

UTAH BIG GAME RANGE TREND STUDIES 1999 Volume 2



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REPORT FOR FEDERAL AID PROJECT W-135-R-20**

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

**UTAH BIG GAME
RANGE TREND STUDIES
1999 Volume 2**

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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 1999 field season and reported in this publication involves the reading of interagency range trend studies in the DWR Southeastern Region. Trend studies surveyed in these management units were established in 1985, 1988, 1989, 1991 and 1994, with rereads in 1991, 1994 and 1999. Some new sites were established in 1999 as well.

The following National Forest Service and 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:

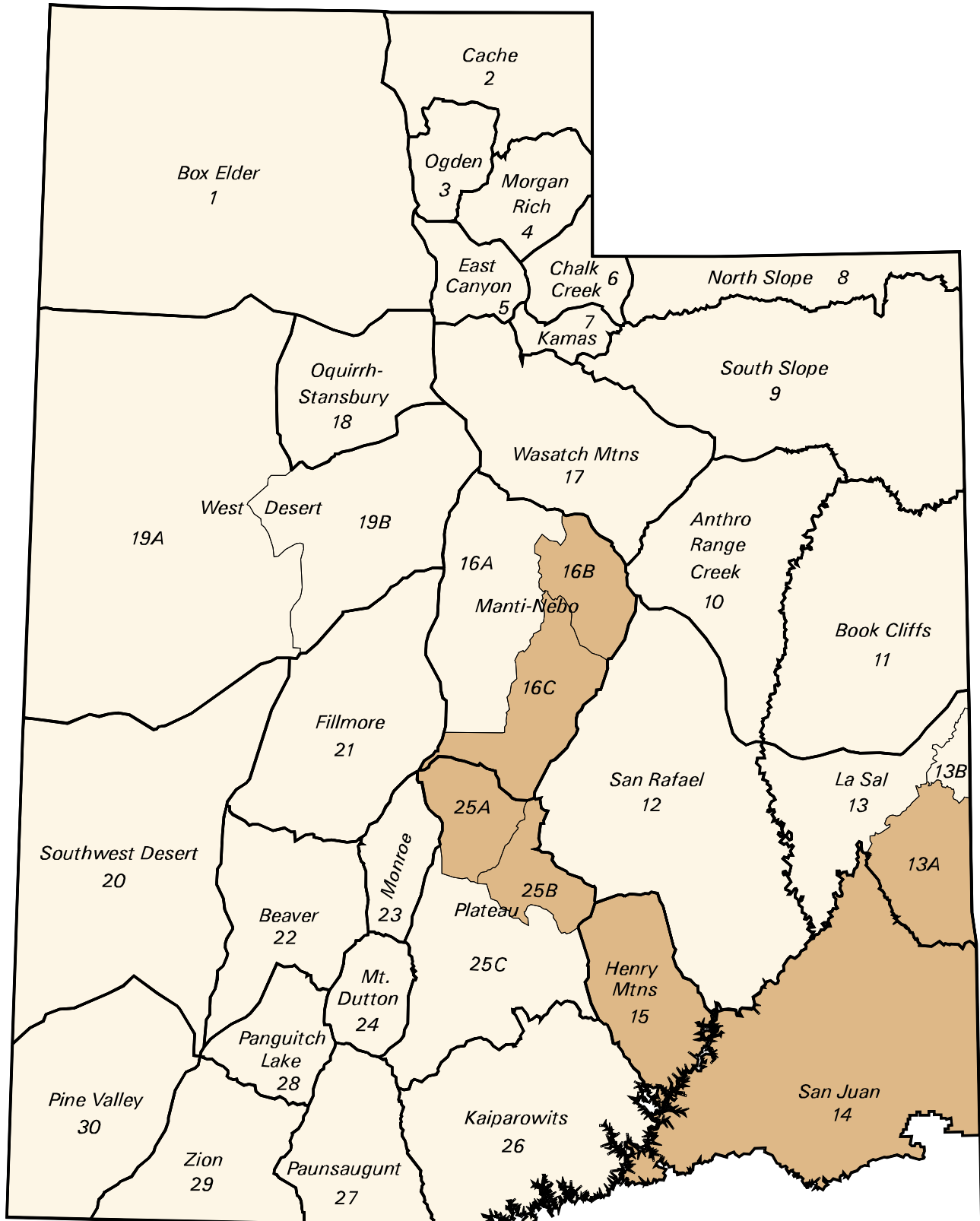
Manti-LaSal National Forest
Moab Ranger District
Monticello Range District

Fish Lake National Forest
Loa Ranger District

Bureau of Land Management
Monticello Resource Area
Moab Resource Area

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

Utah Management Units Surveyed in 1999



RANGE TREND STUDY METHODS

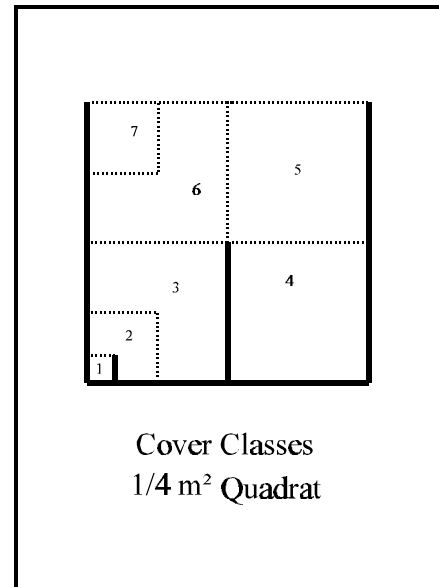
Studies monitoring range trend depend greatly on site selection, especially when dealing with large geographic areas such as wildlife management units. Since it is impossible to intensively monitor all vegetative or habitat types within a unit, it is necessary to concentrate on specific sites and/or "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

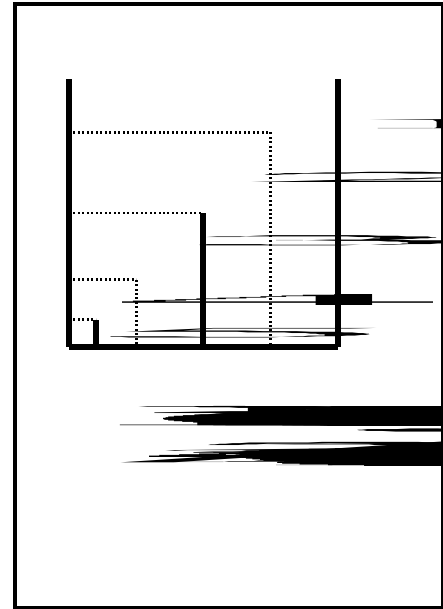
Determining vegetational characteristics for each "key" area is determined by setting up 5 consecutive 100 ft baseline transects in the area of interest. This 500 ft line is the baseline and one, 100 ft belt is placed perpendicular to each 100 ft section of the baseline at random foot marks and centered 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.

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.

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)

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

Type	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:

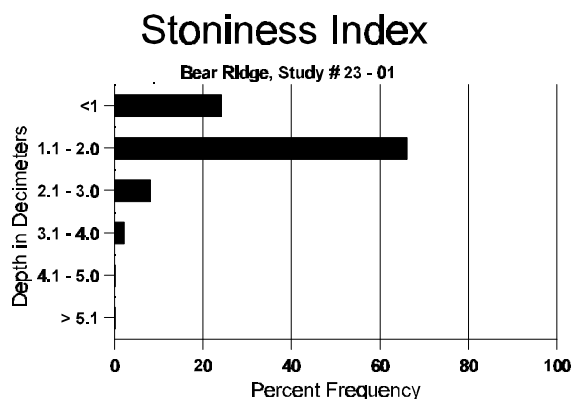
Ultra acid	<3.5
Extremely acid	3.5-4.4
Very strongly acid	4.5-5.0
Strongly acid	5.1-5.5
Moderately acid	5.6-6.0
Slightly acid	6.1-6.5
Neutral	6.6-7.3
Slightly alkaline	7.4-7.8
Moderately alkaline	7.9-8.4
Strongly alkaline	8.5-9.0
Very strongly alkaline	>9.1

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 08	Pellet Transect Days Use/Acre (ha) 08
Rabbit	25	n/a
Elk	4	2 (5)
Deer	36	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

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 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.

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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.

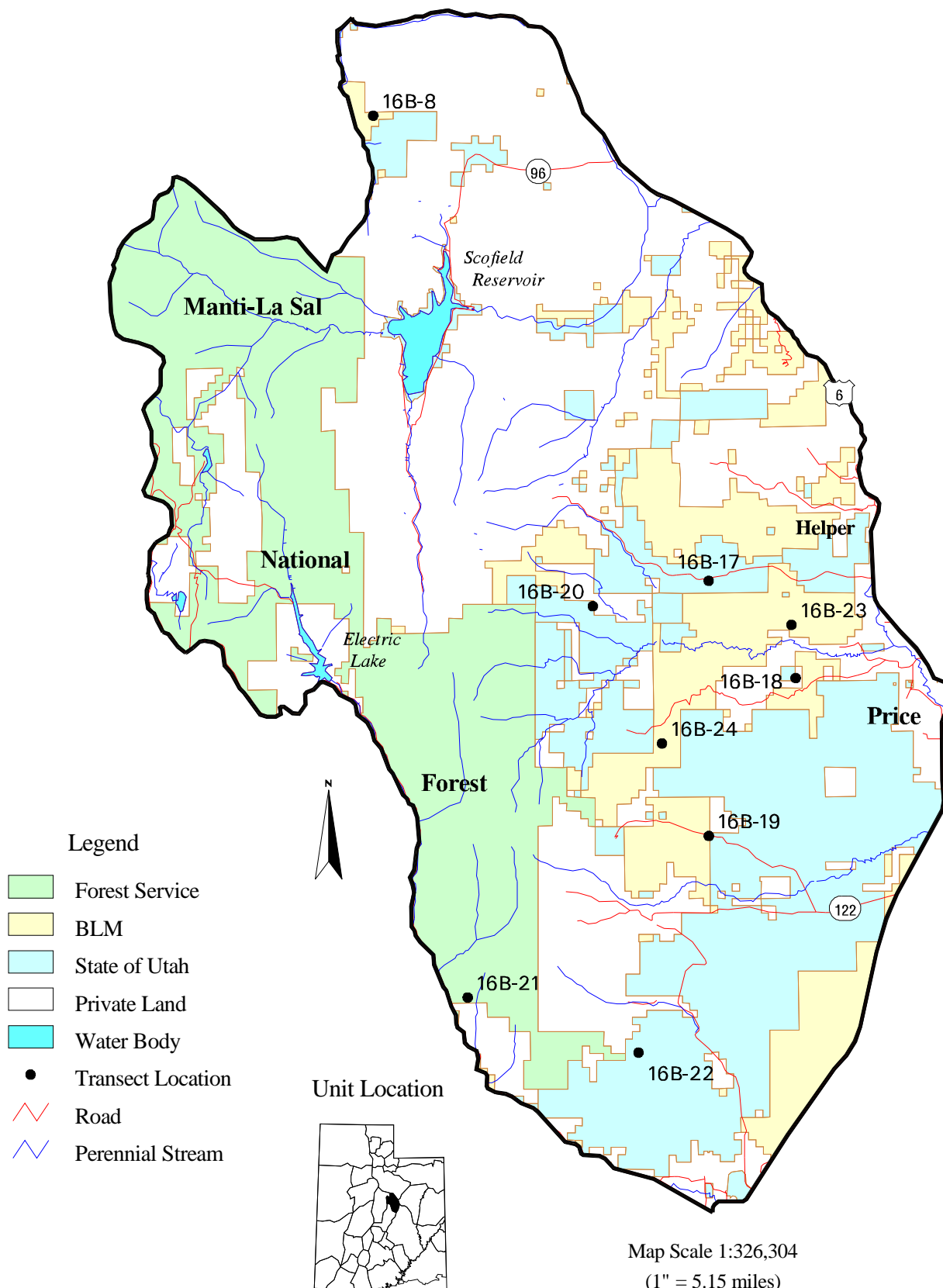
The name of the site and directions for locating the site are given on the location page. Due to many changes in management unit boundaries, trend studies have been renumbered. The previous trend study number is found in parenthesis following the trend study number currently being used. Also included 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 16B



WILDLIFE MANAGEMENT UNIT 16B - MANTI-NEBO, MANTI NORTH

Boundary Description

Utah, Sanpete, Emery, and Carbon counties - Boundary begins at Highway SR-10 and Highway SR-31 in Huntington; then north on SR-10 to Highway US-6; northwest on US-6 to Highway US-89; south on US-89 to SR-31; southeast on SR-31 to Huntington.

This unit was previously called the Northeast Manti Deer Herd Unit 30. In the spring of 1998, this unit was incorporated into the much larger Wildlife Management Unit #16. This subunit (16B) encompasses the east and west sides of the Wasatch Plateau. Most of the winter range in subunit 16B lies on the east side of the Wasatch Plateau, which rises straight up from the valley floor to ridges with heights over 9,500 feet. The winter range is a narrow strip of land along the base of the plateau below the 8,000 foot contour. It runs from Price Canyon south to Huntington Canyon. Other important winter ranges include a large section of land along the Price River in the Colton area, below Scofield Reservoir and in the mouths of several side canyons in Huntington Canyon. Elk winter ranges are found on south-facing grassy points at high elevations on the Wasatch Plateau. These include Ford Ridge, Hardscrabble, and large points on the south side of Gentry Mountain overlooking Huntington Canyon.

Currently, 54% of the winter range in Wildlife Management Unit 16 is managed by the BLM and U.S. Forest Service. The remaining portion is primarily owned by private entities, with a small amount of acreage being owned by the DWR. Summer range is 72% Forest Service lands, 22% privately owned, with the remainder made up of state owned lands.

The Manti-North area has historically supported a variety of wildlife and outdoor recreation, livestock grazing, ranches and farms, energy developments, and some forest industry. Industrial activities on the deer herd unit are associated primarily with coal production, electrical power generation, and oil and gas development. Exploration and development activities for oil and gas have the potential for future increases. Add to this a growing demand for low-sulfur Wasatch coal, and one can begin to visualize the demands placed upon winter ranges in this area.

Power plants, slack piles, coal load-out facilities, ghost towns, railroads, and agriculture compete for valuable winter range property. The Huntington Canyon Power Plant alone has removed over 400 acres of critical winter range. An extensive road system provides year-round access to large portions of the winter range. Heavily used access roads to coal mines dissect important winter ranges all along the east side of the Wasatch Plateau and are accountable for significant highway deer mortality.

Herd Unit Management Objectives

There are no current specific management objectives for subunit 16B, but only unit wide objectives. The current target winter herd size for all of unit 16 is to achieve a target population size of 60,600 (38,000 wintering deer on the Wasatch Plateau or Manti Mountain Portion of the unit and 22,600 on the Nebo portion). A post season buck to doe ration of 15:100 is sought with 30% of these bucks being 3 point or better.

