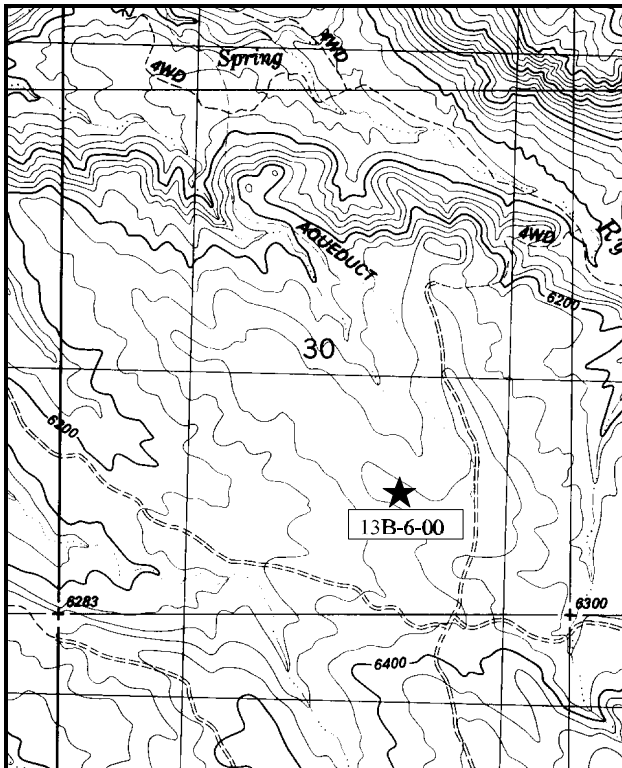
Range type: Chained, Seeded P-J

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

At the "Granary" intersection just south 1.35 miles south of Buckhorn Draw, 13B-5-00 (Coates Creek 15-minute Quad; T23S, R25E, southeast quarter of section 3) bear left and go east 0.7 miles to a fork. Take the middle fork, go 2.4 miles and turn right at the next fork. Continue 0.7 miles to another fork. Turn left. Go 0.65 miles to a cattle guard. Continue 1.5 miles to a fork. Bear left and go 0.2 miles to a water development on the left. Drive up to the water troughs. From here, go up the small ridge to the west for 200 paces to a full high fence post with browse tag #7678 attached. This fence post, the 0-foot baseline stake, can also be located from the nearby underground water tanks by going 1060 feet on a bearing of 266°M degrees true from the tanks. The transect runs south from the start of the baseline. All other plots are marked by rebar stakes.



Map Name: Steamboat Mesa

Diagrammatic Sketch

Township 22S , Range 26E , Section 30

UTM 4302649.514 N, 666581.630 E

DISCUSSION

Trend Study No. 13B-6 (34-6)

The Ryan Creek transect is located within an old 1,800 acre pinyon-juniper chaining, which in the past had been considered an important big-game winter range. The area was chained and aerially seeded with crested wheatgrass, four-wing saltbush, big sagebrush, alfalfa, and bitterbrush in 1968. To help maintain the integrity of the chaining, the BLM used the herbicide tebuthiuron to eliminate the released population of pinyon-juniper trees on 300 acres of the chaining. The area has burned in 1989 which eliminated nearly all of the browse on the site. The study is located near the top of a south-facing slope at an elevation of 6,300 feet. A nearby deer pellet group transect in Ryan Park, on the Utah side, averaged 8 deer days use/acre (20 ddu/ha) between 1986 and 1996. Pellet group data taken along the trend study site base line in 2000 estimated 20 deer days use/acre (49 ddu/ha), 9 elk days use/acre (22 edu/ha), and 10 cow day use/acre (25 cdu/ha). Cattle grazing occurs as part of the large Buckhorn allotment.

The area is characterized as an upland shallow loam site. The surface soil has a sandy clay loam texture. Effective rooting depth is just over 14 inches. Soil reaction is neutral (pH 7.3). The low amount of phosphorus (7.7ppm) could be limiting as 10ppm is thought necessary for normal plant development and growth. The amount of bare ground has increase substantially from 13% in 1995 to 35% in 2000. However, the vegetation and litter still provides adequate protection for the soil and there is no evidence of noticeable erosion.

The pinyon and juniper trees and a very low density of miscellaneous browse were eliminated from the site when it burned. Previously the estimated combined density of pinyon and juniper trees was about 198 trees/acre. The most numerous shrubs on the site after the burn are Harriman's yucca, broom snakeweed, white stemmed rabbitbrush, and a few scattered fourwing saltbush. The estimated cover for all browse species combined is less than 1% cover. With the loss of the browse species, this site is no longer important as critical winter range for wildlife.

In 1995, grasses contributed to 80% of the total vegetative cover with the dominant understory species being cheatgrass. At that time it contributed 74% of the grass cover and being very dense it had the potential of carrying another destructive fire. However, currently ('00) it only makes up 9% of the grass cover with the very dry year we have experienced in 2000. Without the competition with cheatgrass, crested wheatgrass has gone from providing 22% to currently 79% of the total grass cover. Other grass species include; Indian ricegrass, galleta, purple threeawn, mutton bluegrass, and bottlebrush squirreltail. In 1995, forbs were composed primarily of annual species (51%). Now with dry conditions, only 14% of the forbs are annual species. The dominant perennial forb in 1995 was heath aster which doesn't provide much forage for wildlife or livestock. With the current survey, alfalfa is the dominant forb, providing 54% of the forb cover. It continues to appear very robust and vigorous.

1986 APPARENT TREND ASSESSMENT

Density of desirable browse species for deer is very low with little recruitment into their respective populations. However, there is good quantities of forage produced by the crested wheatgrass for the spring and fall. It will be interesting to follow the effects of the Savory grazing system on this particular chaining. Continued maintenance of the pinyon-juniper trees on this chaining is desirable for improving the health of the understory vegetation. Apparent trend for the site is stable, but will be greatly affected by ongoing management decisions and weather patterns.

1995 TREND ASSESSMENT

There is adequate cover provided by vegetation and litter to protect the soil surface from erosion. Therefore, the soil trend is considered stable. The herbaceous understory is comprised mostly of annual forbs and grasses, the majority of which is cheatgrass. Crested wheatgrass is abundant as well and may provide some forage later into the fall with some late precipitation. Tumble mustard is quite prevalent and most were knee high in height. The vegetation provides abundant fine fuels for another wildfire. Trend for the herbaceous understory is down because of the poor composition. There are very few, if any browse species that could provide winter forage for wildlife, so the trend for browse is down.

TREND ASSESSMENT

soil - stable (3)

browse - down (1) with the loss of the browse to wildfire

herbaceous understory - downward (1) because of poor composition

2000 TREND ASSESSMENT

Protective ground cover has declined since 1995 while percent cover of bare ground has more than doubled from 13% to 35%. The ratio of protective cover to bare ground increased from 3.1:1 to 2.2:1. Most of this change in cover can be explained by the decline in annual grasses and forbs. Percent cover of cheatgrass declined from 19% in 1995 to only 2% now. Annual forbs declined from 6% cover to 3% cover. At the same time perennial grass cover increased from 6% to 17%. Sum of nested frequency of perennial grasses remained similar. There appears to be adequate cover provided by vegetation and litter to prevent most erosion but due to the increase in unprotected bare ground the soil trend is considered slightly down. The herbaceous understory has changed noticeably from mostly annual forbs and grasses (69%), to where they now only make up 10% of the total vegetative cover. Crested wheatgrass has increased from 18% to 66% of the vegetative cover. Trend for the herbaceous understory is stable because the perennial component of the grasses showed slight improvement with a substantial decrease in the abundance annual species. The forbs showed a decrease, however they only make up 14% of the herbaceous cover and this loss was easily compensated by the increase in perennial grass nested frequency values. There are very few, if any browse species that could provide winter forage for wildlife. Trend is considered stable but in very poor condition.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3) with few shrubs present

herbaceous understory - stable (3) with good increases for the perennial grass species

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 6

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Agropyron cristatum</i>	_b 286	_a 215	_b 255	95	75	89	5.60	14.70
G	<i>Aristida purpurea</i>	_a -	_a 1	_b 7	-	1	4	.00	.24
G	<i>Bromus tectorum</i> (a)	-	_b 365	_a 138	-	100	55	18.56	1.72
G	<i>Hilaria jamesii</i>	-	3	7	-	1	2	.15	.53
G	<i>Oryzopsis hymenoides</i>	_a -	_b 12	_b 12	-	4	4	.57	1.10
G	<i>Poa fendleriana</i>	-	2	-	-	2	-	.03	-
G	<i>Sitanion hystrix</i>	2	4	4	2	1	2	.00	.18
G	<i>Sporobolus cryptandrus</i>	-	-	2	-	-	1	-	.15
G	<i>Vulpia octoflora</i> (a)	4	3	-	1	1	-	.00	-
Total for Annual Grasses		4	368	138	1	101	55	18.57	1.72
Total for Perennial Grasses		288	237	287	97	84	102	6.37	16.90
Total for Grasses		292	605	425	98	185	157	24.95	18.63
F	<i>Astragalus mollissimus</i>	2	7	1	1	5	1	.02	.00
F	<i>Astragalus nuttallianus</i>	_a -	_b 6	_a -	-	4	-	.02	-
F	<i>Chenopodium fremontii</i> (a)	-	-	3	-	-	1	-	.00
F	<i>Cymopterus</i> spp.	-	3	6	-	1	2	.00	.01
F	<i>Draba nemorosa</i> (a)	-	6	2	-	2	1	.01	.00
F	<i>Erodium cicutarium</i> (a)	-	_b 125	_a 24	-	48	11	1.60	.39
F	<i>Euphorbia</i> spp.	_a -	_b 14	_b 13	-	7	6	.03	.10
F	<i>Lappula occidentalis</i> (a)	-	5	3	-	3	1	.01	.00
F	<i>Lactuca serriola</i>	_a -	_b 6	_{ab} 4	-	4	2	.02	.01
F	<i>Leucelene ericoides</i>	_a -	_b 28	_b 38	-	10	12	1.46	.79
F	<i>Machaeranthera</i> spp	_a -	_b 127	_a -	-	47	-	.28	-
F	<i>Medicago sativa</i>	_a 1	_b 24	_{ab} 12	1	12	6	.84	1.60
F	<i>Phlox longifolia</i>	-	-	3	-	-	1	-	.00
F	<i>Salsola iberica</i> (a)	-	1	-	-	1	-	.00	-
F	<i>Sisymbrium altissimum</i> (a)	-	_b 150	_a 2	-	65	2	1.22	.01
F	<i>Silene</i> spp.	-	5	-	-	2	-	.01	-
F	<i>Sphaeralcea coccinea</i>	-	-	3	-	-	1	-	.03
F	Unknown forb-perennial	2	-	-	1	-	-	-	-
Total for Annual Forbs		0	287	34	0	119	16	2.85	0.41
Total for Perennial Forbs		5	220	80	3	92	31	2.70	2.55
Total for Forbs		5	507	114	3	211	47	5.56	2.97