Key Areas

Key wintering areas for deer include Wildcat Canyon and the Gordon Creek basin, Consumers Bench, Porphyry Bench, North Spring, several areas in Huntington Canyon, Gentry Mountain, and Spring Canyon drainages. Preferred elk wintering areas include Miles Point, Reynolds Point on Trail Mountain, Telephone Bench, and Diamanti Bench.

The winter range is made up of several habitat types which include pinyon-juniper, sagebrush/grass, mountain brush, grassland, seedings, and other miscellaneous vegetation types. Pinyon-juniper woodland is the most widespread type, accounting for 40 percent of the total winter range. Unfortunately, it is also among the least productive according to the 1980 range inventory. Sagebrush grass communities make up approximately 24 percent of the winter range and probably receive the heaviest use due to the availability of preferred forage.

Eight interagency range trend studies were established in June and July of 1988. Six sites sample the big sagebrush/grass range type. One study is on a higher elevation, steep slope, dominated by perennial grass, and another is in a pinyon-juniper chaining. Two studies that were established in 1989 in the Starvation drainage in Spanish Fork Canyon are now included in subunit 16B. These studies sample a curleaf mahogany area and an adjacent mountain brush site. Two additional studies were added in 1994. Both sites are on sagebrush-grass range, one on Consumer Bench, and the other on Wiregrass Bench. Six of the studies are on BLM land including Ford Ridge (#15), Hardscrabble (#16), North Springs Bench (#19), Poison Spring Bench (#22), Consumer Bench (#23) and Wiregrass Bench (#24). Five studies occur on State land including Starvation Mahogany (#8), Starvation Mountain Brush (#9), Slackpile (#17), Porphyry Bench (#18), and Telephone Bench (#20). One study, Huntington Canyon (#21), occurs on land administered by the U.S. Forest Service.

Grazing Summary

Most of the study sites in subunit 16B on which grazing occurs are on lands administered by the BLM. Ford Ridge is in the Price Canyon West allotment which is grazed by 92 cattle from May 17 to November 15. This sagebrush/grass ridge receives year-round elk use. Hardscrabble is in the Crandall Canyon allotment which is grazed from May 1 to October 31 by 31 cattle. It is an important site for elk in winter. North Spring Bench is in the allotment of the same name which is permitted for 1,000 sheep from May 1 to June 30. This study is on critical deer winter range. Poison Spring Bench is in the North Huntington cattle allotment is currently utilized by 354 cows in the spring (April 22 through June 26) and 282 cows in the winter (November 1 through December 15). The management plan outlines a two pasture deferred rotation system. The upper end of the allotment where the study is located was chained and seeded in the late 1960's. The Consumer Bench site is within the Consumer Wash allotment which is grazed by 54 sheep from October 1 to April 21, when an additional 821 sheep are allotted until June 20. Wiregrass Bench occurs in the Haley allotment which is grazed by 27 cattle from May 16 to October 31 in a two pasture deferred rotation.

The five trend studies on State land are not currently grazed by livestock. Slackpile is the only area where livestock grazing was permitted in the years immediately prior to study establishment. One hundred fifty AUM's (cattle) were allocated for use between May 15 and June 15, but grazing has since been discontinued. All areas receive heavy winter deer and elk use.

The remaining study, Huntington Canyon, is on U.S. Forest Service land. It occurs in the Gentry Mountain cattle allotment which is grazed by 1,440 cattle from June 27 through September 30. It is on a four pasture rest rotation schedule. This area contains important winter range for elk and portions of the southwest side of Gentry Mountain have been designated by the Forest Service in their Land and Resource Management Plan as "key big game winter range." This designation stipulates "the area must be available to big game and unencumbered each year during the critical winter period."

These key areas and the study sites for this herd unit were discussed and selected during an Interagency meeting in Price on March 8, 1988.

Trend Study 16B-8-99

Study site name: Starvation Mahogany.

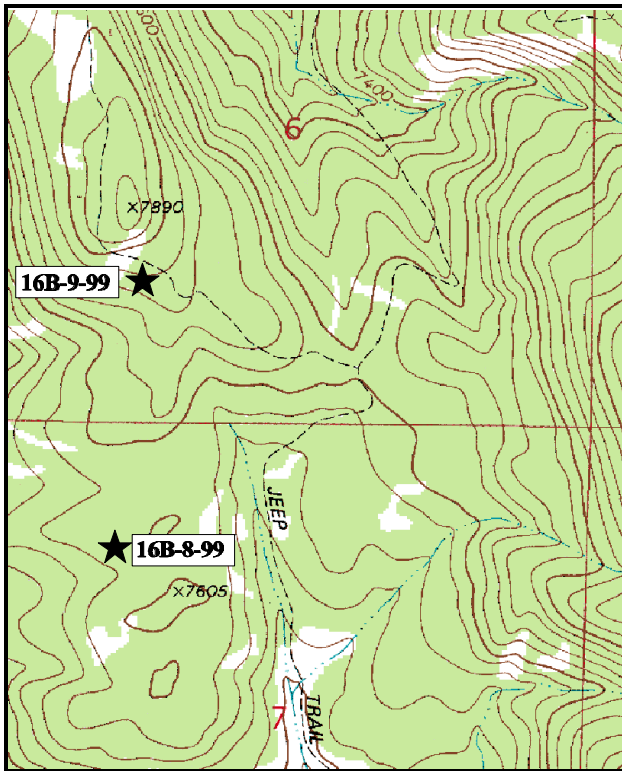
Range type: Curleaf Mountain Mahogany.

Compass bearing: frequency baseline 160°M- line 1; 151°M-lines 2-4.

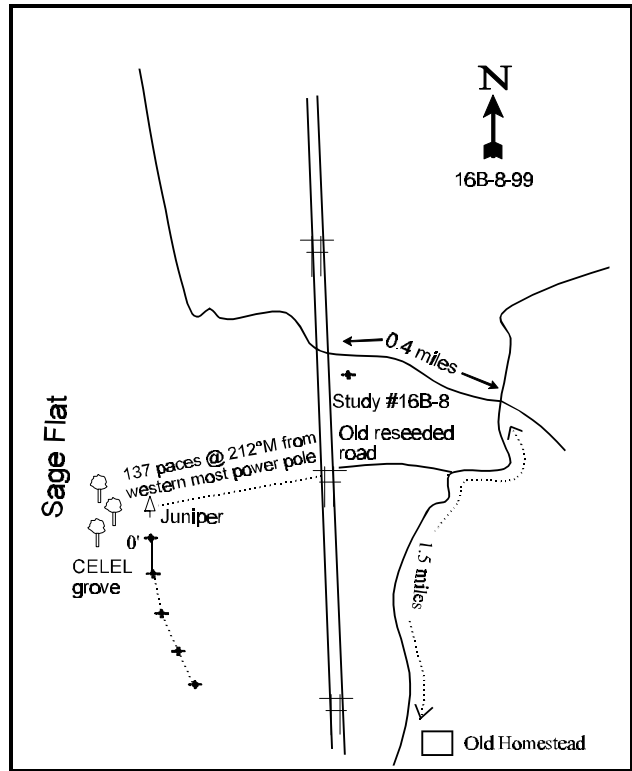
Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11 and 95 ft), line 2(34 ft), line 3(59 ft), line 4(71ft).

LOCATION DESCRIPTION

From Tucker rest area on Highway 50/6 in Spanish Fork Canyon, take the Starvation Canyon road 4.6 miles. Turn left and go 0.5 miles to another fork. Turn left and go up a small canyon on a rough road for 1.15 miles to a fork. Turn left, cross the creek, and go 0.3 miles to an old homestead site. Continue up the road about a mile to an old road on the left that has been seeded over. From here, walk east to the double powerlines on the hill. From the western most pole, walk 137 paces at 212°M to the 0 ft stake of the baseline.



Map Name: Tucker



Diagrammatic Sketch

Township 11S, Range 7E, Section 7.

DISCUSSION

Trend Study Number 16B-8 (37-8)

This trend study is located on a curlleaf mountain mahogany bench in the Starvation Creek drainage on DWR property. It is important range for both mule deer and elk, with most use in the winter. The site lies on a gently sloping bench to the southwest at an elevation of 7,600 feet. Pellet group transect data from 1999 estimates moderate wildlife use with 34 deer days use/acre (84 ddu/ha) and 34 elk days use/acre (84 edu/ha). Livestock is currently light with an estimated 4 cow days use/acre (9 cdu/ha). A large 4-point buck antler shed was found while hiking to the site in 1999.

The soil is a dark brown clay loam with a slightly alkaline pH (7.4). The soil is moderately deep with an estimated effective rooting depth of nearly 14 inches. There is very little rock or pavement on the surface. There is a clay pan layer at 10-12 inches below the surface that is about 6 inches in thickness. The stoniness index estimated by penetrometer readings is more a reflection of this clay pan than from actual rock within the profile. Erosion is minimal with high vegetation and litter cover. Also, the majority of the roots from vegetation lie in the upper 12 inches of the profile helping to hold the soils in place. Organic matter is moderately high at 3.2%, while phosphorus levels are quite low (2.7 ppm). Phosphorus levels less than 10 ppm have been shown to limit normal plant growth and development.

The browse at the site are diverse with 13 species being sampled. Key species include: Utah serviceberry, mountain big sagebrush, true mountain mahogany, curlleaf mountain mahogany, and bitterbrush. These key species account for only 27% of the total browse cover, with the majority being provided by less preferred species such as snowberry, Gambel oak, and stickyleaf low rabbitbrush. This site was established in 1989 and not reread until 1999. The baseline was extended in 1999 accompanying the improvement in methods, which better estimates browse populations that have clumped and/or discontinuous distributions. The extension of the baseline and discontinuation of the relatively small density plots accounts for some of the big changes in population densities for many of the shrub species at the site. The population of serviceberry is currently estimated at 500 plants/acre. Biotic potential is good at 12%, with high recruitment from young plants (52%). Percent decadence has increased from 7% to 12% since 1989, with the proportion of plants in poor vigor increasing from 5% to 12% since the last reading. Currently, 28% of the plants display moderate use, with an additional 16% showing heavy use. Mountain big sagebrush currently numbers 940 plants/acre and occurs mostly in the more open areas. Decadency is high at 43%, with 11% of the population showing poor vigor. Recruitment is very low at 2%.

True mountain mahogany and curlleaf mahogany are currently estimated at 740 and 180 plants/acre respectively. Biotic potential and recruitment for true mountain mahogany are high at 14% and 57% respectively. No plants were classified as being decadent or displaying poor vigor in 1999. Currently, 30% of the plants sampled show moderate use, and 19% of the population shows heavy use which is relatively low for this species compared to other sites. Curlleaf mahogany has a high biotic potential at 33%, and extremely high recruitment from young plants at 67%. However, the low density accounts for these high percentages. Decadency is currently at 11%, with those plants showing poor vigor also at 11%. Mature curlleaf trees are about 7 feet tall, with many being highlined. Currently, the density of antelope bitterbrush is low at 120 plants/acre, with the majority being mature plants. Half of the plants sampled in 1999 displayed heavy use, although average crown measurements nearly doubled.

The most numerous browse at the site are the less preferred species. Snowberry is currently estimated at 3,120 plants/acre. Use is light and vigor good for this species. Gambel oak is found in thickets scattered throughout the site. This species is currently estimated at 1,980 stems/acre, and provides good cover for wildlife. Stickyleaf low rabbitbrush is the most numerous in density with an estimated 4,780 plants/acre in 1999.

The herbaceous understory is diverse in both grasses and forbs. Fourteen species of grasses and 28 species of forbs were sampled in 1989, while 13 species of grasses and 26 species of forbs were sampled in 1999. Two native species, bluebunch wheatgrass and western wheatgrass, are the most abundant grasses providing 58% of the grass cover. Western wheatgrass significantly increased in nested frequency between 1989 and 1999, with bluebunch wheatgrass slightly increasing, but not significantly. Hoods phlox is the most abundant forb occurring in 53% of the quadrats and providing 59% of the forb cover. No utilization was apparent on any of the herbaceous species when the site was read in September 1999.

APPARENT TREND ASSESSMENT

The high diversity would indicate a stable community, and considering the reproduction of desirable species, trend is stable to upward. Much of the curlleaf mountain mahogany is unavailable as forage, but provides good cover. Future overutilization of the browse component could result in higher decadence, unavailability of new production, and lower reproduction. Trend for soil is stable.

1999 TREND ASSESSMENT

Trend for soil remains stable. Protective ground cover provided by herbaceous vegetation and litter is high. Erosion is minimal with the gentle slope and the abundance of grasses and forbs. Trend for the key browse is stable overall. Biotic potential and recruitment is high for Utah serviceberry, true mountain mahogany, and curlleaf mountain mahogany. Percent decadency is also relatively low. These species all display evidence of moderate to heavy use. However, all these species are tolerant of higher levels of browsing and the current levels are not excessive. The main concern for the key browse on this site is the high decadency rate (43%) of mountain big sagebrush, and the number of dead plants (800 per acre). Although, mountain big sagebrush only makes up about 14% of the key preferred browse component (Utah serviceberry, true mountain mahogany, mountain mahogany, and bitterbrush). Herbaceous understory trend is stable. Sum of nested frequency for perennial grasses nearly doubled in 1999, while perennial forb sum of nested frequency decreased by 25%. Overall, the sum of nested frequency of all herbaceous perennial species remained nearly the same between 1989 and 1999.