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 13B, Study no: 6

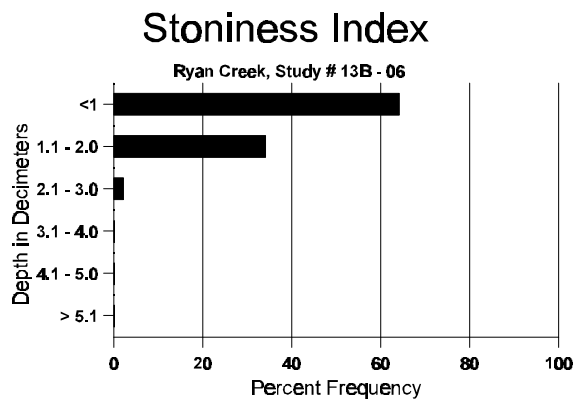
Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Chrysothamnus nauseosus hololeucus	1	1	.15	.15
B	Gutierrezia sarothrae	1	4	.15	.15
B	Yucca harrimaniae	5	4	.30	.30
Total for Browse		7	9	0.60	0.61

BASIC COVER --
Herd unit 13B, Study no: 6

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	381	324	7.25	41.22	23.49
Rock	262	265	4.00	13.35	16.52
Pavement	92	242	4.00	1.11	3.95
Litter	384	365	53.00	45.07	22.25
Cryptogams	42	69	2.25	.61	1.08
Bare Ground	259	342	29.50	13.15	34.65

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 6, Study Name: Ryan Creek

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.30	58.6 (15.91)	7.3	64.0	15.4	20.6	4.9	7.7	80.0	1.0



PELLET GROUP FREQUENCY --

Herd unit 13B, Study no: 6

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'95	'00	00	00
Rabbit	6	38	252	N/A
Elk	12	4	122	9 (24)
Deer	17	29	261	20 (50)
Cattle	3	4	122	10 (26)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 6

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
<i>Artemisia tridentata wyomingensis</i>																		
D	86	-	-	-	-	-	1	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			100%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	100%			
												'95	0		0%			
												'00	0		0%			
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	28	27	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	39	34	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	0		-			
<i>Chrysothamnus nauseosus hololeucus</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20	30	46	1	
	00	-	-	-	1	-	-	-	-	-	1	-	-	20	36	63	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
												'00	20		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total								
		1	2	3	4		5	6		7	8	9	1	2	3	4	
<i>Gutierrezia sarothrae</i>																	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	86	2	-	-	-	-	-	-	-	2	-	-	-	66	10	11	2
	95	1	-	-	-	-	-	-	-	1	-	-	-	20	7	22	1
	00	11	-	-	-	-	-	-	-	11	-	-	-	220	7	7	11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%			-70%						
'95		00%			00%			00%			+93%						
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	66	Dec:	-				
										'95	20		-				
										'00	280		-				
<i>Juniperus osteosperma</i>																	
M	86	2	-	-	-	-	-	-	-	2	-	-	-	66	98	79	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	66	Dec:	-				
										'95	0		-				
										'00	0		-				
<i>Pinus edulis</i>																	
Y	86	2	-	-	-	-	-	-	-	2	-	-	-	66			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	2	-	-	-	-	-	-	-	2	-	-	-	66	78	50	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'95		00%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'86	132	Dec:	-				
										'95	0		-				
										'00	0		-				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Yucca harrimaniae																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	33	-	-	-	-	-	-	-	-	33	-	-	-	660	10	14	33
	'00	1	-	-	4	-	-	-	-	-	5	-	-	-	100	13	19	5
D	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	'00	3	-	-	4	-	-	-	-	-	3	-	-	4	140			7
X	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			-65%							
'00		00%			00%			33%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	680		3%			
												'00	240		58%			

Trend Study 13B-7-00

Study site name: Steamboat Mesa North.

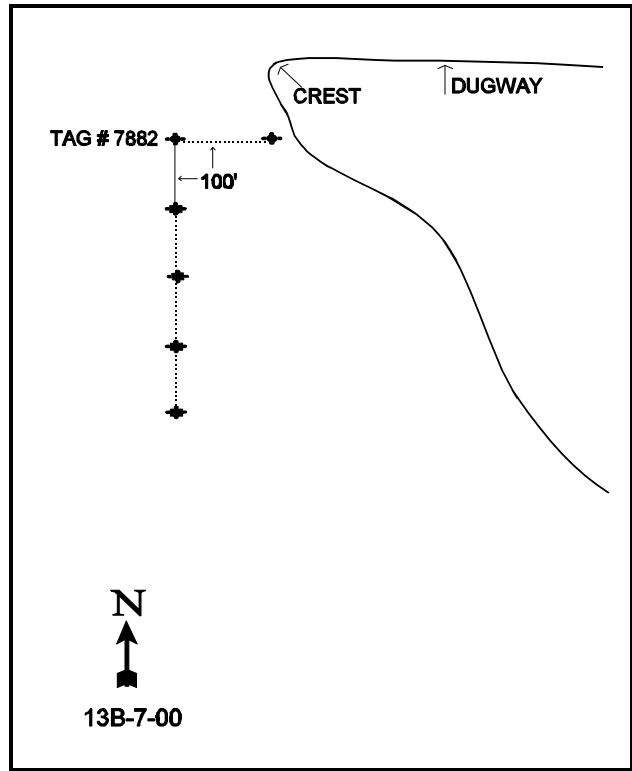
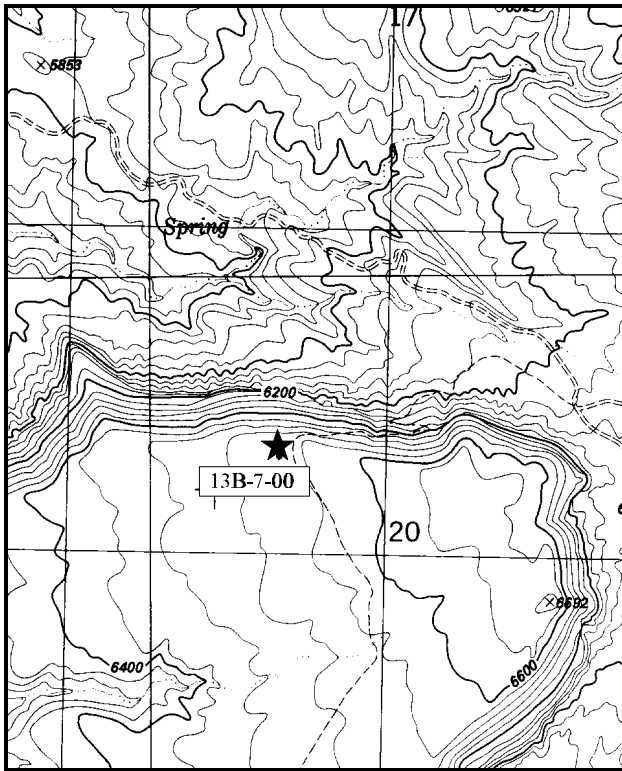
Range type: Chained, Seeded P-J.

Compass bearing: frequency baseline 165°M.

Footmark first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Buckhorn Draw transect (13B-5). Continue southeast for 1.35 miles to the "Granary" intersection. Turn right and go 0.2 miles to a fork. Stay left. Go 1.55 miles and turn left. Go down this road 0.7 miles to Granite Creek. Cross the creek and proceed 4.8 miles to a fork. Stay left, then right at another fork which connects back to the main road, traveling 0.4 miles to a stock pond. Continue 0.15 miles to a fork with many branches (the right goes up on Steamboat Mesa). It is 0.9 miles from the fork to the top of Steamboat Mesa and a witness post on the right side of the road. The witness post (a green fence post) is six feet off the road. The 0-foot baseline stake is 100 feet west of the witness post. All the transect posts are rebar.



Map Name: Steamboat Mesa

Diagrammatic Sketch

Township 23S, Range 26E, Section 20

UTM 4295207.117 N, 666727.059 E

DISCUSSION

Trend Study No. 13B-7 (34-7)

The Steamboat Mesa North study lies on a large flat mesa located in the southeast corner of the Dolores Triangle, just north of the Dolores River and west of the Colorado border. The mesa is surrounded by steep rock cliffs, with the only access being a rough 4-wheel drive road on the north end. This transect was set up in a large chaining just beyond the north edge of the mesa. The study is located on a slight slope (3-5%) with a southwest aspect and an elevation of 6,600 feet. Managed by the BLM, this portion of the Steamboat Mesa allotment was two-way chained and seeded in 1968. Species seeded were crested wheatgrass, four-wing saltbush, big sagebrush, alfalfa, and bitterbrush. The allotment is grazed by cattle from December through mid-April for 884 AUM's. Key forage species are crested wheatgrass, and scattered Wyoming big sagebrush, white stemmed rabbitbrush, green ephedra, and bitterbrush. Data from a pellet group transect run parallel to the study site baseline in 2000 estimates 42 deer days use/acre (104 ddu/ha), and 17 cow days use/acre (42 cdu/ha).