TREND ASSESSMENT

soil - stable

browse - stable for the key species

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 8

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'89	'99	'89	'99	
G	Agropyron cristatum	25	*9	11	3	.18
G	Agropyron smithii	59	*125	20	44	1.98
G	Agropyron spicatum	80	92	35	38	2.56
G	Agropyron trachycaulum	16	*-	7	-	-
G	Bromus inermis	-	2	-	1	.03
G	Carex spp.	9	6	4	3	.44
G	Koeleria cristata	4	12	2	6	.05
G	Oryzopsis hymenoides	11	*2	7	2	.06
G	Poa fendleriana	22	52	11	20	.69
G	Poa pratensis	4	*49	1	16	.88
G	Poa secunda	-	*11	-	6	.05
G	Sitanion hystrix	4	11	2	5	.10
G	Stipa comata	-	2	-	1	.00
G	Stipa lettermani	37	43	18	18	.79
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		271	416	118	163	7.87
Total for Grasses		271	416	118	163	7.87
F	Achillea millefolium	6	3	2	1	.15
F	Antennaria rosea	-	4	-	1	.15
F	Arabis spp.	1	3	1	1	.00
F	Astragalus convallarius	26	23	13	12	.19
F	Astragalus miser	-	1	-	1	.03
F	Aster spp.	57	*16	23	5	.12
F	Astragalus spp.	9	9	6	3	.01
F	Calochortus nuttallii	-	1	-	1	.00
F	Chaenactis douglasii	9	2	6	2	.01
F	Cirsium spp.	30	*13	15	6	.05
F	Comandra pallida	20	15	7	6	.10
F	Draba spp. (a)	-	3	-	2	.01
F	Eriogonum umbellatum	20	12	12	7	.08
F	Gilia aggregata	3	-	1	-	-
F	Lomatium spp.	3	5	1	2	.33
F	Machaeranthera canescens	95	*42	45	18	.16
F	Orthocarpus spp. (a)	-	6	-	3	.04
F	Penstemon caespitosus	-	31	-	15	.46
F	Penstemon cyananthus	69	*7	31	3	.04
F	Penstemon humilis	31	*3	16	1	.00
F	Penstemon spp.	-	*58	-	28	1.00

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'89	'99	'89	'99	
F	Phlox hoodii	154	129	62	53	4.45
F	Phlox longifolia	4	6	2	2	.01
F	Polygonum douglasii (a)	-	4	-	2	.01
F	Senecio multilobatus	8	*-	5	-	-
F	Solidago spp.	-	2	-	2	.03
F	Taraxacum officinale	-	*17	-	6	.03
F	Viguiera multiflora	1	3	1	1	.00
Total for Annual Forbs		0	13	0	7	0.06
Total for Perennial Forbs		546	405	249	177	7.47
Total for Forbs		546	418	249	184	7.54

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 16B, Study no: 8

Type	Species	Strip Frequency	Average Cover %
		09	09
B	Amelanchier utahensis	21	.77
B	Artemisia tridentata vaseyana	34	.98
B	Cercocarpus ledifolius	8	.79
B	Cercocarpus montanus	24	3.63
B	Chrysothamnus depressus	2	.53
B	Chrysothamnus viscidiflorus viscidiflorus	62	3.77
B	Gutierrezia sarothrae	14	.45
B	Juniperus scopulorum	0	-
B	Mahonia repens	33	2.75
B	Opuntia fragilis	4	-
B	Pinus edulis	0	-
B	Purshia tridentata	6	1.23
B	Quercus gambelii	14	4.83
B	Symphoricarpos oreophilus	57	6.97
B	Tetradymia canescens	13	.33
Total for Browse		292	27.06

CANOPY COVER --
Herd unit 16B, Study no: 8

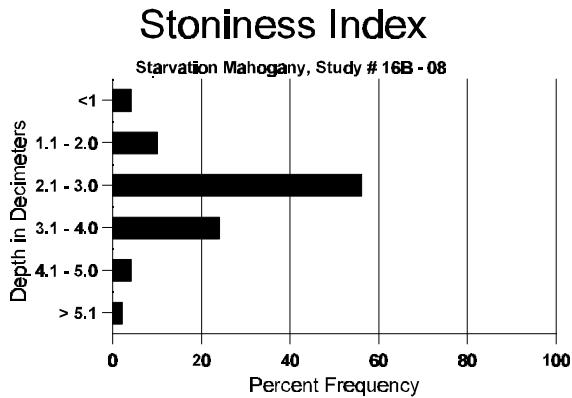
Species	Percent Cover '89
Cercocarpus ledifolius	8
Cercocarpus montanus	1
Quercus gambelii	7

BASIC COVER --
Herd unit 16B, Study no: 8

Cover Type	Nested Frequency '89	Average Cover %	
		'89	'99
Vegetation	335	16.00	39.83
Rock	91	1.00	5.50
Pavement	109	.50	.72
Litter	369	64.75	50.79
Cryptogams	80	.75	3.12
Bare Ground	227	17.00	17.17

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 08, Study Name: Starvation Mahogany

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.9	46.2 (15.1)	7.4	36.7	28.7	34.6	3.2	2.7	156.8	0.7



PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 8

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Elk	24	34 (84)
Deer	20	34 (84)
Cattle	2	4 (10)

BROWSE CHARACTERISTICS --

Herd unit 16B, 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 utahensis</i>																		
S	89	2	-	-	1	-	-	-	-	-	3	-	-	-	200		3	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	89	22	4	-	6	-	-	4	-	-	24	11	1	-	2400		36	
	99	11	-	-	2	-	-	-	-	-	12	-	1	-	260		13	
M	89	-	-	-	-	-	2	-	-	2	-	-	-	133	31	18	2	
	99	-	7	-	1	-	1	-	-	9	-	-	-	180	42	59	9	
D	89	1	1	-	1	-	-	-	-	1	1	1	-	200		3		
	99	-	-	2	-	-	-	-	-	1	-	-	2	60		3		
X	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		12%			00%			05%			-82%							
'99		28%			16%			12%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	2733	Dec:	7%				
											'99	500		12%				
<i>Artemisia tridentata vaseyana</i>																		
Y	89	4	2	-	-	-	-	-	-	-	6	-	-	-	400		6	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	89	-	1	-	-	-	-	-	-	1	-	-	-	66	18	22	1	
	99	20	5	-	1	-	-	-	-	26	-	-	-	520	18	24	26	
D	89	1	4	-	-	-	-	-	-	5	-	-	-	333		5		
	99	10	5	3	2	-	-	-	-	15	-	-	5	400		20		
X	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	800		40		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		58%			00%			00%			+15%							
'99		21%			06%			11%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	799	Dec:	42%				
											'99	940		43%				

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				
Cercocarpus ledifolius																		
S	89	12	2	-	2	-	-	2	-	-	18	-	-	-	1200		18	
	99	2	-	-	-	-	-	1	-	-	3	-	-	-	60		3	
Y	89	9	-	-	-	-	-	1	-	-	10	-	-	-	666		10	
	99	4	1	-	-	-	1	-	-	6	-	-	-	120		6		
M	89	-	-	-	-	-	-	-	6	-	6	-	-	-	400	235 146	6	
	99	-	-	1	-	-	-	-	1	-	2	-	-	-	40	140 152	2	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	1	-	-	-	-	-	-	-	-	1	20		1		
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%			-83%							
'99		11%			33%			11%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	1066	Dec:	0%				
											'99	180		11%				
Cercocarpus montanus																		
S	89	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	99	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
Y	89	14	8	1	5	-	-	4	-	-	24	8	-	-	2133		32	
	99	11	4	1	2	3	-	-	-	-	21	-	-	-	420		21	
M	89	-	6	-	3	-	-	-	-	-	9	-	-	-	600	30 20	9	
	99	2	2	3	1	2	3	3	-	-	16	-	-	-	320	38 40	16	
D	89	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		36%			02%			00%			-74%							
'99		30%			19%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	2799	Dec:	2%				
											'99	740		0%				
Chrysothamnus depressus																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220	-	-	11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	0	Dec:	-				
											'99	220		-				

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>Chrysothamnus viscidiflorus viscidiflorus</i>																	
Y	89	60	-	-	-	-	-	-	-	-	60	-	-	-	4000		60
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11
M	89	18	-	-	-	-	-	-	-	-	18	-	-	-	1200	11 12	18
	99	220	-	-	2	-	-	-	-	-	222	-	-	-	4440	12 15	222
D	89	6	-	-	-	-	-	-	-	-	5	-	-	1	400		6
	99	6	-	-	-	-	-	-	-	-	4	-	-	2	120		6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		00%			00%			01%			-15%						
'99		00%			00%			.83%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	5600	Dec:	7%		
												'99	4780		3%		
<i>Gutierrezia sarothrae</i>																	
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	89	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	99	12	-	-	-	-	-	-	-	-	12	-	-	-	240		12
M	89	4	-	-	-	-	-	-	-	-	4	-	-	-	266	8 7	4
	99	37	2	-	-	-	-	-	-	-	39	-	-	-	780	6 12	39
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		00%			00%			00%			+61%						
'99		04%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	399	Dec:	-		
												'99	1020		-		
<i>Juniperus scopulorum</i>																	
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-		
												'99	0		-		
<i>Mahonia repens</i>																	
S	89	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10
	99	5	-	-	3	-	-	-	-	-	8	-	-	-	160		8
Y	89	143	-	-	27	-	-	13	-	-	183	-	-	-	12200		183
	99	193	-	-	13	-	-	8	-	-	214	-	-	-	4280		214
M	89	27	-	-	-	-	-	-	-	-	27	-	-	-	1800	4 4	27
	99	225	-	-	15	-	-	41	-	-	276	5	-	-	5620	4 4	281
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		00%			00%			00%			-29%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	14000	Dec:	-		
												'99	9900		-		

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>Opuntia fragilis</i>																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	4	9	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		00%			00%			14%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	0%			
												'99	140		14%			
<i>Pinus edulis</i>																		
Y	89	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			100%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	66	Dec:	-			
												'99	0		-			
<i>Purshia tridentata</i>																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
M	89	-	-	2	1	-	-	-	-	-	2	-	1	-	200	14	23	
	99	1	2	-	-	-	-	-	-	1	4	-	-	-	80	17	44	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			67%			33%			-40%							
'99		33%			50%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	200	Dec:	0%			
												'99	120		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				
Quercus gambelii																		
S	89	1	-	-	1	-	-	-	-	-	-	2	-	-	133		2	
	99	7	-	-	9	-	-	9	-	-	-	25	-	-	500		25	
Y	89	9	-	-	1	-	-	-	-	-	-	10	-	-	666		10	
	99	29	-	-	17	-	-	7	-	-	-	53	-	-	1060		53	
M	89	-	-	-	-	-	-	-	1	-	-	1	-	-	66	177	39	
	99	32	-	-	5	-	-	-	7	-	-	37	7	-	880	86	38	
D	89	6	-	-	-	-	-	-	-	-	-	6	-	-	400		6	
	99	-	-	-	1	1	-	-	-	-	-	2	-	-	40		2	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%			+43%							
'99		01%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	1132	Dec:	35%				
											'99	1980		2%				
Symphoricarpos oreophilus																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	7	-	-	-	-	-	-	-	-	-	7	-	-	140		7	
Y	89	55	5	-	23	-	-	6	-	-	-	81	8	-	5933		89	
	99	37	-	-	3	-	-	-	-	-	-	40	-	-	800		40	
M	89	35	6	-	4	-	-	1	-	-	-	45	1	-	3066	17	20	
	99	85	-	-	19	-	-	5	-	-	-	109	-	-	2180	17	38	
D	89	15	5	-	4	-	-	-	-	-	-	23	-	-	1600		24	
	99	7	-	-	-	-	-	-	-	-	-	5	-	-	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		10%			00%			.62%			-71%							
'99		00%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	10599	Dec:	15%				
											'99	3120		4%				
Tetradymia canescens																		
Y	89	2	-	-	-	-	-	-	-	-	-	2	-	-	133		2	
	99	3	-	-	-	-	-	-	-	-	-	3	-	-	60		3	
M	89	2	-	-	-	-	-	-	-	-	-	2	-	-	133	16	12	
	99	10	-	-	-	-	-	-	-	-	-	10	-	-	200	12	15	
D	89	2	-	-	-	-	-	-	-	-	-	2	-	-	133		2	
	99	2	-	-	1	-	-	-	-	-	-	3	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%			-20%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	399	Dec:	33%				
											'99	320		19%				

Trend Study 16B-9-99

Study site name: Starvation Mountain Brush .

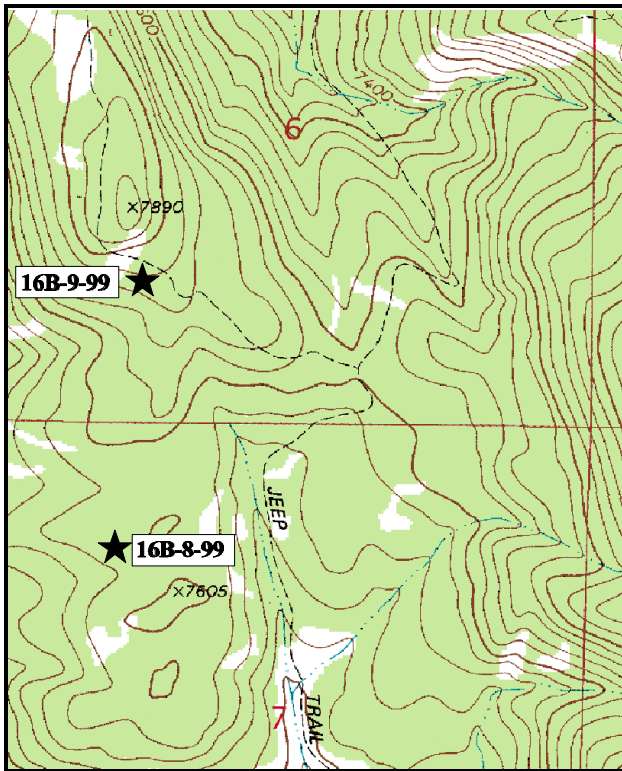
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 175°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(71ft).

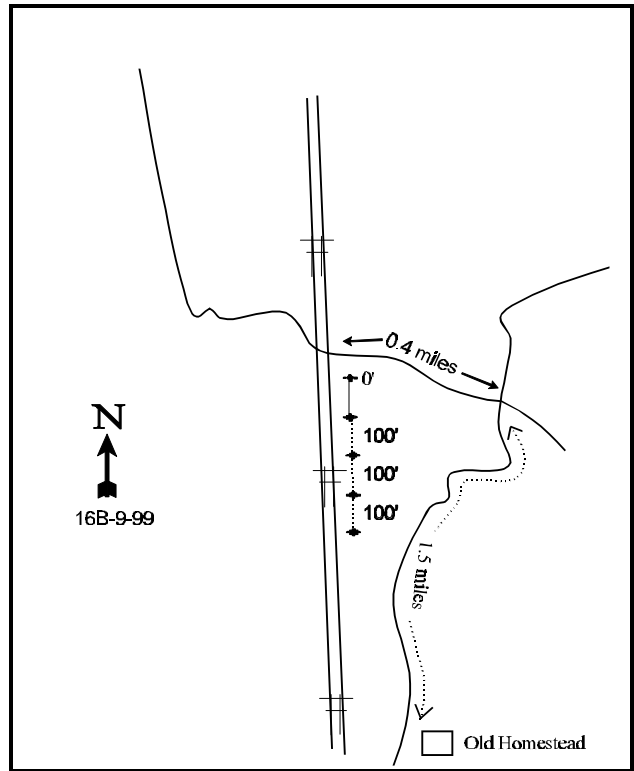
LOCATION DESCRIPTION

From Tucker rest area on Highway 50/6 in Spanish Fork Canyon, take the Starvation Canyon road 4.6 miles. Turn left and go 0.5 miles to another fork. Turn left and go up a small canyon on a rough road for 1.15 miles to a fork. Turn left, cross the creek, and go 0.3 miles to an old homestead site. Continue on this road for 1.5 miles to a 4-way intersection. Turn left (west) and go 0.4 miles and park beneath the powerlines. The 0 ft stake of the baseline is 30 ft away from the road.



Map Name: Tucker

Township 11S, Range 7E, Section 6 .



Diagrammatic Sketch

UTM 4415366.072 N, 484114.098 E

DISCUSSION

Trend Study No. 16B-9 (37-9)

The Starvation Mountain Brush trend study samples a mixed mountain brush community in the Starvation Creek drainage on DWR property. The slope of the site averages 25% on a south facing aspect, and lies above the curleaf mahogany bench sampled by trend study 16B-8. The elevation of the site is about 7,700 feet. The site was established in 1989 due to heavy use by wildlife. Use by big game remains quite high with an estimated 45 deer days use/acre (111 ddu/ha) and 64 elk days use/acre (159 edu/ha) in 1999. The surrounding area provides excellent thermal and escape for wildlife with large curleaf mahogany thickets scattered in all directions. Several perennial water sources exist in the nearby area with the Spanish Fork River within a few miles to the north, Starvation Creek ½ mile to the west, and a spring ¾ mile to the south.