The soil is shallow and well-drained. The soil is classified as a sandy clay loam derived from sandstone. It has a mildly alkaline pH of 7.7. Soil depth is variable, from very shallow to moderately deep, with rock scattered throughout the soil profile, effective rooting depth on average is almost 12 inches. Low phosphorus at 8.7 ppm may be limiting as 10ppm has been shown to be the minimum necessary for normal plant growth and development. Litter accounts for almost 47% of the ground cover, much of which was left from the chaining. Vegetative cover is currently about 33% with about 5% to 9% combined rock and pavement cover. Percent bare ground has increased since 1986 from 23% to 39%. The ratio of bare soil to protective cover has remained almost the same. There are a few shallow bare spots, but overall, no signs of active erosion on the site.

The overstory canopy cover from pinyon and juniper trees is 9%. Point-center quarter from 2000 estimates tree densities at 177 pinyon/acre and 142 juniper/acre. True mountain mahogany, Antelope bitterbrush, rubber rabbitbrush, Wyoming big sagebrush, black sagebrush, Utah serviceberry, and fourwing saltbush, although all found at low densities, display good vigor and only light hedging. Green ephedra and fourwing saltbush show moderate hedging with some appearing to be in poor condition. This is generally normal for these two species where they are found in low densities.

Crested wheatgrass is the key forage species for cattle. It accounts for nearly all of the grass cover and forms large, distinct patches over the site. Cheatgrass was the next dominant grass in 1995 yet it only made up 13% of the grass cover. It has since declined significantly in frequency and currently accounts for <1% of the grass cover. Other important forage grasses are Indian ricegrass and mutton bluegrass. Needle and thread grass was sampled in 1986 as an important forage grass, but was not found in 1995. However, it was sampled again in 2000.

A variety of native perennial forbs are found on the site, although none are particularly important in terms of forage value on winter range. Most common are increasers such as rock goldenrod, Hoods phlox, and hairy gold aster. Alfalfa is scattered throughout the site in very low densities.

1986 APPARENT TREND ASSESSMENT

Juniper and pinyon are becoming more dominant on this site and will begin to impact the more desirable browse species. However, there is a potential for the other shrubs to increase. The BLM resource management plan addresses the need to "maintain" this chaining. Big game habitat could be improved if maintenance involved tree removal to release the more desirable browse species. The variety of grasses and forbs currently provide good spring forage. The long-term vegetative trend would be considered down without intervention. The soil trend appears stable at this time.

1995 TREND ASSESSMENT

Bare ground has increased since 1986 although there are no signs of active erosion. The increase in bare ground is due to the lack of litter produced with drier conditions in recent years. Therefore, the soil trend is stable. Currently, grasses provide good spring forage. There is a wide variety of annual species found on the site as well. Most of the cheatgrass is found in large patches with crested wheatgrass scattered throughout. Although nested frequency for perennial forb species has increased, most are increasers and of little forage value. The herbaceous understory trend is slightly upward, although, a different composition may be desirable. Pinyon and juniper combine for 305 trees/acre. Browse species are scattered throughout in low densities with most showing little utilization. This leads to a stable browse trend.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly upward (4)

2000 TREND ASSESSMENT

Bare ground has increased slightly again since 1995, yet the ratio of bare soil to protective cover is almost unchanged and there are no signs of active erosion. The increase in bare ground is due to the exceptionally dry year we have just experienced. Therefore, the soil trend is stable. Currently, grasses provide good spring forage. There is a wide variety of annual species found on the site, although they are in reduced numbers with the drought. Nested frequency for perennial forb species has decreased, while that for the perennial grasses increased. Since forbs only make up 15% of the herbaceous cover, the herbaceous understory trend is considered slightly upward for the perennial grasses, with the composition shifting to more perennial species. Pinyon and juniper density appears stable. Browse species are scattered throughout in low densities with most showing little utilization. This leads to a stable browse trend.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly upward (4)

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Agropyron cristatum</i>	a155	b228	c277	63	78	92	9.01	16.29
G	<i>Bromus tectorum</i> (a)	-	b163	a3	-	58	2	1.35	.03
G	<i>Oryzopsis hymenoides</i>	c52	b15	a-	22	9	-	.14	.00
G	<i>Poa fendleriana</i>	b4	b4	a-	3	3	-	.04	-
G	<i>Poa secunda</i>	a-	ab3	b9	-	2	3	.03	.04
G	<i>Sitanion hystrix</i>	b28	a-	a2	13	-	1	-	.03
G	<i>Sporobolus cryptandrus</i>	-	-	1	-	-	1	-	.03
G	<i>Stipa comata</i>	b8	a-	ab5	5	-	2	-	.03
G	<i>Vulpia octoflora</i> (a)	-	5	-	-	3	-	.01	-
Total for Annual Grasses		0	168	3	0	61	2	1.37	0.03
Total for Perennial Grasses		247	250	294	106	92	99	9.23	16.43
Total for Grasses		247	418	297	106	153	101	10.60	16.47
F	<i>Agoseris glauca</i>	-	-	-	-	-	-	.01	-
F	<i>Allium</i> spp.	-	3	-	-	1	-	.00	-
F	<i>Astragalus convallarius</i>	7	1	1	3	1	1	.01	.03
F	<i>Astragalus</i> spp.	-	6	1	-	3	1	.01	.00
F	<i>Carduus nutans</i> (a)	-	b8	a-	-	3	-	.01	-
F	<i>Cryptantha</i> spp.	-	4	-	-	2	-	.01	-
F	<i>Cymopterus</i> spp.	a-	b16	a-	-	8	-	.04	-
F	<i>Descurainia</i> spp. (a)	-	4	-	-	2	-	.01	-
F	<i>Draba nemorosa</i> (a)	-	b96	a-	-	36	-	.21	-
F	<i>Erodium cicutarium</i> (a)	-	8	9	-	3	3	.16	.41
F	<i>Erigeron pumilus</i>	a2	b19	ab13	1	8	6	.04	.05
F	<i>Gilia hutchinifolia</i> (a)	-	b28	a-	-	13	-	.07	-
F	<i>Haplopappus acaulis</i>	3	7	3	2	2	1	.01	.00
F	<i>Heterotheca villosa</i>	a-	b16	b16	-	7	6	.21	.29
F	<i>Lappula occidentalis</i> (a)	-	b43	a-	-	21	-	.15	-
F	<i>Lactuca serriola</i>	-	6	-	-	2	-	.15	-
F	<i>Lepidium densiflorum</i> (a)	-	b24	a-	-	9	-	.19	-
F	<i>Machaeranthera</i> spp	a-	b21	a-	-	9	-	.04	-
F	<i>Medicago sativa</i>	-	3	2	-	1	1	.00	.03
F	<i>Penstemon</i> spp.	-	1	3	-	1	1	.00	.15
F	<i>Petradoria pumila</i>	37	41	32	16	17	13	2.21	1.35
F	<i>Phlox hoodii</i>	28	32	13	14	14	7	.49	.11
F	<i>Phlox longifolia</i>	-	2	-	-	1	-	.00	-
F	<i>Plantago patagonica</i> (a)	-	3	-	-	1	-	.01	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	<i>Polygonum douglasii</i> (a)	-	3	-	-	1	-	.00	-
F	<i>Ranunculus testiculatus</i> (a)	-	3	-	-	2	-	.01	-
F	<i>Schoenocrambe linifolia</i>	_a -	_b 17	_a -	-	8	-	.07	-
F	<i>Sisymbrium altissimum</i> (a)	-	_b 27	_a -	-	13	-	.07	-
F	<i>Sphaeralcea coccinea</i>	_a -	_b 13	_b 12	-	6	5	.13	.05
F	<i>Streptanthus cordatus</i>	-	3	-	-	1	-	.00	-
F	<i>Tragopogon dubius</i>	_b 14	_b 5	_a -	6	4	-	.02	-
Total for Annual Forbs		0	247	9	0	104	3	0.90	0.41
Total for Perennial Forbs		91	216	96	42	96	42	3.52	2.07
Total for Forbs		91	463	105	42	200	45	4.42	2.48

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 7

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	<i>Artemisia nova</i>	0	1	-	-
B	<i>Artemisia tridentata wyomingensis</i>	0	1	-	.38
B	<i>Atriplex canescens</i>	1	1	-	.00
B	<i>Chrysothamnus nauseosus</i>	4	7	.98	1.62
B	<i>Ephedra viridis</i>	9	8	1.35	.86
B	<i>Gutierrezia sarothrae</i>	0	11	-	.02
B	<i>Juniperus osteosperma</i>	0	6	2.70	3.67
B	<i>Leptodactylon pungens</i>	4	4	.01	.18
B	<i>Opuntia</i> spp.	2	2	.03	.00
B	<i>Pinus edulis</i>	0	6	4.77	4.36
B	<i>Purshia tridentata</i>	1	1	.15	.30
Total for Browse		21	48	9.99	11.42

CANOPY COVER --

Herd unit 13B, Study no: 7

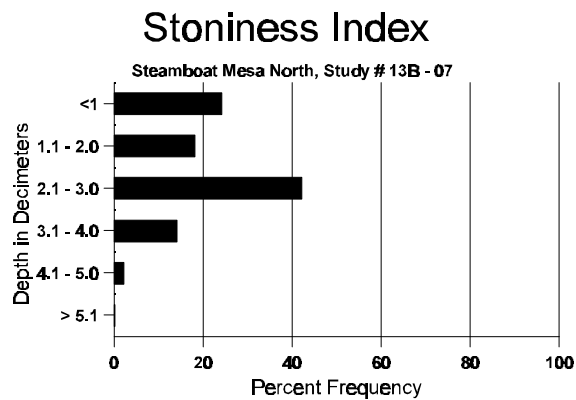
Species	Percent Cover '00
<i>Juniperus osteosperma</i>	5
<i>Pinus edulis</i>	4