The soil is a clay loam with a slightly alkaline pH (7.4). The profile is shallow and rocky with an estimated effective rooting depth of just over 12 inches. Organic matter is very high at 5.5%, while phosphorus levels (8.5) are lower than the minimum thought necessary for normal plant development and growth (10 ppm). Most of the bare areas are covered with rock and pavement. When coupled with the steep terrain, these rocky slopes tend to increase run-off, significantly reducing the amount of effective precipitation. Erosion potential is moderate to severe, especially during severe thunderstorms with the formation of rills and the movement of litter downslope. Abundant pedestaling and terracing is occurring on the steeper areas. This site was read following a period of heavy rains in September 1999. The well armored surface provided by rock and pavement limits erosion to minimal levels during most of the year.

Browse at the site is diverse with many key species present. The most important species include: Utah serviceberry, basin big sagebrush, mountain big sagebrush, true mountain mahogany, and antelope bitterbrush. These key species provide 47% of the total browse cover, and 37% of the total vegetative cover at the site. The sagebrush was classified only as basin big sagebrush (*Artemisia tridentata tridentata*) in 1989, but was split into basin big sagebrush and mountain big sagebrush (*Artemisia tridentata vaseyana*) in 1999. A large portion of those plants classified as basin big sagebrush in both 1989 and 1999 displayed moderate to heavy use, and most likely these plants are hybrids with the more palatable subspecies mountain big sagebrush. This much use would most likely not occur on basin big sagebrush, especially with the abundance of more preferred species on the site. Currently, the sagebrush population (both subspecies) is estimated at 1,660 plants/acre, a decrease from 2,666 plants/acre that were estimated in 1989. The extension of the baseline in 1999 accounts for most of the differences in browse densities. This much larger sample size better samples browse populations that have clumped and/or discontinuous distributions. Thirty-two percent and sixteen percent of the basin big sagebrush plants displayed moderate and heavy use respectively, while 55% of the mountain big sagebrush species showed moderate use. Poor vigor is currently noted on 11% of the basin big sagebrush plants and 5% of the mountain big sagebrush plants. Recruitment and biotic potential are low for both subspecies of sagebrush.

Serviceberry is currently estimated at 1,060 plants/acre, a decrease from the 1989 estimate of 4,733 plants/acre. The current age class distribution shows high recruitment (25%), 51% mature, and a 25% decadency rate. The main concern for this species is that 77% of the decadent plants are classified as dying, and 25% show poor vigor. Thirty-six percent of the population are currently classified as heavily utilized, although this is not excessive for this species which is tolerant to heavy browsing. In 1999, most of the leader growth on serviceberry is minimal (3-5 inches), with most being restricted to those stems which are protected and/or unavailable to browsing animals. True mountain mahogany is currently estimated at 1,120 mostly mature plants/acre. Heavy use on this species is high (55%), although it is also a species tolerant to heavy browsing. Nine percent of the population shows poor vigor. Bitterbrush currently numbers 540 plants/acre, with 81% of these being mature. Use is mostly moderate with only 15% of the population showing heavy use. Recruitment is good at 19%.

The herbaceous understory is dominated by perennial species. In all, 10 species of grasses and 16 species of forbs were sampled in 1999. The presence of seeded grasses indicates that some seeding was done in the area, probably to revegetate the power line corridor which runs directly through the area. Crested wheatgrass is the dominant species providing 71% of the grass cover, and 43% of the total herbaceous cover. Hoods phlox is the most abundant forb, and provides nearly half off the forb cover. All other species occur infrequently.

APPARENT TREND ASSESSMENT

The soil trend is downward on this site with the presence of active gullies and evidence of soil movement. Trend for browse and the herbaceous understory appears to be stable at the present time. However, continued heavy use coupled with drought may reverse this trend in the future.

1999 TREND ASSESSMENT

Trend for soil is slightly down with a decrease in litter cover, and an increase in bare ground. Soil movement is evident with pedestaling occurring around the base of most vegetation. The trend for the key browse is mixed. The most preferred species, serviceberry, true mountain mahogany, and bitterbrush show good recruitment from young plants. Use is moderate to heavy on these species, however, all are tolerant of heavy browsing. Biotic potential and recruitment for both subspecies of sagebrush is low. Basin big sagebrush (most likely a hybrid with mountain big sagebrush) shows moderate to heavy use on nearly half of the population, with mountain big sagebrush showing mostly moderate utilization (55%). Currently, 11% of the basin big sagebrush and 5% of the mountain big sagebrush plants show poor vigor. Overall, browse trend is stable. The herbaceous understory trend is up slightly. Sum of nested frequency for perennials increased, while annuals are a insignificant influence on the site currently.

TREND ASSESSMENT

soil - down slightly

browse - stable overall for the key species

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 16B, Study no: 9

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '99
		'89	'99	'89	'99	
G	Agropyron cristatum	78	*168	32	58	4.31
G	Agropyron intermedium	6	8	2	4	.18
G	Agropyron spicatum	55	*25	21	13	.62
G	Bromus inermis	4	1	2	1	.00
G	Bromus tectorum (a)	-	23	-	9	.22
G	Carex spp.	-	3	-	1	.00
G	Oryzopsis hymenoides	-	3	-	1	.03
G	Poa fendleriana	26	18	13	9	.36
G	Poa pratensis	-	5	-	2	.30
G	Sitanion hystrix	21	4	7	4	.02
G	Stipa lettermani	1	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'89	'99	'89	'99	
	Total for Annual Grasses	0	23	0	9	0.21
	Total for Perennial Grasses	191	235	78	93	5.85
	Total for Grasses	191	258	78	102	6.07
F	Astragalus spp.	8	*-	3	-	-
F	Chaenactis douglasii	14	19	6	8	.07
F	Cirsium spp.	8	19	5	10	.08
F	Cryptantha spp.	-	*16	-	6	.45
F	Cynoglossum officinale	2	-	1	-	-
F	Eriogonum racemosum	1	1	1	1	.00
F	Eriogonum umbellatum	2	3	1	1	.03
F	Machaeranthera canescens	91	*21	40	11	.13
F	Microsteris gracilis (a)	-	1	-	1	.00
F	Penstemon caespitosus	-	1	-	1	.00
F	Penstemon cyananthus	30	31	17	17	.18
F	Penstemon humilis	11	*-	5	-	-
F	Penstemon spp.	14	*31	8	17	.85
F	Phlox hoodii	16	*81	7	36	1.89
F	Phlox longifolia	51	*7	27	3	.01
F	Streptanthus cordatus	4	4	2	2	.01
F	Taraxacum officinale	1	7	1	3	.04
F	Tragopogon dubius	-	3	-	1	.00
F	Verbascum thapsus	1	-	1	-	-
F	Viguiera multiflora	-	5	-	2	.06
	Total for Annual Forbs	0	1	0	1	0.00
	Total for Perennial Forbs	254	249	125	119	3.84
	Total for Forbs	254	250	125	120	3.85

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
 Herd unit 16B, Study no: 9

Type	Species	Strip Frequency '99	Average Cover % '99
B	Amelanchier utahensis	42	2.33
B	Artemisia tridentata tridentata	37	6.70
B	Artemisia tridentata vaseyana	14	.36
B	Cercocarpus montanus	46	4.28
B	Chrysothamnus depressus	2	-
B	Chrysothamnus viscidiflorus viscidiflorus	44	2.21
B	Cowania mexicana stansburiana	0	-
B	Juniperus osteosperma	0	1.23
B	Mahonia repens	7	.51
B	Opuntia spp.	1	.00
B	Purshia tridentata	19	3.33
B	Quercus gambelii	0	.00
B	Symphoricarpos oreophilus	91	14.12
B	Tetradymia canescens	20	1.09
Total for Browse		323	36.20

CANOPY COVER --
 Herd unit 16B, Study no: 9

Species	Percent Cover '99
Amelanchier utahensis	.20
Artemisia tridentata tridentata	.20
Juniperus osteosperma	2

BASIC COVER --
 Herd unit 16B, Study no: 9

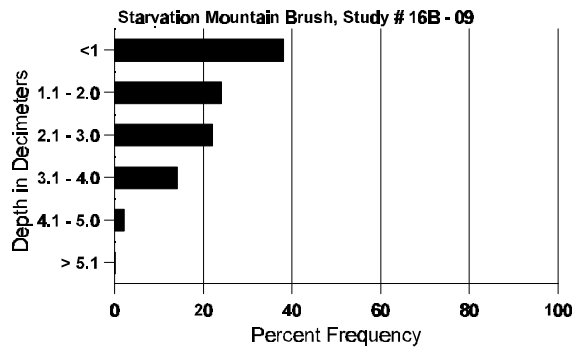
Cover Type	Nested Frequency '99	Average Cover %	
		'89	'99
Vegetation	309	12.50	41.06
Rock	150	12.00	6.14
Pavement	202	11.50	3.91
Litter	377	54.25	50.65
Cryptogams	63	.50	2.03
Bare Ground	246	4.00	18.73

SOIL ANALYSIS DATA --

Herd Unit 16B, Study # 09, Study Name: Starvation Mountain Brush

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.5	51.0 (13.3)	7.4	36.7	22.7	40.6	5.5	8.5	121.6	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 9

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Sheep	3	5 (12)
Rabbit	2	n/a
Elk	37	64 (158)
Deer	22	45 (111)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 9

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>																		
S	89	9	-	-	-	-	1	1	-	-	11	-	-	-	733		11	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	89	16	29	4	1	-	-	1	-	-	49	-	2	-	3400		51	
	99	5	3	-	3	2	-	-	-	-	11	-	2	-	260		13	
M	89	-	-	10	-	-	1	-	-	-	11	-	-	-	733	28	27	
	99	-	3	9	3	6	6	-	-	-	26	-	1	-	540	24	23	
D	89	-	-	9	-	-	-	-	-	-	9	-	-	-	600		9	
	99	1	1	2	2	1	2	4	-	-	3	-	-	10	260		13	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		41%			34%			03%			-78%							
'99		30%			36%			25%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	4733	Dec:	13%				
											'99	1060		25%				
<i>Artemisia tridentata tridentata</i>																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	1	-	-	-	-	-	1	-	-	2	-	-	-	40		2	
Y	89	8	-	1	-	-	-	-	-	-	9	-	-	-	600		9	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	89	2	7	8	-	-	-	-	-	-	17	-	-	-	1133	21	22	
	99	19	18	5	-	-	-	1	-	-	43	-	-	-	860	28	33	
D	89	1	3	10	-	-	-	-	-	-	14	-	-	-	933		14	
	99	2	2	-	3	-	5	3	-	-	8	-	-	7	300		15	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	-	860		43	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		25%			48%			00%			-53%							
'99		32%			16%			11%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	2666	Dec:	35%				
											'99	1260		24%				
<i>Artemisia tridentata vaseyana</i>																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	9	10	-	-	-	-	-	-	-	19	-	-	-	380	13	21	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	1	-	-	-	-	-	-	-	-	-	1	-	20		1	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		55%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'89	0	Dec:	0%				
											'99	400		5%				

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				
Cercocarpus montanus																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	4	1	-	-	-	-	1	-	-	6	-	-	-	120		6	
Y	89	-	1	-	-	-	-	1	-	-	2	-	-	-	133		2	
	99	4	1	-	1	1	-	1	-	-	8	-	-	-	160		8	
M	89	-	-	4	-	-	-	-	-	-	4	-	-	-	266	25 27	4	
	99	-	5	5	-	9	22	-	-	-	34	5	2	-	820	32 33	41	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	4	3	-	-	4	-	-	3	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		17%			67%			00%			+64%							
'99		29%			55%			09%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	399	Dec:	0%			
												'99	1120		13%			
Chrysothamnus depressus																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140	-	7	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	1	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		00%			13%			13%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	0%			
												'99	160		13%			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	89	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	99	10	-	-	1	-	-	-	-	-	11	-	-	-	220		11	
M	89	51	-	-	-	-	-	-	-	-	50	-	1	-	3400	12 15	51	
	99	98	11	-	11	-	-	-	-	-	120	-	-	-	2400	8 14	120	
D	89	5	-	-	-	-	-	1	-	-	6	-	-	-	400		6	
	99	7	-	-	-	-	-	1	-	-	2	-	-	6	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			02%			-36%							
'99		08%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	4333	Dec:	9%			
												'99	2780		6%			
Cowania mexicana stansburiana																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	44 48	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-			
												'99	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				
Juniperus osteosperma																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-			
												'99	0		-			
Mahonia repens																		
Y	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	99	21	-	-	-	-	-	-	-	-	21	-	-	-	420		21	
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	81	-	-	-	-	-	-	-	-	81	-	-	-	1620	2	5	81
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%			+90%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	200	Dec:	-			
												'99	2040		-			
Opuntia spp.																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	21	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-			
												'99	20		-			
Purshia tridentata																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	89	-	-	-	-	-	1	-	-	-	1	-	-	-	66		1	
	99	2	2	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	89	-	1	-	-	-	-	-	-	-	1	-	-	-	66	17	19	1
	99	3	10	3	-	5	1	-	-	-	22	-	-	-	440	23	51	22
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		50%			00%			00%			+76%							
'99		63%			15%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	132	Dec:	-			
												'99	540		-			

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>Quercus gambelii</i>																	
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-		
												'99	0		-		
<i>Symphoricarpos oreophilus</i>																	
S	89	3	-	-	-	-	-	-	-	-	-	-	-	200		3	
	99	15	-	-	1	-	-	-	-	-	-	-	-	320		16	
Y	89	22	1	-	-	-	-	-	-	-	-	-	-	1533		23	
	99	66	-	-	3	-	-	1	-	-	-	-	-	1400		70	
M	89	84	1	1	1	-	-	2	-	-	-	-	-	5933	16 21	89	
	99	150	4	-	52	2	-	-	-	-	-	-	-	4160	19 33	208	
D	89	10	3	-	-	-	-	-	-	-	-	-	-	866		13	
	99	7	-	-	4	-	-	1	-	-	-	-	-	240		12	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		04%			.80%			10%			-30%						
'99		02%			00%			05%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	8332	Dec:	10%		
												'99	5800		4%		
<i>Tetradymia canescens</i>																	
S	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	7	-	-	-	-	-	-	-	-	-	-	-	140		7	
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	11	-	-	-	-	-	-	-	-	-	-	-	220		11	
M	89	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	27	1	-	1	-	-	1	-	-	-	-	-	600	13 20	30	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	2	-	-	-	-	-	-	-	-	-	-	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'89		00%			00%			00%									
'99		06%			00%			02%									
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	0%		
												'99	960		15%		

Trend Study 16B-15-99

Study site name: Ford Ridge .