BASIC COVER --
Herd unit 13B, Study no: 7

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	325	300	11.25	26.70	33.01
Rock	96	61	.25	4.64	6.08
Pavement	57	120	0	.13	2.52
Litter	383	356	65.00	37.74	47.32
Cryptogams	79	95	.25	.53	2.33
Bare Ground	299	296	23.25	33.34	38.60

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 7, Study Name: Steamboat Mesa North

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.53	59.0 (12.44)	7.7	56.6	25.1	21.3	1.9	8.7	92.8	0.7



PELLET GROUP FREQUENCY --
Herd unit 13B, Study no: 7

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
Rabbit	18	32	513	N/A
Elk	1	-	-	-
Deer	19	9	63	42 (105)
Cattle	6	8	24	17 (43)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 7

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
<i>Amelanchier utahensis</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	0	29	62	0
	00	-	-	-	-	-	-	-	0	63	76	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
	'86	00%		00%		00%						
	'95	00%		00%		00%						
	'00	00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'95	0		-			
						'00	0		-			
<i>Artemisia nova</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	20	5	13	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
	'86	00%		00%		00%						
	'95	00%		00%		00%						
	'00	00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'95	0		-			
						'00	20		-			
<i>Artemisia tridentata wyomingensis</i>												
M	86	1	-	-	-	-	-	-	66	22	19	1
	95	-	-	-	-	-	-	-	0	9	14	0
	00	-	-	1	-	-	-	-	20	9	15	1
X	86	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
	'86	00%		00%		00%						
	'95	00%		00%		00%						
	'00	00%		100%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	66	Dec:	-			
						'95	0		-			
						'00	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Atriplex canescens</i>																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	-	-	1	-	-	-	-	-	-	1	-	-	-	20	38	41	1
	'00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	34	79	0
D	'86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%			-70%							
'95		00%			100%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	100%			
												'95	20		0%			
												'00	20		100%			
<i>Chrysothamnus nauseosus</i>																		
M	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	27	34	5
	'00	4	1	-	-	-	-	-	1	-	6	-	-	-	120	37	45	6
D	'86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'00	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+29%							
'00		29%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	100		0%			
												'00	140		14%			

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	7	-	-	2	-	-	-	-	-	9	-	-	-	180		9	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	2	-	-	-	-	-	-	2	-	-	-	133	18	11	2
	95	7	6	2	-	-	-	-	-	-	15	-	-	-	300	17	22	15
	00	-	-	9	4	-	-	-	-	-	13	-	-	-	260	21	29	13
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	2	-	-	1	-	-	3	-	-	-	60		3	
	00	-	-	3	-	3	-	-	-	-	5	-	-	1	120		6	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			100%			00%			+75%							
'95		22%			07%			00%			-26%							
'00		15%			60%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	133	Dec:	0%				
											'95	540		11%				
											'00	400		30%				
<i>Gutierrezia sarothrae</i>																		
S	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	15	0
	00	23	-	-	-	-	-	-	-	-	23	-	-	-	460	5	10	23
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	3	-	-	-	-	-	-	-	-	2	-	-	1	60		3	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	66	Dec:	100%				
											'95	0		0%				
											'00	560		11%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	83	58	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	2	-	-	-	-	-	-	3	-	5	-	-	-	100	-	-	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
												'00	120		-			
Leptodactylon pungens																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	10	4
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120	5	10	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+33%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	80		-			
												'00	120		-			
Opuntia spp.																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	18	2
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	10	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	60		-			
												'00	60		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Pinus edulis</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133	81	47	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	2	-	-	-	-	-	-	4	-	6	-	-	-	120	-	-	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	333	Dec:	-				
											'95	0		-				
											'00	120		-				
<i>Purshia tridentata</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	20	40	1
	00	-	-	2	-	-	-	-	-	-	2	-	-	-	40	24	89	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>% Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+50%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	-				
											'95	20		-				
											'00	40		-				

Trend Study 13B-8-00

Study site name: Steamboat Mesa South .

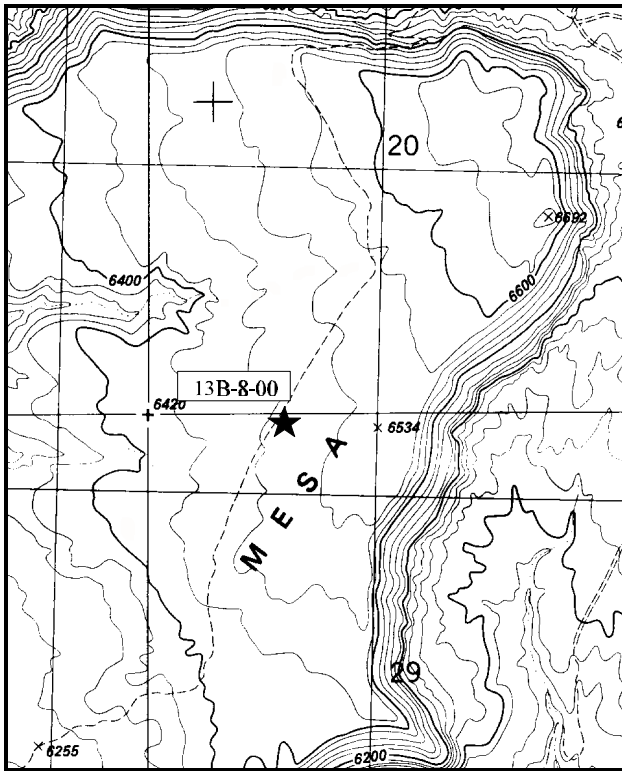
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

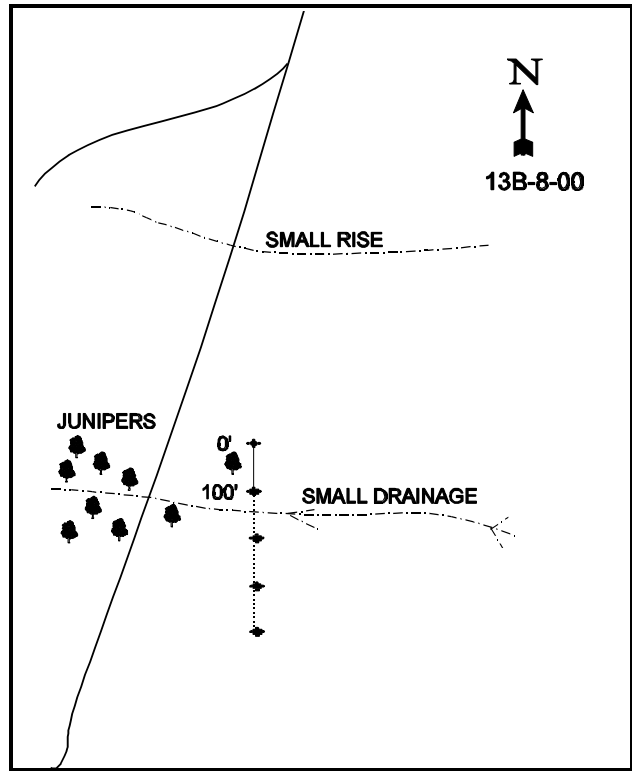
LOCATION DESCRIPTION

Start from site number 13B-7-00, Steamboat Mesa North. Continue south on the same road for 0.6 miles to a fork. Proceed straight 0.2 miles (halfway to an enclosure) to a large Juniper in a sagebrush-grass flat. The baseline 0-foot stake (tag #7812) is located north of the tree.



Map Name: Steamboat Mesa

Township 23S , Range 26E , Section 29



Diagrammatic Sketch

UTM 4294146.747 N, 666652.110 E

DISCUSSION

Trend Study No. 13B-8 (34-8)

Located approximately 3/4 miles south of transect 13B-7, the Steamboat Mesa South transect samples a habitat type dominated by native vegetation, although not in a completely natural condition. This open rolling site may be an example of a former sagebrush park undergoing a conversion to annual grass-sagebrush due to excessive livestock use in the past. A large enclosure is located to the south of the study. Two pellet group transects are also located on Steamboat Mesa. The lower elevation transect (6,300') shows an average of 27 deer days use/acre (67 ddu/ha) between 1986 and 1997. The pellet transect located at 6,700 feet, and closer to the this study, averaged 23 deer use days/acre (56 ddu/ha) for the same time period. A pellet group transect run parallel to the trend study baseline in 2000 estimates 86 deer days use/acre (212 ddu/ha) and 46 cow days use/acre (114 cdu/ha). All of the cattle and most of the deer use appears to be from the past winter ('99).

This area of the mesa is topographically an open park that slopes gently to the west with an elevation of 6,400 feet. The surface soil texture is a sandy clay loam with no rocks or pavement on the surface. Effective rooting depth is about 13 inches and soil reaction is neutral (pH 6.9). Low amounts of phosphorus (4.9ppm) and potassium (67.2ppm) could be a limiting factor for this site where 10ppm and 70ppm respectively are necessary for normal plant development and growth. As for all the other sites for this management unit, soil temperature is moderately high (62°F). Percent bare soil cover decreased from 1986 to 1995, now it has increased to over 40% with the exceptionally dry year in 2000. Vegetative cover and litter cover have both decreased. This helps illustrate the point that you cannot depend on annuals to provide consistent litter cover year to year.

Wyoming big sagebrush, the key browse species, currently ('00) has an estimated density of 2,480 plants/acre. The population appears vigorous with moderate to heavy use reported in 1986, mostly light use in 1995 and heavy use in 2000. Age class distribution is fairly stable with nearly the same proportion of young and mature with each reading. Only 2% of the population is decadent. Winterfat was also sampled on this site, but is in very low numbers, vigorous, and with no signs of utilization. Escape and thermal cover is found in scattered junipers along washes and ridgetops. Most of the trees have been highlined.