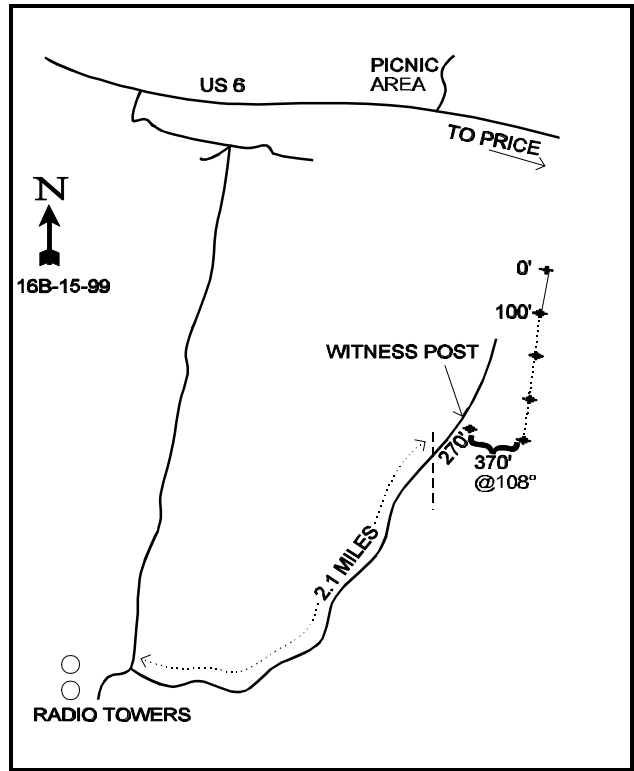
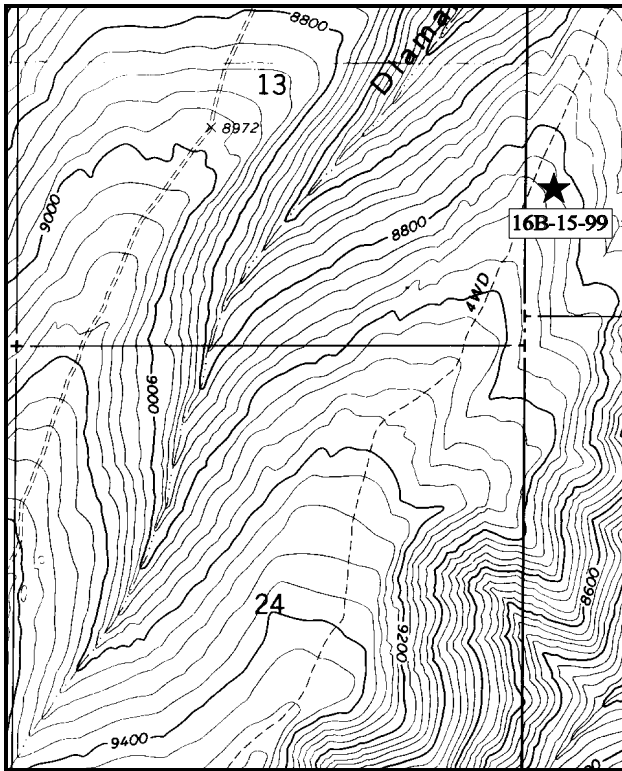
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 198°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

Take US 6 north from Price to the top of Price Canyon. About one mile NW of the picnic area, turn left towards Bristlecone BSA camp and the radio towers. Go 0.7 miles to a 3-way fork. Take the center road and go up the ridge 5.15 miles. Below the towers, turn left onto a rough road. Follow this road 2.1 miles to a fence. Continue 100 yards past the fence to a witness post on the right side of the road. From the witness post, walk approximately 125 yards (74 paces) east to the 400 foot stake. The first baseline stake, a 12" fencepost marked with browse tag #9014, is 400 feet to the north.



Map Name: Kyune

Diagrammatic Sketch

Township 12S, Range 9E, Section 18

UTM 4403236.223 N, 503161.821 E

DISCUSSION

Trend Study No. 16B-15 (30-1)

This study on Ford Ridge was established to monitor what was thought to be year-round elk range. Deer use is limited in most winters with an elevation of 8,700 feet. After 3 readings, this site will be discontinued in the future due to little or no use by big game. Pellet group transect data in 1999 indicate less than 1 deer day use/acre (2 ddu/ha) and just over 1 elk day use/acre (3 edu/ha). The open sage/grass ridge tops are windswept in winter, while the steep side hills bare off early, providing open country for winter elk use. Aspen stands in the draws and brushy east-facing slopes provide cover. The area is a checkerboard of private and BLM land used mainly for spring-to-fall cattle grazing. The study is located near the ridgeline with a northeast aspect and a slope of about 5%.

The soil is a moderately deep, clay texture with a slightly alkaline pH (7.4). Rock is fairly uniformly distributed throughout the profile as indicated by the estimated stoniness index. Erosion potential in the area is moderate to high as evidenced by washed-out roads and trails. Directly on the site, there is noticeable soil loss in the interspaces between shrubs. Percent bare ground increased in 1994, remaining nearly the same in 1999. Vegetation and litter cover both decreased in 1999, which could result in increased erosion in the future.

Mountain big sagebrush is the dominant browse providing 66% of the browse cover in 1999. During the 1988 reading, there were an estimated 11,066 sagebrush/acre, 89% of which were young plants. Seedling sagebrush numbered nearly 11,000 per acre indicating an expanding population. Since then the population has remained fairly stable with 10,500 plants/acre counted in 1994, and 11,440 in 1999. The population has become more mature with 86% and 79% of the population respectively consisting of mature plants in 1994 and 1999. Young plants make up only 13% and 7% of the population respectively in 1994 and 1999. The baseline was extended from 100 to 400 feet prior to reading in 1994. This larger sample better estimates browse densities which have clumped and/or discontinuous distributions, and would account for much of the changes in age class distribution of this big sagebrush population. Percent decadence increased from 2% in 1988 and 1994, to 14% in 1999. Fifty-nine percent of the decadent plants were classified as dying in 1999 which would point to a slightly declining population that may be thinning out. Vigor is mostly good and use light, with the majority of the mature plants showing good seed production in 1999. Twenty-two percent of the young plants encountered in 1988, displayed reduced vigor. Currently, all young plants display good vigor. Other shrubs present include snowberry, mountain low rabbitbrush, and a few serviceberry.

Herbaceous forage is an important element of this range. As with much of the Wasatch Plateau, the dominant grass species is Salina wildrye or bullgrass. Muttongrass is a preferred but less common species. Although large bunch grasses appear to dominate the site, there is still room for a variety of forbs. Seventeen species were encountered on the study area in 1994, and 21 in 1999. Forbs are an important component of deer and elk spring and summer diets, and preferred species like penstemon, milkvetches, and paintbrushes are important. Current use of herbaceous plants is light.

1994 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1988. Relative percent cover of bareground has gone up slightly (22% to 26%) and litter has declined due to drought from 49% to 33%. However, vegetation and litter cover are abundant enough to stabilize the soil. Trend for soil is stable. The browse trend is stable currently, but the population has become increasingly mature (85%). Reproductive potential (proportion of young) has declined considerably due in large part to the dry conditions of the past several years. Vigor has improved and percent decadence is very low. Herbaceous trend is slightly down due to the drought. Four of the five perennial grasses on the site have declined significantly in their sum of nested frequency values. Several perennial forb species have also shown significant declines in their sum of nested frequency values.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is down due to decreases in both vegetation and litter cover. Bare ground remains high at 30%, and noticeable soil loss is occurring in the interspaces between shrubs. Trend for the key browse, mountain big sagebrush, is slightly down. Percent decadency increased from 2% to 14%, and the proportion of decadent plants classified as dying is high at 59%. With low recruitment and biotic potential, this species appears to be declining in the future. Trend for the herbaceous component is slightly up. The sum of nested frequency for perennial species increased in 1999, following a large decrease in 1994 due to drought. Very few annuals are present at this elevation.

TREND ASSESSMENT

soil - down

browse - slightly down for the key species, mountain big sagebrush

herbaceous understory - slightly up

HERBACEOUS TRENDS --

Herd unit 16B, Study no: 15

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	_b 25	_a 2	_c 48	12	1	19	.00	.46
G	Carex spp.	-	-	3	-	-	1	-	.03
G	Elymus salina	_b 299	_b 296	_a 262	91	93	91	14.07	5.50
G	Festuca ovina	1	3	6	1	1	3	.00	.06
G	Poa fendleriana	117	84	92	54	42	43	.93	.62
G	Poa pratensis	-	-	2	-	-	1	-	.00
G	Stipa spp.	15	6	8	5	3	4	.06	.07
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		457	391	421	163	140	162	15.08	6.75
Total for Grasses		457	391	421	163	140	162	15.08	6.75
F	Achillea millefolium	56	46	56	22	20	24	.25	.93
F	Antennaria rosea	_a -	_a -	_b 8	-	-	4	-	.21
F	Androsace septentrionalis (a)	-	1	1	-	1	1	.00	.00
F	Antennaria spp.	_b 24	_b 9	_a -	10	4	-	.44	-
F	Arabis spp.	_b 9	_a -	_{ab} 2	4	-	1	-	.00
F	Astragalus argophyllus	_b 22	_a -	_a -	11	-	-	-	-
F	Astragalus convallarius	12	19	14	5	8	8	.09	.09
F	Astragalus coltoni	_b 16	_c 37	_a -	7	21	-	.25	-
F	Astragalus tenellus	_a 27	_b 56	_c 83	13	29	38	1.34	1.34

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Aster spp.	-	-	2	-	-	1	-	.03
F	Astragalus spp.	a-	a-	b22	-	-	12	-	.21
F	Castilleja flava	b34	a19	a18	18	9	13	.12	.24
F	Calochortus nuttallii	1	1	-	1	1	-	.00	-
F	Chaenactis douglasii	26	10	28	12	4	13	.07	.11
F	Comandra pallida	a-	ab5	b7	-	2	4	.01	.05
F	Erigeron spp.	4	4	5	2	4	3	.02	.04
F	Eriogonum umbellatum	-	1	1	-	1	1	.00	.03
F	Holosteum umbellatum (a)	-	-	2	-	-	1	-	.00
F	Hymenoxys richardsonii	b47	c66	a20	27	34	12	.50	.16
F	Lygodesmia spp.	a-	a-	b12	-	-	6	-	.06
F	Machaeranthera canescens	7	7	4	3	3	2	.04	.03
F	Penstemon spp.	a1	b7	a-	1	6	-	.08	-
F	Penstemon watsonii	b92	a41	b81	47	20	39	.28	.91
F	Phlox longifolia	b67	a29	a30	30	15	16	.07	.08
F	Senecio multilobatus	20	10	12	10	5	7	.05	.06
F	Taraxacum officinale	a4	a-	b16	2	-	9	-	.04
Total for Annual Forbs		0	1	3	0	1	2	0.00	0.00
Total for Perennial Forbs		469	367	421	225	186	213	3.64	4.66
Total for Forbs		469	368	424	225	187	215	3.64	4.67

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

BROWSE TRENDS --

Herd unit 16B, Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	7	6	.18	-
B	Artemisia frigida	1	0	.03	-
B	Artemisia tridentata vaseyana	98	96	14.56	12.23
B	Chrysothamnus depressus	1	1	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	92	82	4.85	2.97
B	Mahonia repens	5	1	.45	.03
B	Opuntia spp.	1	1	.00	.00
B	Symphoricarpos oreophilus	57	50	3.65	3.26
B	Tetradymia canescens	0	2	.15	.00
Total for Browse		262	239	23.88	18.51

BASIC COVER --

Herd unit 16B, Study no: 15

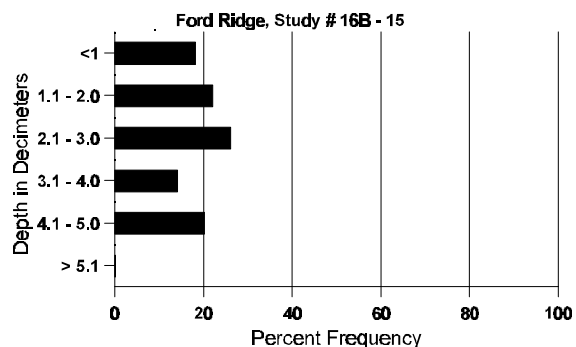
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	335	329	9.25	39.45	31.47
Rock	248	190	8.50	9.01	5.87
Pavement	252	254	11.25	.82	4.77
Litter	396	374	48.75	39.74	30.96
Cryptogams	9	25	0	.16	.29
Bare Ground	333	314	22.25	30.53	30.12

SOIL ANALYSIS DATA --

Herd Unit 16B, Study # 15, Study Name: Ford Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.2	46.0 (16.2)	7.4	26.4	31.1	42.6	3.9	10.2	201.6	1.2

Stoniness Index



PELLET GROUP DATA --

Herd unit 16B, Study no: 15

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	14	2	n/a
Elk	4	-	1 (2)
Cattle	1	2	15 (37)
Deer	0	0	1 (2)
Sheep	0	0	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16B, 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				
Amelanchier utahensis																		
Y	88	4	-	3	-	-	-	-	-	-	5	-	2	-	466			7
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	1	-	-	-	-	-	-	-	-	-	-	1	-	20			1
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	8	2	-	1	-	-	-	-	-	11	-	-	-	220	17	26	11
	99	-	-	1	1	-	-	-	-	-	2	-	-	-	40	21	21	2
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	3	1	-	-	-	-	-	-	3	-	-	3	120			6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			43%			29%			-48%							
'94		17%			00%			00%			-25%							
'99		33%			22%			44%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	466	Dec:	0%			
												'94	240		0%			
												'99	180		67%			
Artemisia frigida																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	6	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	20		-			
												'99	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													
<i>Artemisia tridentata vaseyana</i>																		
S	88	123	-	-	8	-	-	32	-	-	158	-	5	-	10866		163	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	8	-	-	2	-	-	-	-	-	10	-	-	-	200		10	
Y	88	132	6	-	8	-	-	1	-	-	111	4	32	-	9800		147	
	94	66	-	-	-	-	-	-	-	-	66	-	-	-	1320		66	
	99	38	3	-	-	-	-	-	-	-	41	-	-	-	820		41	
M	88	10	4	2	-	-	-	-	-	-	8	1	7	-	1066	14 19	16	
	94	449	-	-	-	-	-	-	-	-	448	1	-	-	8980	10 19	449	
	99	353	93	3	-	2	-	-	-	-	451	-	-	-	9020	12 24	451	
D	88	2	-	1	-	-	-	-	-	-	1	-	2	-	200		3	
	94	9	1	-	-	-	-	-	-	-	3	-	-	7	200		10	
	99	69	8	-	1	2	-	-	-	-	33	-	-	47	1600		80	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		06%			02%			25%			- 5%							
'94		.19%			00%			01%			+ 8%							
'99		19%			.52%			08%										
Total Plants/Acre (excluding Dead & Seedlings)										'88	11066	Dec:	2%					
										'94	10500		2%					
										'99	11440		14%					
<i>Chrysothamnus depressus</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3 12	1	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3 11	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-					
										'94	20		-					
										'99	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>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	88	8	-	-	-	-	-	2	-	-	10	-	-	-	666		10	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	48	4	-	-	-	-	-	-	-	51	-	1	-	3466		52	
	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
M	88	73	5	-	2	-	-	-	-	-	80	-	-	-	5333	7 9	80	
	94	360	-	-	-	-	-	-	-	-	360	-	-	-	7200	7 11	360	
	99	234	-	-	2	-	-	-	-	-	236	-	-	-	4720	8 11	236	
D	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
	99	34	-	-	5	-	-	-	-	-	14	-	-	25	780		39	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		06%			00%			.66%			-25%							
'94		00%			00%			00%			-24%							
'99		00%			00%			09%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	9999	Dec:	12%				
											'94	7520		2%				
											'99	5700		14%				
<i>Mahonia repens</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	94	92	-	-	-	-	-	-	-	-	92	-	-	-	1840	4 5	92	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3 5	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%			-97%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	1920		-				
											'99	60		-				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total				
		1	2	3	4							
Opuntia spp.												
S	88	2	-	-	-	-	-	-	2	133		2
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	0		0
Y	88	4	-	-	-	-	-	-	4	266		4
	94	1	-	-	-	-	-	-	1	20		1
	99	-	-	-	-	-	-	-	-	0		0
M	88	-	-	-	-	-	-	-	-	0	-	0
	94	2	-	-	-	-	-	-	2	40	2 8	2
	99	1	-	-	-	-	-	-	1	20	1 4	1
D	88	2	-	-	-	-	-	-	2	133		2
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		00%		00%		00%		-85%				
'94		00%		00%		00%		-67%				
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	399	Dec:	33%
									'94	60		0%
									'99	20		0%
Symphoricarpos oreophilus												
S	88	8	-	-	-	-	5	-	13	866		13
	94	-	-	-	1	-	-	-	1	20		1
	99	2	-	-	-	-	-	-	2	40		2
Y	88	33	2	1	-	-	3	-	33	2600		39
	94	9	-	-	1	-	-	-	10	200		10
	99	14	-	-	4	-	-	-	15	360		18
M	88	14	4	4	-	-	-	-	11	1466	12 18	22
	94	98	11	-	4	-	-	-	113	2260	11 25	113
	99	57	3	-	3	-	-	-	61	1260	12 26	63
D	88	5	-	-	-	-	-	-	1	333		5
	94	-	-	-	-	-	-	-	-	0		0
	99	7	-	-	1	-	-	-	1	160		8
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		09%		08%		32%		-44%				
'94		09%		00%		00%		-28%				
'99		03%		00%		13%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	4399	Dec:	8%
									'94	2460		0%
									'99	1780		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		1	2					
Tetradymia canescens													
M	'88	1	-	-	-	-	-	-	1	66	11	15	1
	'94	-	-	-	-	-	-	-	0	0	6	9	0
	'99	3	-	-	-	-	-	-	3	60	-	-	3
D	'88	-	-	-	-	-	-	-	0	0			0
	'94	-	-	-	-	-	-	-	0	0			0
	'99	1	-	-	-	-	-	-	1	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
		'88			'88			'88					
		'94			'94			'94					
		'99			'99			'99					
Total Plants/Acre (excluding Dead & Seedlings)									'88	66	Dec:	0%	
									'94	0		0%	
									'99	80		25%	

Trend Study 16B-16-99

Study site name: Hardscrabble .

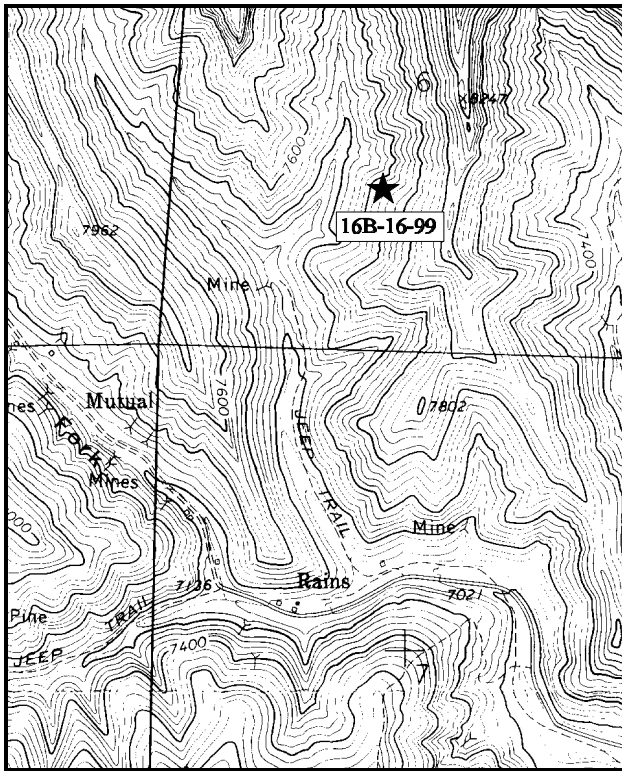
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 270°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34 & 71 ft), line 3 (59ft).

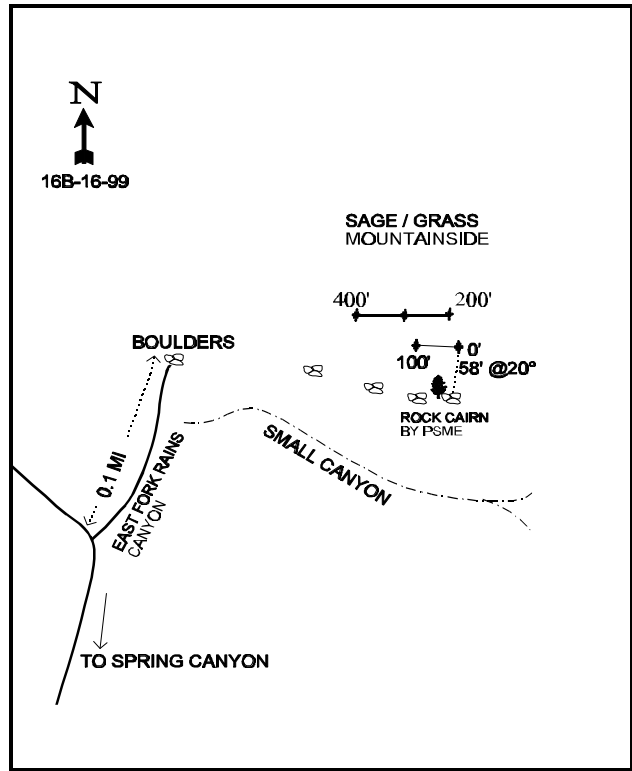
LOCATION DESCRIPTION

From US 6 in Helper, turn west onto North Main St. at the Texaco station. Go straight until you come to Uintah St., then turn left. Continue on to Canyon St., then turn right. Go 1.35 miles to an old R.R. trestle. Continue 2.6 miles to a fork. Stay left on the oiled road and proceed 2.5 miles. Before the concrete bridge in the ghost town of Rains, turn right onto a dirt road by a UP&L substation. Go up Rains Canyon 1 mile to the East Fork. Go up the East Fork of Rains Canyon 0.1 miles to the end of the road. The study is located about halfway up the ridge to the east. Hike up the steep ridge to a rock cairn by a lone Douglas Fir tree. The frequency baseline 0' stake is 58 feet north of the cairn. The 2' tall fencepost has browse tag #7111 attached.



Map Name: Standardville

Township 13S, Range 9E, Section 6



Diagrammatic Sketch

UTM 4396522.094 N, 503526.206 E

DISCUSSION

Trend Study No. 16B-16 (30-2)

The grassy ridges and steep side hills in the Hardscrabble area are important winter and spring range for elk. There are scattered blocks of private land in this area administered by the BLM. It is cattle spring-fall range, but livestock use is insignificant on the steep upper slopes. The range type is sagebrush/grass, with Salina wildrye (*Elymus salina*) being the dominant species. The sidehills in this area are all very steep. The study site has a slope of approximately 50%. The north-facing slopes in the area support mountain brush and conifers, while the south slopes are dominated by grasses. Aspect on the study area is to the west with an elevation of 7,600 feet. Pellet group transect data from 1999 indicate a moderate level of use by elk with an estimated 41 elk days use/acre (101 edu/ha). Deer use was light with an estimated 2 deer days use/acre (5 ddu/ha).

Although very rocky, the soil appears to be moderately deep with an estimated effective rooting depth of over 19 inches. The soil textural class is clay loam, with a slightly alkaline pH (7.5). Due to the uniform coverage by bunch grasses, and the prevalence of boulders, cobble and gravel as erosion pavement on the soil surface, the soil is fairly well protected against erosion. On such a steep slope, there will always be some soil movement but it does not appear excessive on this area. Some pedestaling has occurred on the uphill side of the bunch grasses. Phosphorus is low at 3.9 ppm, where 10 ppm has been shown to be necessary for normal plant growth and development. Bare ground makes up only 11% ground cover in 1999, a decrease from 15% in 1994. Litter cover declined from 40% to 21% in 1994 due to drought conditions, but has since increased to nearly 26% in 1999. The increase in litter and decrease in bare ground points to improving soil conditions.

Browse is rather limited on the slope, but is not key as this site does not sample a critical winter browse range. Black sagebrush is the most common species with an estimated density of 5,932 plants/acre in 1988, 5,360 in 1994, and 8,540 plants/acre in 1999. The baseline was lengthened and realigned in 1999 which accounts for most of the large increase in density for black sagebrush over previous readings. Black sagebrush naturally has a somewhat hedged appearance, but half of these shrubs were classified as heavily hedged in 1988. Use in 1994 and 1999 was light to moderate. Percent decadency was high in 1988 and 1994 at 58% and 46% respectively, but has declined to 28% in 1999. Currently, 31% of the decadent plants are classified as dying. However, recruitment is high at 20% and the young age class is sufficient to replace those individuals that are classified as dying. Other species on or near the site include mountain big sagebrush, Greene's rabbitbrush, a shrubby eriogonum, snowberry, and curleaf mountain mahogany. This is a marginal site for mountain big sagebrush, and none were sampled in 1999 with the realignment of the baseline. Snowberry has also declined and was not found in 1994 or 1999. The curleaf mahogany in the vicinity is highlined.

Perennial grasses dominate the site with an estimated cover of over 16% in 1994, and nearly 19% in 1999. Salina wildrye, the most abundant grass, is large and vigorous but produces only poor to fair forage. Bluebunch wheatgrass and muttongrass are also very common. Salina wildrye and bluebunch wheatgrass together provide 59% of the total vegetative cover at the site. Forbs are uncommon and relatively unimportant as a forage source on this site. A large *Astragalus* is the most common forb, being sampled in 32% of the quadrats.

1994 TREND ASSESSMENT

Ground cover characteristics have changed due to the drought conditions which have existed over the past few years. Litter cover has declined by nearly 50%, while bare ground has increased by over 50%. However, due to the abundance of herbaceous vegetation, erosion does not appear to be a serious problem. Trend for soil is down slightly due to the reduction of protective ground cover. Trend for browse is stable. Black sagebrush, the key browse species on the site, has a stable population with reduced heavy use, decrease in decadency, and good vigor. Drought conditions have caused a decline in mountain big sagebrush and snowberry, but this

is a marginal site for these shrubs. The site is dominated by grasses. Both bluebunch wheatgrass and Salina wildrye increased significantly in sum of nested frequency while mutton grass declined significantly. Overall, sum of nested frequency for grasses declined slightly. Forbs were never very abundant on the site. Combined, they currently make up less than 1% cover on the site and sum of nested frequency has declined 30%. Trend for herbaceous understory is down slightly.

TREND ASSESSMENT

soil - slightly down

browse - stable

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is slightly up. Erosion is minimal even with the excessive slope. The increase in percent litter cover coupled with the decrease in bare soil cover suggests an improving soil condition. Sum of nested frequency for perennial grasses and forbs increased as well, which indicates better distribution of protective ground cover to hold soils in place. Trend for the key browse, black sagebrush, is up slightly. Percent decadency decreased and recruitment is high. Use is light to moderate with good seed production. The herbaceous understory shows upward trends as the perennial species increased in sum of nested frequency and cover since the 1994 reading.

TREND ASSESSMENT

soil - slightly up

browse - slightly up for black sagebrush, although not critical for this site

herbaceous understory - up

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 16

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	151	175	178	63	66	74	5.31	7.04
G	Elymus salina	_a 198	_{ab} 243	_b 265	76	87	92	10.69	10.61
G	Poa fendleriana	_c 191	_a 70	_b 118	83	32	51	.43	1.21
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		540	488	561	222	185	217	16.45	18.86
Total for Grasses		540	488	561	222	185	217	16.45	18.86
F	Andropogon scoparius	-	1	-	-	1	-	.00	-
F	Arabis spp.	1	2	8	1	1	4	.00	.02
F	Astragalus tenellus	_a -	_b 6	_a -	-	5	-	.06	-
F	Astragalus spp.	_c 128	_a 2	_b 71	56	2	32	.03	2.99
F	Castilleja linariaefolia	-	2	-	-	1	-	.00	-
F	Erigeron eatonii	1	-	-	1	-	-	-	-
F	Eriogonum elatum	-	2	-	-	1	-	.00	-
F	Lesquerella spp.	-	-	2	-	-	1	-	.00
F	Machaeranthera grindelioides	8	13	15	4	6	8	.11	.13

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Phlox longifolia	-	5	-	-	2	-	.01	-
F	Schoenrambe linifolia	a-	b6	ab5	-	4	2	.04	.01
F	Senecio multilobatus	-	4	2	-	2	2	.01	.01
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		138	43	103	62	25	49	0.28	3.17
Total for Forbs		138	43	103	62	25	49	0.28	3.17

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

BROWSE TRENDS --

Herd unit 16B, Study no: 16

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia frigida	16	22	.01	.07
B	Artemisia nova	87	92	6.14	7.14
B	Artemisia tridentata vaseyana	15	0	.18	-
B	Chrysothamnus depressus	0	2	.00	.03
B	Chrysothamnus viscidiflorus viscidiflorus	7	2	-	-
B	Eriogonum corymbosum	4	4	.00	.15
B	Gutierrezia sarothrae	15	20	.36	.20
B	Juniperus osteosperma	-	-	.63	.15
B	Pinus edulis	0	1	-	.15
B	Symphoricarpos oreophilus	0	0	-	-
Total for Browse		144	143	7.33	7.89

CANOPY COVER --

Herd unit 16B, Study no: 16

Species	Percent Cover '09
Pinus edulis	1

BASIC COVER --

Herd unit 16B, Study no: 16

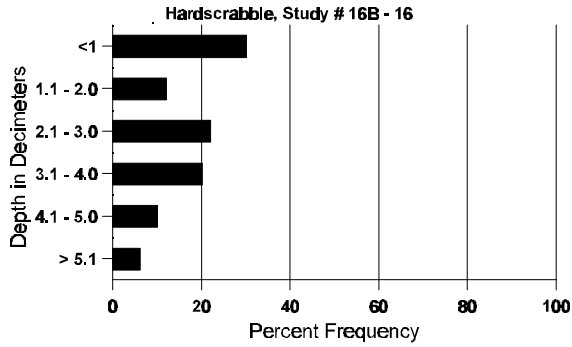
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	314	326	14.75	28.01	34.47
Rock	357	313	16.75	26.09	24.68
Pavement	313	309	18.00	3.29	9.48
Litter	372	360	40.25	21.05	25.95
Cryptogams	104	203	2.50	1.75	3.34
Bare Ground	299	271	7.75	15.39	11.73