Cheatgrass was the most abundant grass accounting for 53% of the total vegetative cover in 1995 and was found in 95% of the quadrats. Currently ('00) this has turned completely around with cheatgrass only making up 11% of the total vegetative cover and quadrat frequency has gone down to 64%. The cheatgrass will provide some early spring forage, however now it does not pose a severe fire hazard as it did previously. Both needle and thread grass and mutton bluegrass significantly decreased in nested frequency between 1986 to 1995. In 2000, with the dry year and corresponding reduction in competition from cheatgrass, needle and thread grass has increased from less than 1% to more than 16% cover and quadrat frequency has risen sharply from 40% to 93%. It now provides 69% of the total herbaceous cover an increase from 3% in 1995. Galleta has remained stable while Indian ricegrass has decreased slightly. They still occur in relatively low densities. Forbs comprise 21% of the vegetative cover with nearly two-thirds being annual species in 1995. Currently annuals only make up 4% of the vegetative cover. Perennial forbs have also declined in frequency and cover since 1995. This illustrates the effect the dry year has had on forbs. Most of these forbs are small and not of much value for winter forage.

1986 APPARENT TREND ASSESSMENT

The soil appears stable with no signs of erosion on the study site. The vegetative trend appears generally stable in terms of succession, except for form and vigor of Wyoming big sagebrush. In the past there had been signs of sagebrush that had died, most likely from overuse and/or prolonged drought. A series of winters with constant snow cover and use by cattle could be very detrimental to the sagebrush population. Currently, the sagebrush appears healthy, but the stand density is low.

1995 TREND ASSESSMENT

The soil is adequately covered by both vegetation and litter. Both adequate ground cover and no signs of erosion indicate a stable soil trend. Grass cover is good, but most comes from undesirable annual species. Cheatgrass is abundant and contributes large quantities of fine fuel to the litter. Furthermore, 70% of the total herbaceous understory cover is contributed by annual species. Most forbs have little forage value, but do aid in soil stabilization. Because cheatgrass dominates the site, there is a high probability of losing the sagebrush population with a single wildfire event. The herbaceous understory trend for this site is considered downward because of the high percentage of annual species. Wyoming big sagebrush shows less utilization than in the past, exhibiting characteristics of a stable population. It has a good biotic potential of 10% and the young age class is at 46%. The winterfat population is also stable with no observable utilization. Thus, browse trend is considered stable.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - downward (1) because of the high percentage of annual species

2000 TREND ASSESSMENT

Percent bare soil has increased sharply since 1995 with it increasing from 15% to 44% with significant decreases in vegetative and litter cover. The ratio of bare soil to protective cover has also deteriorated downward from 1:3.5 to 1:2.3, also indicating a downward trend. In 1995 annuals contributed to 70% of the vegetative cover, where currently they only make up 13% of the vegetative cover. Another clear example of why annual vegetative and litter cover is not an adequate or dependable source of protective cover for the soil. The trend for soil is slightly downward. Grass cover is good, with most of it coming from perennial species. The forbs have little forage value and only make up 4% of the vegetative cover. Cheatgrass does not currently dominate the site, therefore it is not a high fire hazard as it was in 1995. The herbaceous understory trend for this site is considered improving because of the increased values for perennial species and the decrease in the abundance of annual species. Wyoming big sagebrush shows continued moderate to heavy use, but it still exhibits characteristics of a stable healthy population. It has a fair to good biotic potential and the young age class makes up 50% of the population. The winterfat population is also stable with no observable utilization. Thus, browse trend is considered stable.

TREND ASSESSMENT

soil - slightly down (2)

browse - stable (3)

herbaceous understory - improving (4) because of the decrease of annual species and increase in perennial species

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 8

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Agropyron cristatum</i>	a ⁻	b ⁷	a ⁻	-	3	-	.01	-
G	<i>Bromus tectorum</i> (a)	-	b ³⁴¹	a ¹⁸¹	-	95	64	15.05	3.09
G	<i>Hilaria jamesii</i>	a ¹⁷	b ⁵²	b ⁵²	7	22	21	.79	1.58
G	<i>Oryzopsis hymenoides</i>	6	20	7	2	7	3	.77	.21
G	<i>Poa fendleriana</i>	26	16	5	10	6	3	.05	.16
G	<i>Poa secunda</i>	a ⁻	c ¹¹⁷	b ⁵⁴	-	46	21	.65	.52
G	<i>Sitanion hystrix</i>	11	-	-	7	-	-	-	-
G	<i>Sporobolus cryptandrus</i>	b ⁷	a ⁻	c ¹⁹	3	-	10	-	.81
G	<i>Stipa comata</i>	b ²⁵⁷	a ⁹¹	b ²⁶⁰	90	40	93	.70	16.47
G	<i>Vulpia octoflora</i> (a)	-	b ²³¹	a ⁶	-	70	3	1.08	.01
Total for Annual Grasses		0	572	187	0	165	67	16.14	3.11
Total for Perennial Grasses		324	303	397	119	124	151	2.99	19.77
Total for Grasses		324	875	584	119	289	218	19.14	22.88
F	<i>Astragalus</i> spp.	a ⁻	b ²⁹	a ⁻	-	15	-	.24	-
F	<i>Carduus nutans</i> (a)	-	b ⁵⁹	a ⁻	-	28	-	.14	-
F	<i>Cymopterus</i> spp.	-	6	-	-	2	-	.01	-
F	<i>Draba nemorosa</i> (a)	-	a ¹⁵	b ⁵¹	-	5	22	.02	.16
F	<i>Erodium cicutarium</i> (a)	-	a ⁻	b ¹⁶	-	-	6	-	.03
F	<i>Erigeron pumilus</i>	a ⁻	a ⁻	b ¹¹	-	-	5	.00	.02
F	<i>Gilia hutchinifolia</i> (a)	-	b ³²	a ²	-	16	1	.08	.00
F	<i>Grindelia squarrosa</i>	-	1	-	-	1	-	.00	-
F	<i>Hedysarum</i> spp.	-	6	-	-	2	-	.18	-
F	<i>Lappula occidentalis</i> (a)	-	b ¹⁶	a ⁻	-	7	-	.06	-
F	<i>Lactuca serriola</i>	a ⁻	b ³⁰	a ⁻	-	16	-	.08	-
F	<i>Lepidium densiflorum</i> (a)	-	b ²⁰¹	a ⁻	-	68	-	.95	-
F	<i>Leucelene ericoides</i>	a ⁻	b ⁹	b ¹⁰	-	4	3	.16	.33
F	<i>Machaeranthera</i> spp	a ⁻	b ¹⁰	a ⁻	-	6	-	.03	-
F	<i>Phlox hoodii</i>	-	4	-	-	1	-	.03	-
F	<i>Phlox longifolia</i>	-	4	-	-	2	-	.01	-
F	<i>Plantago patagonica</i> (a)	-	b ²³²	a ⁶⁴	-	67	25	2.34	.22
F	<i>Polygonum douglasii</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Ranunculus testiculatus</i> (a)	-	3	-	-	1	-	.00	-
F	<i>Schoenocrambe linifolia</i>	a ⁻	b ³⁵	a ⁻	-	16	-	.08	-
F	<i>Sisymbrium altissimum</i> (a)	-	b ⁵⁰	a ⁻	-	25	-	.18	-
F	<i>Sphaeralcea coccinea</i>	c ²⁰⁷	b ¹⁰⁸	a ⁴⁵	79	39	23	1.09	.34
F	<i>Tragopogon dubius</i>	c ⁶⁹	b ²¹	-	29	11	-	.05	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Trifolium spp.	-	2	-	-	1	-	.00	-
F	Unknown forb-perennial	_b 15	_b 24	_a -	6	8	-	.06	-
Total for Annual Forbs		0	610	133	0	218	54	3.80	0.41
Total for Perennial Forbs		291	289	66	114	124	31	2.05	0.69
Total for Forbs		291	899	199	114	342	85	5.86	1.11

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 8

T y p e	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata wyomingensis	40	45	1.53	2.34
B	Ceratoides lanata	2	2	-	-
B	Opuntia spp.	0	1	-	-
B	Pinus edulis	0	1	1.82	.98
Total for Browse		42	49	3.36	3.32

CANOPY COVER --

Herd unit 13B, Study no: 8

Species	Percent Cover '00
Juniperus osteosperma	3
Pinus edulis	1

BASIC COVER --

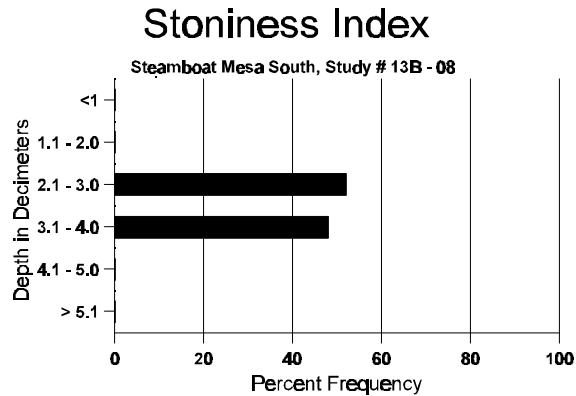
Herd unit 13B, Study no: 8

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	393	331	6.00	44.37	29.38
Rock	-	-	0	0	0
Pavement	-	-	0	0	0
Litter	400	369	67.00	60.84	51.45
Cryptogams	163	42	0	1.98	.86
Bare Ground	274	318	27.00	14.81	43.76

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 8, Study Name: Steamboat Mesa South

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
13.01	62.4 (14.57)	6.9	54.6	23.1	25.3	1.4	4.9	67.2	0.5