SOIL ANALYSIS DATA --

Herd Unit 16B, Study # 16, Study Name: Hardscrabble

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
19.3	47.4 (17.7)	7.5	36.0	35.4	28.6	2.7	3.9	112.0	0.7

Stoniness Index



PELLET GROUP DATA --

Herd unit 16B, Study no: 16

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Rabbit	14	1	n/a
Elk	49	55	41 (101)
Deer	7	4	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 16

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	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	18	-	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	9	3	2
	94	20	-	-	-	-	-	-	-	-	20	-	-	-	400	7	8	20
	99	28	-	-	-	-	-	-	-	-	28	-	-	-	560	7	7	28
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+53%							
'94		00%			00%			00%			+54%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	-			
												'94	420		-			
												'99	920		-			
Artemisia nova																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
	99	23	-	-	3	-	-	-	-	-	26	-	-	-	520		26	
Y	88	4	4	1	-	-	-	-	-	-	9	-	-	-	600		9	
	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	99	86	-	-	1	-	-	-	-	-	83	4	-	-	1740		87	
M	88	7	5	16	-	-	-	-	-	-	28	-	-	-	1866	8	14	28
	94	109	22	-	-	-	-	-	-	-	120	9	2	-	2620	19	21	131
	99	141	61	17	1	-	-	-	-	-	220	-	-	-	4400	6	14	220
D	88	8	16	28	-	-	-	-	-	-	49	-	1	2	3466		52	
	94	81	35	-	4	-	-	-	-	-	93	9	9	9	2400		120	
	99	59	51	9	1	-	-	-	-	-	83	-	-	37	2400		120	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	900		45	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	1840		92	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		28%			51%			03%			-12%							
'94		22%			00%			08%			+39%							
'99		26%			06%			09%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	5932	Dec:	58%			
												'94	5220		46%			
												'99	8540		28%			

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				
<i>Artemisia tridentata vaseyana</i>																
S	88	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	88	6	2	-	-	-	-	-	-	8	-	-	-	533		8
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	88	4	2	3	-	-	-	-	-	9	-	-	-	600	8 12	9
	94	15	-	-	-	-	-	-	-	15	-	-	-	300	7 10	15
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
D	88	4	1	1	-	-	-	-	-	5	-	-	1	400		6
	94	3	-	-	2	-	-	-	-	5	-	-	-	100		5
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	60		3
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		22%			17%			04%			-74%					
'94		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	1533	Dec:	26%			
										'94	400		25%			
										'99	0		0%			
<i>Chrysothamnus depressus</i>																
M	88	1	1	-	-	-	-	-	-	2	-	-	-	133	4 13	2
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	3	-	-	-	-	-	-	-	3	-	-	-	60	4 8	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		50%			00%			00%								
'94		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	133	Dec:	-			
										'94	0		-			
										'99	60		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	94	10	-	-	-	-	-	-	-	10	-	-	-	200	6 10	10
	99	2	-	-	-	-	-	-	-	2	-	-	-	40	7 11	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		00%			00%			00%								
'94		00%			00%			00%			-80%					
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-			
										'94	200		-			
										'99	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		5	6		7	8	9	1	2			
<i>Eriogonum corymbosum</i>																	
M	88	-	2	-	-	-	-	-	-	2	-	-	-	133	8	16	2
	94	5	-	-	-	-	-	-	-	5	-	-	-	100	11	25	5
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	11	19	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
	'88	100%			00%			00%			-25%						
	'94	00%			00%			00%			-20%						
	'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	133	Dec:	-				
										'94	100		-				
										'99	80		-				
<i>Gutierrezia sarothrae</i>																	
Y	88	2	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	2	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	2	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	7	-	-	-	-	-	-	-	7	-	-	-	466	10	5	7
	94	28	-	-	-	-	-	-	-	28	-	-	-	560	8	9	28
	99	34	-	-	-	-	-	-	-	34	-	-	-	680	7	8	34
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
	'88	00%			00%			00%			+ 0%						
	'94	00%			00%			00%			+17%						
	'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	599	Dec:	-				
										'94	600		-				
										'99	720		-				
<i>Pinus edulis</i>																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	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%									
	'94	00%			00%			00%									
	'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	0		-				
										'99	20		-				
<i>Symphoricarpos oreophilus</i>																	
M	88	-	1	-	-	-	-	-	-	1	-	-	-	66	9	8	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	12	19	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
	'88	100%			00%			00%									
	'94	00%			00%			00%									
	'99	00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	66	Dec:	-				
										'94	0		-				
										'99	0		-				

Trend Study 16B-17-99

Study site name: Slackpile .

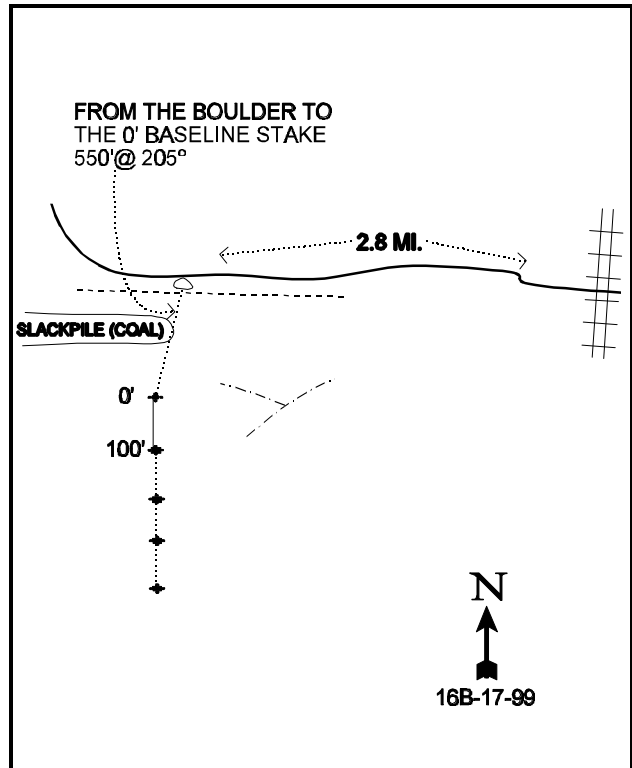
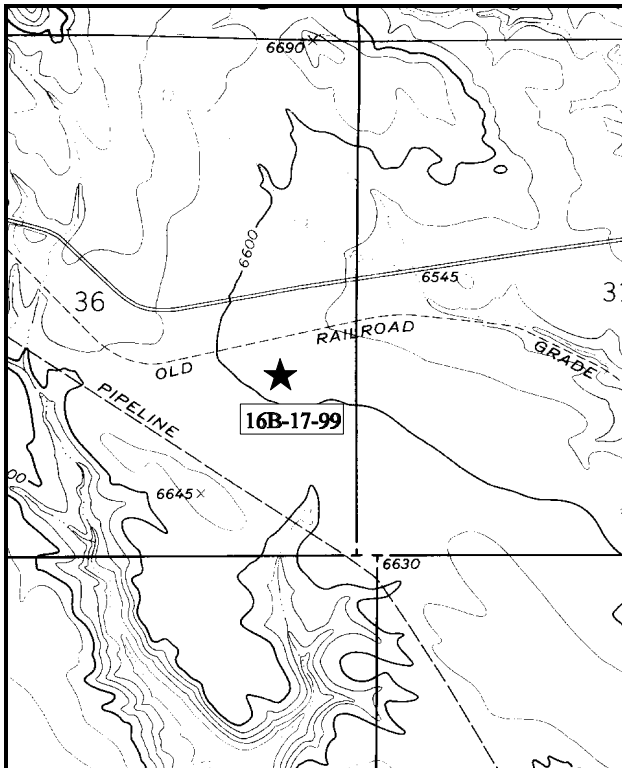
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 165°M- Line 1 & 2; 163°M- Line 3 & 4.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

On US 6 north of Helper, turn west onto Consumers Road. Proceed west 3.2 miles to the railroad tracks. Cross the tracks and continue 2.8 miles to a large boulder on the left. The study is located in the sagebrush south of the fence. Walk 550 feet at 190°M from the boulder to the start of the frequency baseline. The first stake is marked with a red browse tag, #9022.



Map Name: Standardville

Diagrammatic Sketch

Township 13S , Range 8E , Section 36

UTM 4388792.606 N, 502890.346 E

DISCUSSION

Trend Study No. 16B-17 (30-3)

The Slackpile study samples a representative sagebrush/grass site owned by the Division. The sagebrush/grass type covers an extensive part of the Gordon Creek range, an important wintering area for large numbers of deer. At the time of study establishment, the Division permitted spring cattle grazing, May 15 to June 15, with 150 AUMs on the south side of Consumers Road. Grazing has since been discontinued although trespass cattle were on the site when it was read in May of 1999. Currently, livestock use is moderately low with 23 cow days use/acre (57 cdu/ha) being estimated from the pellet group transects. Use by deer is moderately high with an estimated 65 deer days use/acre (160 ddu/ha) being estimated in 1999.

The study is at 6,600 feet in elevation on an 8% north-facing slope. Soil texture is a loam with a slightly alkaline pH (7.5). The surface is very hard with a crust present. The formation of cracks is occurring with the drying of the soil surface. The soil is moderately deep with an estimated effective rooting depth of 18 inches. There are very few rocks or pavement on the surface or throughout the profile. The stoniness index is more a measure of the compaction of the profile than actual presence of rock. There is a considerable amount of bare ground on the site, currently estimated at 43%. Pedestaling is present around the baseline stakes and shrub stems. Exposed roots and small gullies indicate some erosion problems on the site. Phosphorus (5.1 ppm) and potassium (44.8 ppm) are lower than the 10 ppm and 70 ppm that have been shown necessary for normal plant development and growth.

The various ecotypes and hybrids of big sagebrush in the area make plant classification difficult. On the study site, all big sagebrush were classified as Wyoming big sagebrush. Some black sagebrush was also encountered in 1994. Density for Wyoming big sagebrush has remained stable over all sampling years, and is estimated at 2,800 plants/acre in both 1994 and 1999. Cover for this species increased in 1999 to just over 7%. Browsing was heavy in 1988 when 44% of the Wyoming big sage displayed heavy use. Use was more moderate in 1994 with only 7% of the sagebrush displaying heavy use. Currently, utilization on sagebrush is high with 31% showing moderate use, and 42% displaying heavy use. Percent decadence has bounced around with each reading from 42% in 1988, to 57% in 1994, then decreasing to 36% in 1999. Ten percent of the population currently displays poor vigor. Biotic potential (number of seedlings) and recruitment have greatly decreased since the initial reading, currently at 0% and 9% respectively. Stickyleaf low rabbitbrush is the most abundant shrub in both cover and density and is currently estimated at 19,040 plant/acre, an increase of 34% since the 1994 reading. This is mostly a mature population with 23% of the plants showing moderate use. Broom snakeweed is also present, but after a large decrease due to drought during the previous reading, appears to be stabilizing at the present time.

Species richness of herbaceous vegetation is average for this range type with 7 grass and 7 forb species identified in 1994. The number of herbaceous species sampled in 1999 increased, with 7 grasses and 17 forbs present. However, most of the increase in forbs comes from species infrequently encountered. Bluebunch wheatgrass is the most abundant grass on the site with a quadrat frequency of 70% in 1994, increasing to 87% in 1999. It currently provides 76% of the grass cover, and 64% of the herbaceous cover, and was lightly utilized in 1999. Indian ricegrass and blue grama are the next most abundant grasses, but are decreasing in frequency. Nested frequency for all perennial grasses combined decreased in 1999. Forbs are unimportant as a forage source on this site, and provide very little protective cover.

1994 TREND ASSESSMENT

Protective ground cover has increased since 1988, with bare ground now covering 40% of the ground surface. Percent litter and cryptogamic cover have declined somewhat but vegetative cover appears to have increased. In 1988, basal vegetation cover was estimated at 4.5%. Aerial vegetation cover was estimated at 29% during the 1994 reading. Fifty-one percent of that cover comes from herbaceous vegetation which is best at holding

soil in place. There is still a considerable amount of exposed soil and some signs of soil movement, but it does not appear to be severe. Trend for soil is therefore improving.

Browse trend is down. The key species on this site is Wyoming big sagebrush. It's population density is currently stable with light to moderate use and good vigor. However, biotic and reproductive potentials are low and percent decadency has increased from 42% to 57%. The number of dead plants was estimated at 1,580 plants/acre in 1994, a very high number. The main negative aspect of this site is the extremely high number of small rabbitbrush (12,620 plants/acre). Currently, the population is mostly mature with few young and decadent. This shrub will replace Wyoming big sagebrush if current trends continue. The only positive aspect of the browse trend on this site is the 90% reduction in broom snakeweed density (13,398 to 1,400 plants/acre). Broom snakeweed is a short-lived shrub which commonly dies off in large numbers during extended drought.

Sum of nested frequency for grasses have remained fairly stable since the last reading, while those of the forbs have declined 45%. The native, bluebunch wheatgrass, increased significantly, nearly doubling in nested frequency. All other grasses encountered in 1988, declined significantly in nested frequency. Even though the sum of nested frequency for grasses and forbs combined declined, it appears in the photos that the grasses are much larger than they were previously. However, without cover data for individual species in 1988, we cannot make any direct comparisons. Trend for grasses is stable while those for forbs is down.

TREND ASSESSMENT

soil - improving

browse - down due to abundance of the increaser rabbitbrush and an increase in decadence for sagebrush

herbaceous understory - stable overall, stable for grasses but down for forbs

1999 TREND ASSESSMENT

Trend for soil is stable, but still in poor condition. Relative bare ground cover is the same as in 1994. The ratio of protective cover to bare soil has actually improved slightly. Bare ground cover still remains relatively high and soil movement is noticeable with pedestaling occurring around the base of shrubs. The proportion of protective ground cover (herbaceous vegetation, cryptogams, and litter) to bare ground is marginally low, indicating high amounts of exposed bare soil. Wyoming big sagebrush, the key species, has a stable trend. The population density remains stable overall, although biotic potential and recruitment are low. Percent decadency decreased from 57% to 36%, however, the proportion of the population displaying heavy use increased from 7% to 42% in 1999. A negative aspect for browse on the site comes from the increase in stickyleaf low rabbitbrush, currently at 19,040 plants/acre. As a result, trend for browse is slightly down overall. Any continued increase in rabbitbrush could result in deleterious effects to the key species, Wyoming big sagebrush. Trend for the herbaceous understory is stable overall. Perennial grass sum of nested frequency decreased, while perennial forb nested frequency increased.