PELLET GROUP FREQUENCY --

Herd unit 13B, Study no: 8

Type	Quadrat Frequency	
	'95	'00
Rabbit	5	41
Deer	18	33
Cattle	21	17

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
174	N/A
1114	86 (212)
548	46 (113)

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 8

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total					
		1	2	3	4		1	2						
<i>Artemisia tridentata wyomingensis</i>														
S	86	1	1	-	-	-	-	-	2	-	-	133		2
	95	8	-	-	-	-	-	-	8	-	-	160		8
	00	1	-	-	-	-	-	-	1	-	-	20		1
Y	86	5	9	3	1	-	-	-	18	-	-	1200		18
	95	37	-	-	-	-	-	-	37	-	-	740		37
	00	25	16	20	1	-	-	-	62	-	-	1240		62
M	86	-	7	9	-	-	-	-	16	-	-	1066	17 12	16
	95	19	22	1	-	-	-	-	42	-	-	840	17 25	42
	00	7	18	34	-	-	-	-	59	-	-	1180	14 21	59
D	86	-	-	1	-	-	-	-	1	-	-	66		1
	95	2	-	-	-	-	-	-	-	-	2	40		2
	00	1	1	1	-	-	-	-	1	-	2	60		3
X	86	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>					<u>%Change</u>			
'86		46%		37%		00%					-31%			
'95		27%		01%		02%					+35%			
'00		28%		44%		02%								
Total Plants/Acre (excluding Dead & Seedlings)										'86	2332	Dec:	3%	
										'95	1620		2%	
										'00	2480		2%	
<i>Ceratoides lanata</i>														
Y	86	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	2	-	-	40		2
	00	-	-	-	-	-	-	-	-	-	-	0		0
M	86	-	-	1	-	-	-	-	1	-	-	66	14 11	1
	95	1	-	-	-	-	-	-	1	-	-	20	11 16	1
	00	5	-	-	-	-	-	-	5	-	-	100	14 15	5
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>					<u>%Change</u>			
'86		00%		100%		00%					- 9%			
'95		00%		00%		00%					+40%			
'00		00%		00%		00%								
Total Plants/Acre (excluding Dead & Seedlings)										'86	66	Dec:	-	
										'95	60		-	
										'00	100		-	

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4			
<i>Chrysothamnus nauseosus</i>								
M	'86	-	-	-	-	-	-	0
	'95	-	-	-	-	-	-	0
	'00	-	-	-	-	-	-	0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>			
	'86	00%	00%	00%				
	'95	00%	00%	00%				
	'00	00%	00%	00%				
Total Plants/Acre (excluding Dead & Seedlings)					'86	0	Dec:	-
					'95	0		-
					'00	0		-
<i>Gutierrezia sarothrae</i>								
M	'86	-	-	-	-	-	-	0
	'95	-	-	-	-	-	-	0
	'00	-	-	-	-	-	-	0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>			
	'86	00%	00%	00%				
	'95	00%	00%	00%				
	'00	00%	00%	00%				
Total Plants/Acre (excluding Dead & Seedlings)					'86	0	Dec:	-
					'95	0		-
					'00	0		-
<i>Opuntia spp.</i>								
Y	'86	-	-	-	-	-	-	0
	'95	-	-	-	-	-	-	0
	'00	1	-	-	-	-	-	20
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>			
	'86	00%	00%	00%				
	'95	00%	00%	00%				
	'00	00%	00%	00%				
Total Plants/Acre (excluding Dead & Seedlings)					'86	0	Dec:	-
					'95	0		-
					'00	20		-
<i>Pinus edulis</i>								
M	'86	-	-	-	-	-	-	0
	'95	-	-	-	-	-	-	0
	'00	1	-	-	-	-	-	20
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>			
	'86	00%	00%	00%				
	'95	00%	00%	00%				
	'00	00%	00%	00%				
Total Plants/Acre (excluding Dead & Seedlings)					'86	0	Dec:	-
					'95	0		-
					'00	20		-

Trend Study 13B-9-00

Study site name: Steamboat East Bench.

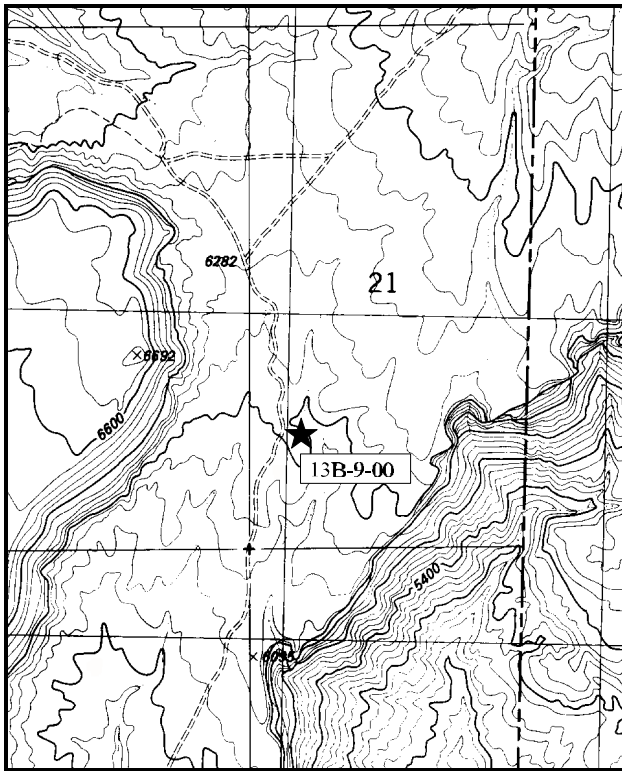
Range type: Chained. Seeded P-J.

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

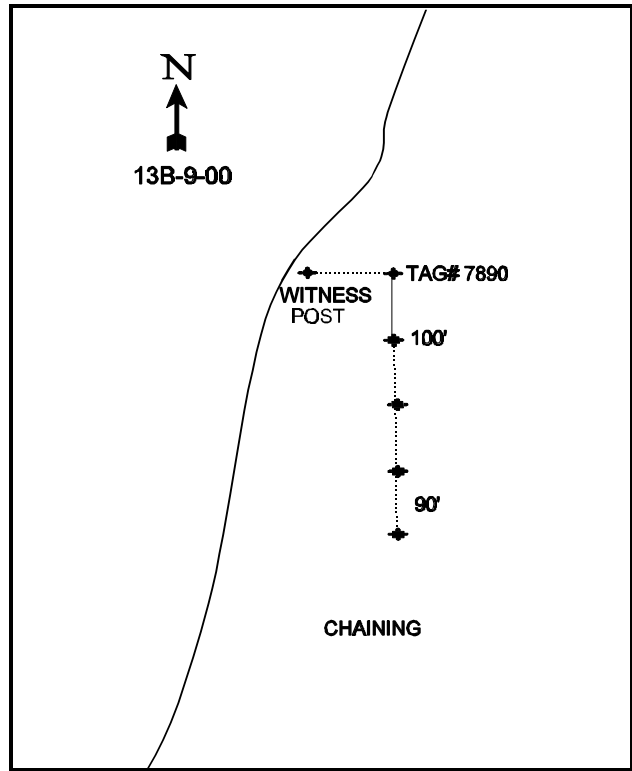
LOCATION DESCRIPTION

From the Buckhorn Draw transect (13B-5). Continue southeast for 1.35 miles to the "Granary" intersection. Turn right and go 0.2 miles to a fork. Stay left. Go 1.55 miles and turn left. Go down this road 0.7 miles to Granite Creek. Cross the creek and proceed 4.8 miles to a fork. Stay left, then right at another fork which connects back to the main road, traveling 0.4 miles to a stock pond. Continue 0.15 miles to a fork with many branches (the right goes up on Steamboat Mesa). Stay on the same road (straight through the intersection and up a steep hill) for 0.5 miles to an old P-J chaining and a 2 ½ foot tall rebar witness post on the left, 6 feet off the road. The 0-foot end of the baseline is 100 feet east of the witness post and is marked by a rebar tagged #7890.



Map Name: Steamboat Mesa

Township 23S, Range 26E, Section 21



Diagrammatic Sketch

UTM 4294656.310 N, 668020.850 E

DISCUSSION

Trend Study No. 13B-9 (34-9)

The Steamboat East Bench transect is located on a narrow bench (one-half mile wide) below Steamboat Mesa, bounded on the west by the sheer sandstone cliffs of Steamboat Mesa and on the east by deep canyons of the Dolores River. The northern part of the bench was included in the 1968 Steamboat Mesa allotment chaining. Currently, the area supports a moderately dense stand of pinyon-juniper and a variety of shrubs and herbaceous plants. The study site is on a moderately sloping ridge with a west-southwest exposure and an elevation of 6,200 feet. Drainage off the bench is to the south. A pellet group transect run parallel to the trend study baseline in 2000 estimates 17 deer days use/acre (42 ddu/ha) and 7 elk days use/acre (17 edu/ha).

The soil texture is a sandy clay loam with an effective rooting depth of about 12 inches. The soil temperature is moderately high (63° F). One limiting factor could be low amounts of phosphorus (2ppm) where 10ppm is considered minimal for normal plant growth and development. Erosion is evident in areas disturbed by roads. Overall the vegetative and litter cover provides adequate soil protection. Some slight pedestalling of some plants and large rocks was noted in the interspaces.

The site supports a variety of browse species. Preferred species include: Utah serviceberry, black sagebrush, Wyoming big sagebrush, true mountain mahogany and green ephedra. These species provided 22% of the browse cover in 1995 and 17% in 2000. Most of these key browse species occur in low to very low densities. For example, true mountain mahogany provides the most forage (contributes 16% and 12% of the total browse cover respectively for 1995 and 2000) even though it has a relatively low density of only 120 plants/acre in 2000. Mature plants are large, averaging over 6 feet in height making them partly unavailable to browsing. Use was mostly light in 1995 and 2000.

Black sagebrush has an estimated density of 440 plants/acre ('95 and '00), but only provides 4% of the total browse cover during the last two sampling dates. It showed moderate to heavy hedging in 1986 and 1995 but light use in 2000. It displays good vigor and low decadency. The proportion of young plants was relatively stable except for this last year with few to no seedlings present. Wyoming big sagebrush was also sampled at a low density of only 132 plants/acre in 1986 declining to only 40 in 2000. The scattered Utah serviceberry was not encountered in the shrub density strips in 2000. Some surrounding mature plants measured for height/crown are large averaging 9 feet tall with a crown measurement of 14 feet. Pinyon and juniper trees dominate the site. They currently ('00) provide 76% of the browse cover with a density of 274 pinyon trees/acre and 63 Utah juniper trees/acre using point-center quarter data.

On average, grasses contribute 24% of the total vegetative cover on this site. It is an important component in stabilizing the soil. Cheatgrass was the most abundant grass in 1995, contributing almost half of the total grass cover. Currently ('00) it only makes up 1% of the grass cover due to the dry season. Crested wheatgrass was second in abundance in 1995. With the decrease in cheatgrass competition, it has now increased from 31% to 66% of the grass cover. Both Indian ricegrass and bottlebrush squirreltail have continued to decrease in abundance. Forbs provide little forage or ground cover with most occurring as low growing life forms. Stemless goldenweed and rock goldenrod are the most abundant forbs on the site. Other common forbs include: hairy goldaster, tumble mustard, and Hood's phlox.

1986 APPARENT TREND ASSESSMENT

Currently, browse density and diversity is promising on this winter range. However, many of the more palatable shrubs have been heavily hedged and may be receiving too much pressure to continue in the community. The most obvious downward trend indicator is the gradual increase of the pinyon-juniper trees. Many of the pinyon

are suffering from an unidentified disease (or possibly an herbicide), therefore their increase is difficult to predict and will be interesting to follow the changes taking place. Other trend parameters such as form, vigor, and age class distribution for key species appear stable. The overall soil trend also appears stable.

1995 TREND ASSESSMENT

Bare ground has decreased since 1986 with only slight sign of erosion. Vegetation and litter offer good protection and contribute to a stable soil trend. The herbaceous understory is comprised primarily of grasses. This includes two annual and six perennial species, of which, cover is almost equally distributed (annuals 47% vs 53% perennial). Herbaceous understory is stable, although a better composition is desired. The pinyon and juniper extensive root system may be affecting the understory species by being more competitive for moisture. There are several different browse species, of which, broom snakeweed is the most abundant. This population does not appear to be expanding at this time, but are becoming slightly more robust. Both sagebrush populations show a decrease in percent decadency with a few plants being heavily hedged. Almost 1 out of 4 black sagebrush and 1 out of 3 Wyoming big sagebrush are dead at this time. This is most likely due to extended drought conditions, thinning out the sagebrush populations and competition with the pinyon and juniper trees. Although these are relatively high ratio's, there is still a comparatively high percentage of young plants in the population. This combined with light use of other palatable browse species, contributes to a stable to slightly upward browse trend.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3) but poor composition with too many annuals

2000 TREND ASSESSMENT

Percent bare soil has increased slightly since 1995 with only almost no sign of erosion. There has been increases in both vegetation and litter cover. The ratio of bare soil to protective cover has increased from 1:2.1 to 1:2.6 which provides good protection and contributes to a stable soil trend. The herbaceous understory is comprised primarily of grasses. This includes mostly perennial species (crested wheatgrass, purple three-awn, galleta, and Indian ricegrass) which makes up more than 98% of the grass cover. At this time annuals only make up 1% of the grass cover. Herbaceous understory is stable even though there was a slight decrease in sum of nested frequency for perennial grasses. However, there is a much improved composition of mostly perennials at this time. The pinyon and juniper extensive root system is affecting the understory species by being more competitive for moisture and sunlight. This is especially true for this last year of extreme drought. There are several different browse species, of which, broom snakeweed is still the most abundant browse. This population does not appear to be expanding at this time as its density is down slightly from 1995. Both sagebrush populations continue to show a decrease in percent decadency (0% in 2000). Black sagebrush and Wyoming big sagebrush are a minor component as together they only make up 5% of the browse cover. With a pinyon-juniper density of 337 trees/acre, the preferred browse will never be an important winter forage component until the competitive tree overstory is thinned. Seventy-six percent of the total browse cover comes from pinyon and juniper trees making it difficult for any browse species to do well in this community. Browse trend is slightly down.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - stable with a great reduction of annuals (3)

HERBACEOUS TRENDS --

Herd unit 13B, Study no: 9

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	<i>Agropyron cristatum</i>	_a 63	_b 106	96	26	38	38	2.00	5.21
G	<i>Aristida purpurea</i>	_a -	_b 16	_b 13	-	7	5	.40	.84
G	<i>Bromus tectorum</i> (a)	-	_b 243	_a 6	-	79	4	3.00	.09
G	<i>Hilaria jamesii</i>	_a -	_b 14	_b 18	-	4	6	.48	1.01
G	<i>Oryzopsis hymenoides</i>	_b 29	_a 17	_a 11	21	9	8	.46	.68
G	<i>Poa fendleriana</i>	_b 15	_b 15	_a -	7	7	-	.03	-
G	<i>Poa secunda</i>	-	-	2	-	-	1	-	.00
G	<i>Sitanion hystrix</i>	_b 62	_a 7	_a 4	29	3	2	.04	.04
G	<i>Vulpia octoflora</i> (a)	-	4	-	-	2	-	.01	-
Total for Annual Grasses		0	247	6	0	81	4	3.01	0.09
Total for Perennial Grasses		169	175	144	83	68	60	3.43	7.80
Total for Grasses		169	422	150	83	149	64	6.45	7.89
F	<i>Arabis drummondi</i>	_a -	_b 9	_a -	-	4	-	.02	-
F	<i>Astragalus mollissimus</i>	_b 15	_b 10	_a -	7	4	-	.05	-
F	<i>Astragalus</i> spp.	-	4	-	-	2	-	.01	-
F	<i>Carduus nutans</i> (a)	-	_b 5	_a -	-	3	-	.01	-
F	<i>Cryptantha</i> spp.	_a -	_b 23	_a -	-	13	-	.06	-
F	<i>Cymopterus</i> spp.	_a -	_b 16	_a -	-	8	-	.04	-
F	<i>Draba nemorosa</i> (a)	-	4	-	-	2	-	.01	-
F	<i>Erodium cicutarium</i> (a)	-	_b 18	_a 5	-	8	2	.04	.01
F	<i>Erigeron pumilus</i>	2	-	-	2	-	-	-	-
F	<i>Euphorbia</i> spp.	_c 13	_b 4	_a -	9	3	-	.01	-
F	<i>Gilia hutchinifolia</i> (a)	-	_b 28	_a -	-	16	-	.08	-
F	<i>Haplopappus acaulis</i>	_b 70	_a 31	_a 29	31	15	14	.39	.24
F	<i>Heterotheca villosa</i>	_a -	_b 12	_{ab} 4	-	4	2	.16	.15
F	<i>Hymenoxys acaulis</i>	_a -	_a -	_b 5	-	-	3	-	.06
F	<i>Lappula occidentalis</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Lactuca serriola</i>	-	1	-	-	1	-	.00	-
F	<i>Lesquerella ludoviciana</i>	_b 10	_a -	_a -	4	-	-	-	-
F	<i>Lithospermum</i> spp.	-	2	-	-	1	-	.00	-
F	<i>Machaeranthera grindelioides</i>	_b 10	_a -	_a -	4	-	-	-	-
F	<i>Medicago sativa</i>	-	-	-	-	-	-	.01	-
F	<i>Penstemon carnosus</i>	_{ab} 3	_b 5	_a -	1	3	-	.04	-
F	<i>Petroradia pumila</i>	_b 28	_a 14	_{ab} 16	14	6	6	.47	1.12
F	<i>Phlox hoodii</i>	_b 25	_a 11	_a 10	10	4	5	.05	.07
F	<i>Physaria</i> spp.	1	-	-	1	-	-	-	-

Type	Species	Nestled Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Sisymbrium altissimum (a)	_a 1	_b 13	_a -	1	6	-	.03	-
F	Silene spp.	_a -	_b 11	_a -	-	4	-	.02	-
F	Streptanthus cordatus	_a -	_b 7	_a -	-	4	-	.02	-
F	Townsendia incana	3	-	-	1	-	-	-	-
F	Tragopogon dubius	_b 17	_a 3	_a -	7	1	-	.00	-
Total for Annual Forbs		1	70	5	1	36	2	0.17	0.00
Total for Perennial Forbs		197	163	64	91	77	30	1.39	1.66
Total for Forbs		198	233	69	92	113	32	1.57	1.67

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 13B, Study no: 9

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Amelanchier utahensis	1	0	-	-
B	Artemisia nova	13	13	.85	1.00
B	Artemisia tridentata wyomingensis	5	1	.18	.15
B	Cercocarpus montanus	10	5	3.25	2.76
B	Ephedra viridis	1	1	.15	.15
B	Gutierrezia sarothrae	30	32	.71	1.28
B	Juniperus osteosperma	0	7	2.95	5.73
B	Opuntia spp.	1	2	-	.03
B	Pinus edulis	0	16	11.50	12.08
B	Sclerocactus	1	5	.00	.06
B	Symphoricarpos oreophilus	1	1	.15	.15
B	Yucca harrimaniae	1	2	.00	.00
Total for Browse		64	85	19.75	23.42

CANOPY COVER --

Herd unit 13B, Study no: 9

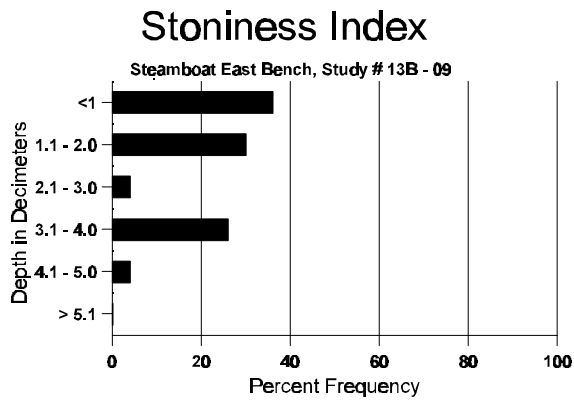
Species	Percent Cover
	'00
Juniperus osteosperma	9
Pinus edulis	12

BASIC COVER --
Herd unit 13B, Study no: 9

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	316	216	2.00	27.71	32.60
Rock	236	182	7.00	15.66	11.94
Pavement	65	176	1.75	.52	6.53
Litter	382	356	55.50	41.47	50.87
Cryptogams	62	60	1.00	.80	1.73
Bare Ground	264	239	32.75	26.00	28.85

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 9, Study Name: Steamboat East Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.72	63.4 (13.15)	7.3	57.6	17.1	25.2	2.0	2.0	80.0	0.6



PELLET GROUP FREQUENCY --
Herd unit 13B, Study no: 9

Type	Quadrat Frequency	
	'95	'00
Rabbit	17	15
Elk	9	-
Deer	6	10
Cattle	-	1

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
418	N/A
11	7 (19)
218	17 (42)
-	-

BROWSE CHARACTERISTICS --

Herd unit 13B, Study no: 9

AGE	YGR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Amelanchier utahensis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	119	169	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	109	167	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
												'00	0		-			
Artemisia nova																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	5	6	-	-	-	-	-	-	-	11	-	-	-	366		11	
	95	2	4	-	-	-	-	-	-	-	6	-	-	-	120		6	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	8	4	1	-	-	-	-	-	-	13	-	-	-	433	8	11	13
	95	3	8	4	-	-	-	-	-	-	15	-	-	-	300	10	18	15
	00	20	1	-	-	-	-	-	-	-	21	-	-	-	420	7	17	21
D	86	3	8	1	-	-	-	-	-	-	10	-	-	2	400		12	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		50%			06%			06%			-63%							
'95		55%			18%			00%			+ 0%							
'00		05%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	1199	Dec:	33%			
												'95	440		5%			
												'00	440		0%			

A G R E	Y R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	1	-	-	-	-	-	-	-	1	-	-	-	33	5	7	1
	95	1	-	2	-	-	-	-	-	-	3	-	-	-	60	14	22	3
	00	-	-	2	-	-	-	-	-	-	2	-	-	-	40	9	17	2
D	86	-	1	1	-	-	-	-	-	-	1	-	-	1	66		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		50%			25%			25%			- 9%							
'95		00%			33%			00%			-67%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	132	Dec:	50%				
											'95	120		33%				
											'00	40		0%				
<i>Cercocarpus montanus</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6	
	00	-	-	-	1	-	-	1	-	-	2	-	-	-	40		2	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	1	-	2	-	-	-	-	-	5	-	-	-	100	68	94	5
	00	-	-	-	-	1	-	2	-	-	3	-	-	-	60	74	92	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	1	20		1		
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		08%			00%			08%			-50%							
'00		17%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'86	0	Dec:	0%				
											'95	240		8%				
											'00	120		17%				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4		1	2				
<i>Chrysothamnus nauseosus hololeucus</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	0	43	56	0
	00	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%						
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'95	0		-			
						'00	0		-			
<i>Ephedra viridis</i>												
M	86	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	20	34	35	1
	00	1	-	-	-	-	-	-	20	33	57	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>				
'86		00%		00%		00%						
'95		00%		00%		00%		+ 0%				
'00		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	0	Dec:	-			
						'95	20		-			
						'00	20		-			
<i>Gutierrezia sarothrae</i>												
S	86	-	-	-	-	-	-	-	0			0
	95	13	-	-	-	-	-	-	260			13
	00	-	-	-	-	-	-	-	0			0
Y	86	7	-	-	-	-	-	-	233			7
	95	7	-	-	-	-	-	-	140			7
	00	2	-	-	-	-	-	-	40			2
M	86	39	-	-	-	-	-	-	1300	8	10	39
	95	74	-	-	-	-	-	-	1480	9	13	74
	00	43	-	-	1	-	-	-	880	6	11	44
D	86	1	-	-	-	-	-	-	33			1
	95	3	-	-	-	-	-	-	60			3
	00	19	-	-	-	-	-	-	380			19
X	86	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	560			28
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>% Change</u>				
'86		00%		00%		00%		+ 7%				
'95		00%		00%		01%		-23%				
'00		00%		00%		29%						
Total Plants/Acre (excluding Dead & Seedlings)						'86	1566	Dec:	2%			
						'95	1680		4%			
						'00	1300		29%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	00	2	-	-	1	-	-	-	3	-	6	-	-	-	120	-	6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
												'00	140		-			
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	11	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	3	12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'95		00%			00%			00%			+50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
												'00	40		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total									
		1	2	3	4		1	2										
Pinus edulis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
	00	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
Y	86	3	-	-	-	-	-	-	-	3	-	-	-	100		3		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	5	-	-	7	-	-	-	-	12	-	-	-	240		12		
M	86	6	-	-	-	-	-	-	-	3	3	-	-	200	81	39	6	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	00	3	-	-	-	-	5	3	-	11	-	-	-	220	-	-	11	
D	86	1	-	-	-	-	-	-	-	-	-	-	1	33		1		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>										
'86		00%		00%		10%												
'95		00%		00%		00%												
'00		00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)										'86	333	Dec:	10%					
										'95	0		0%					
										'00	460		0%					
Sclerocactus																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	1	-	-	-	-	-	-	-	1	-	-	-	20	11	8	1	
	00	8	-	-	-	-	-	-	-	8	-	-	-	160	5	7	8	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>										
'86		00%		00%		00%												
'95		00%		00%		00%		+75%										
'00		00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-					
										'95	40		-					
										'00	160		-					
Symphoricarpos oreophilus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	1	-	-	-	-	1	-	-	-	20	30	57	1	
	00	-	-	-	1	-	-	-	-	1	-	-	-	20	-	-	1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>										
'86		00%		00%		00%												
'95		00%		00%		00%		+ 0%										
'00		00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)										'86	0	Dec:	-					
										'95	20		-					
										'00	20		-					

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Yucca harrimaniae																		
Y	86	7	-	-	-	-	-	-	-	-	7	-	-	-	233		7	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	86	17	-	-	-	-	-	-	-	-	17	-	-	-	566	12	16	17
	95	1	-	-	-	-	-	-	-	-	-	-	-	20	4	2	1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	0	12	13	0	
D	86	1	-	-	-	-	-	-	-	-	-	-	1	33		1		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	86	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	00	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			04%			-98%							
'95		00%			00%			00%			+50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	832	Dec:	4%			
												'95	20		0%			
												'00	40		0%			

SUMMARY

WILDLIFE MANAGEMENT UNIT - 13 B (34) - DOLORES TRIANGLE

Four of the 9 studies located in the Dolores Triangle unit sample pinyon-juniper chainings completed in 1968. The chaining sites include Fish Park (#3), Ryan Park (#6), Steamboat Mesa North (#7), and Steamboat East Bench (#9). Another four sites are considered sagebrush/grass sites. These sites include Lower Westwater (#1), Upper Westwater (#2), Buckhorn Draw (#5), and Steamboat Mesa South (#8). The final site, Red Cliffs (#4), is classified as a blackbrush site. The following table summarizes trends for all sites for all years. Detailed information with regard to site trends is written up in each site narrative. The exceptionally dry year has greatly reduced the dominance of cheatgrass and decreased the amount of forbs throughout this unit.

TREND SUMMARY

Site No. and Name	Category	1986	1995	2000
13B-1 Lower Westwater	soil	est	3	2
	browse	est	1	1
	herbaceous understory	est	1	1
13B-2 Upper Westwater	soil	est	3	1
	browse	est	1	1
	herbaceous understory	est	1	1
13B-3 Fish Park	soil	est	3	3
	browse	est	5	3
	herbaceous understory	est	2	3
13B-4 Red Cliffs	soil	est	3	3
	browse	est	3	3
	herbaceous understory	est	2	3
13B-5 Buckhorn Draw	soil	est	3	2
	browse	est	4	3
	herbaceous understory	est	3	3
13B-6 Ryan Creek	soil	est	3	2
	browse	est	1	3
	herbaceous understory	est	1	3
13B-7 Steamboat Mesa North	soil	est	3	3
	browse	est	3	3
	herbaceous understory	est	4	4

est = established, 1 = down, 2 = slightly down, 3 = stable, 4 = slightly up, 5 = up

Site No. and Name	Category	1986	1995	2000
13B-8 Steamboat Mesa South	soil	est	3	2
	browse	est	3	3
	herbaceous understory	est	1	4
13B-9 Steamboat Mesa East Bench	soil	est	3	3
	browse	est	3	2
	herbaceous understory	est	3	3

est = established, 1 = down, 2 = slightly down, 3 = stable, 4 = slightly up, 5 = up

REFERENCES

Coles, F. H. and J. C. Pederson. 1968. Utah big game range inventory, 1967. Publ No. 68-2. Utah Department of Fish and Game, Salt Lake City, Utah. 120 pp.

Jense, G. K., J. W. Fitzgerald and others. 1986. Utah big game annual report, 1986. Publ. No. 86-3. Utah Dept. of Natural Resources, Division of Wildlife Resources. Salt Lake City, Utah.

Jense, G. K., W. S. Shields and others. 1991. Utah big game annual report, 1991. Publ. No. 91-3. Utah Dept. of Natural Resources, Division of Wildlife Resources. Salt Lake City, Utah.