TREND ASSESSMENT

soil - stable

browse - stable for the key species, Wyoming big sage, but slightly down overall due to the increase in rabbitbrush

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 17

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Agropyron spicatum</i>	a ₁₂₇	b ₂₁₁	b ₂₃₅	53	70	87	10.30	8.85
G	<i>Bouteloua gracilis</i>	a ₋	c ₃₇	b ₃₀	-	11	10	1.72	1.22
G	<i>Elymus salina</i>	a ₋	b ₁₇	b ₂₀	-	6	7	.51	.87
G	<i>Oryzopsis hymenoides</i>	95	81	53	41	35	25	1.77	.57
G	<i>Poa fendleriana</i>	-	3	3	-	2	1	.01	.03
G	<i>Sitanion hystrix</i>	b ₁₇₂	a ₂₆	a ₇	69	10	3	.29	.04
G	<i>Stipa columbiana</i>	-	4	-	-	2	-	.03	-
G	<i>Stipa comata</i>	b ₁₅	a ₂	ab ₃	6	1	2	.03	.03
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		409	381	351	169	137	135	14.68	11.61
Total for Grasses		409	381	351	169	137	135	14.68	11.61
F	<i>Arabis</i> spp.	b ₆	a ₋	ab ₅	3	-	2	-	.01
F	<i>Astragalus convallarius</i>	b ₄₄	a ₅	b ₃₅	21	2	17	.01	.08
F	<i>Castilleja linariaefolia</i>	ab ₁	a ₋	b ₁₃	1	-	7	-	.20
F	<i>Carduus nutans</i> (a)	-	-	3	-	-	2	-	.01
F	<i>Calochortus nuttallii</i>	a ₁	a ₋	b ₁₆	1	-	8	-	.04
F	<i>Collinsia parviflora</i> (a)	-	a ₋	b ₅	-	-	3	-	.01
F	<i>Eriogonum umbellatum</i>	-	3	10	-	1	4	.15	.16
F	<i>Machaeranthera grindelioides</i>	9	10	19	6	4	10	.07	.07
F	<i>Mammillaria</i> spp.	1	-	-	1	-	-	-	-
F	<i>Orthocarpus purpureo-albus</i> (a)	b ₄₆	a ₋	a ₋	23	-	-	-	-
F	<i>Penstemon caespitosus</i>	c ₄₃	b ₂₃	a ₋	23	12	-	.11	-
F	<i>Penstemon</i> spp.	a ₋	a ₋	b ₃₁	-	-	16	-	.13
F	<i>Phlox austromontana</i>	a ₃	b ₂₉	b ₃₂	3	14	15	.36	.70
F	<i>Phlox longifolia</i>	b ₂₃₅	a ₁₀₆	a ₈₈	88	40	40	.25	.25
F	<i>Physaria</i> spp.	-	-	1	-	-	1	-	.00
F	<i>Potentilla</i> spp.	-	-	2	-	-	1	-	.03
F	<i>Schoenocrambe linifolia</i>	a ₋	a ₋	b ₉	-	-	6	-	.03
F	<i>Sphaeralcea coccinea</i>	44	45	49	22	17	21	.35	.20
F	<i>Thlaspi montanum</i>	-	-	2	-	-	1	-	.00
F	<i>Trifolium gymnocarpon</i>	b ₅₉	a ₋	b ₄₇	28	-	23	-	.24
Total for Annual Forbs		46	0	8	23	0	5	0	0.02
Total for Perennial Forbs		446	221	359	197	90	172	1.31	2.18
Total for Forbs		492	221	367	220	90	177	1.31	2.21

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

BROWSE TRENDS --
Herd unit 16B, Study no: 17

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia nova	4	3	.76	.38
B	Artemisia tridentata wyomingensis	74	73	5.03	7.57
B	Atriplex canescens	0	0	-	-
B	Ceratoides lanata	0	0	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	90	95	6.42	8.37
B	Echinocereus spp.	0	3	-	.00
B	Gutierrezia sarothrae	42	27	.17	.30
B	Opuntia spp.	17	19	.22	.37
B	Pinus edulis	0	0	.00	-
B	Sclerocactus	0	1	-	-
Total for Browse		227	221	12.63	17.00

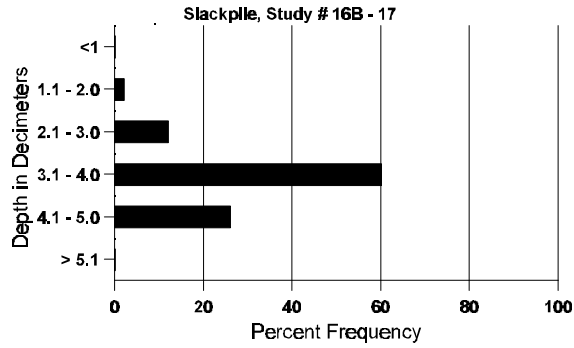
BASIC COVER --
Herd unit 16B, Study no: 17

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	327	324	4.50	28.70	30.32
Rock	16	1	0	.06	.00
Pavement	19	4	.50	.09	.01
Litter	377	356	29.25	25.67	21.25
Cryptogams	138	216	10.00	2.78	9.93
Bare Ground	354	351	55.75	40.50	42.94

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 17, Study Name: Slackpile

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.0	56.0 (18.1)	7.5	39.3	34.2	26.6	1.5	5.1	44.8	0.6

Stoniness Index



PELLET GROUP DATA --
Herd unit 16B, Study no: 17

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	8	54	n/a
Elk	4	2	0
Deer	48	59	65 (161)
Cattle	1	6	23 (57)

BROWSE CHARACTERISTICS --
Herd unit 16B, 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				
Artemisia nova																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	1	3	-	-	-	-	-	-	-	4	-	-	-	80	16	34	4
	'99	-	3	-	-	-	5	1	-	-	9	-	-	-	180	7	14	9
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	1	1	-	-	-	-	-	-	-	1	-	-	1	40			2
	'99	-	-	-	-	-	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%										
'94		50%			00%			13%			+27%							
'99		27%			64%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	160		25%			
												'99	220		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>																		
S	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	4	6	2	-	-	-	-	-	-	12	-	-	-	800		12	
	94	2	1	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	8	2	-	-	1	1	-	-	-	12	-	-	-	240		12	
M	88	1	6	7	-	-	-	-	-	-	14	-	-	-	933	13 18	14	
	94	34	21	1	1	-	-	-	-	-	55	-	-	2	1140	16 23	57	
	99	4	6	17	2	20	23	5	-	-	77	-	-	-	1540	18 27	77	
D	88	-	6	11	-	-	-	2	-	-	17	-	2	-	1266		19	
	94	19	51	8	-	-	1	1	-	-	64	-	-	16	1600		80	
	99	10	4	7	-	10	11	9	-	-	35	2	-	14	1020		51	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	1580		79	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1940		97	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		40%			44%			04%			- 7%							
'94		52%			07%			13%			+ 0%							
'99		31%			42%			10%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	2999	Dec:	42%				
											'94	2800		57%				
											'99	2800		36%				
<i>Atriplex canescens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14 47	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	0		-				
<i>Ceratoides lanata</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		100%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-				
											'94	0		-				
											'99	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 viscidiflorus viscidiflorus																		
S	88	30	-	-	-	-	-	-	-	-	30	-	-	-	2000		30	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	27	-	-	-	-	-	1	-	-	28	-	-	-	560		28	
Y	88	657	7	-	-	-	-	-	-	-	664	-	-	-	44266		664	
	94	20	-	-	-	-	-	-	-	20	-	-	-	400		20		
	99	156	9	-	-	2	6	-	-	173	-	-	-	3460		173		
M	88	118	20	1	2	-	-	-	-	-	141	-	-	-	9400	6	9	141
	94	598	-	-	12	-	-	-	-	-	610	-	-	-	12200	5	12	610
	99	502	206	29	-	-	26	12	-	-	775	-	-	-	15500	4	9	775
D	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	94	1	-	-	-	-	-	-	-	-	-	-	-	20		1		
	99	4	-	-	-	-	-	-	-	-	1	-	-	80		4		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		03%			.12%			00%			-77%							
'94		00%			00%			.15%			+34%							
'99		23%			06%			.31%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	53799	Dec:	0%				
											'94	12620		0%				
											'99	19040		0%				
Echinocereus spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	2	4	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	60		-				

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	88	2	-	-	-	-	-	-	2	133		2	
	94	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	0		0	
Y	88	37	-	-	-	-	-	-	37	2466		37	
	94	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	1	20		1	
M	88	157	-	-	-	-	-	-	157	10466	7 7	157	
	94	70	-	-	-	-	-	-	70	1400	8 5	70	
	99	99	-	-	-	-	-	-	99	1980	4 3	99	
D	88	7	-	-	-	-	-	-	5	466		7	
	94	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		00%		00%		.99%		-90%					
'94		00%		00%		00%		+30%					
'99		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	13398	Dec:	3%
										'94	1400		0%
										'99	2000		0%
<i>Opuntia spp.</i>													
S	88	1	-	-	-	-	-	-	1	66		1	
	94	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	1	20		1	
Y	88	4	-	-	-	-	-	-	3	266		4	
	94	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	1	-	-	-	5	100		5	
M	88	2	-	-	-	-	-	-	1	133	3 7	2	
	94	22	-	-	-	-	-	-	22	440	4 13	22	
	99	16	-	-	-	-	-	-	16	320	3 13	16	
D	88	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	0		0	
	99	4	-	1	1	-	-	-	1	120		6	
X	88	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		00%		00%		33%		+ 9%					
'94		00%		00%		00%		+19%					
'99		00%		04%		19%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	399	Dec:	0%
										'94	440		0%
										'99	540		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																	
S	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	0		-		
												'99	0		-		
Sclerocactus																	
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'99	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%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	0		-		
												'99	20		-		

Trend Study 16B-18-99

Study site name: Porphyry Bench .

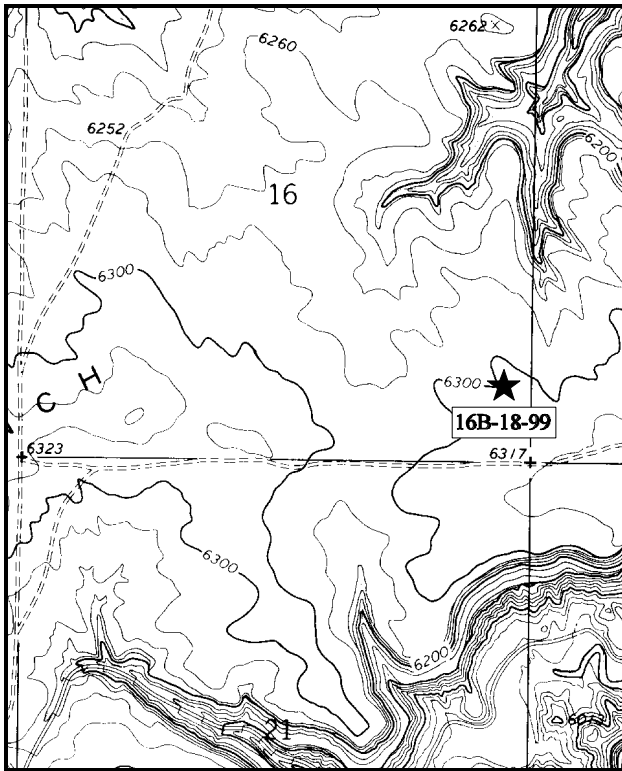
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 270°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

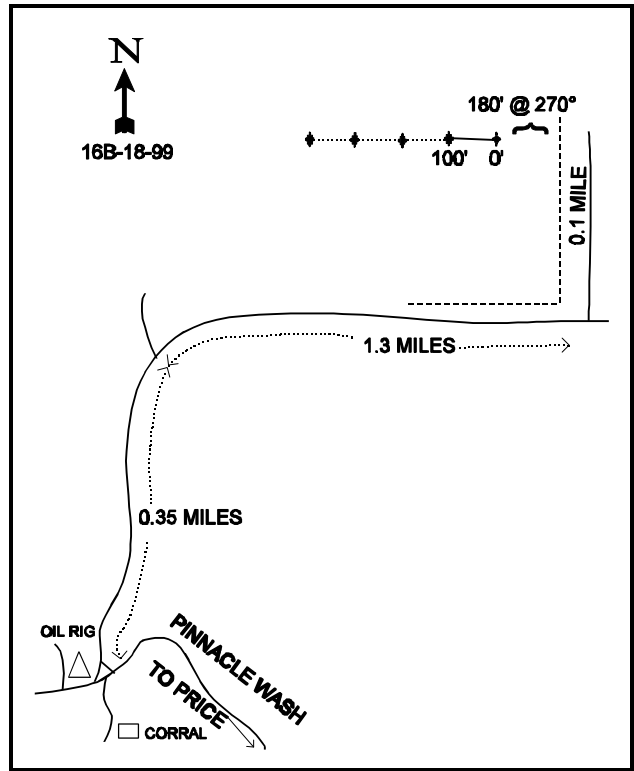
LOCATION DESCRIPTION

Take Westwood Blvd (1550 W) northwest out of Price 2.35 miles to a major intersection. Turn left onto Gordon Creek Road and travel 0.45 miles to a fork. Bear left away from Gordon Creek, going 0.1 miles to a gravel pit. Continue 5.2 miles on the Pinnacle Peak Road to a 3-way fork at the top of the bench. Go right 0.35 miles to a fork. Bear right and continue 1.3 miles, going alongside a fence to the SE corner. Turn left and go along the fence 0.1 mile to the fifth wood post from the corner. Walk west into the sagebrush 180 feet to the 0-foot baseline stake. It is a 1 1/2 foot tall fencepost marked by browse tag #9021.



Map Name: Pinnacle Peak

Township 14S , Range 9E , Section 16



Diagrammatic Sketch

UTM 4383381.268 N, 507730.346 E

DISCUSSION

Trend Study No. 16B-18 (30-4)

The Porphyry Bench study site is located on Porphyry Bench which is critical deer winter range. The bench is largely a sagebrush/grass type, with juniper covered side hills and draws. The study is on a very gentle (1-2%) west-facing slope at an elevation of 6,300 feet. Located on a fenced 1/4 section of DWR land, the study site shows signs of heavy deer use. A nearby pellet group transect has had an average of 45 deer days use/acre between 1988 and 1994. Pellet group transect data from 1999 on the study site indicate extremely high deer use with an estimated 149 deer days use/acre (369 ddu/ha). Use by elk and livestock is light with an estimated 1 elk days use/acre (3 edu/ha) and 4 cow days use/acre (9 cdu/ha).

The soil appears to be moderately deep with an estimated effective rooting depth of just over 16 inches. A compacted layer is present at about 16 inches below the surface. Rock and pavement cover is nearly non-existent on the surface, and very little is found in the profile. The soil has a loam texture with a moderately alkaline pH (8.1). Potassium is very low at 25.6 ppm, when 70 ppm is the minimal level shown to be necessary for normal plant development and growth. Surface erosion is minimal on the site due to the level topography and substantial vegetation and litter cover. Evidence of some pedestaling is apparent around the base of sagebrush stems and the larger bunch grasses.

Wyoming big sagebrush is the key species for this site. When this site was initially established in 1988, the Wyoming big sage population was characterized as being large and vigorous with good leader growth, with marginal seed production. The mature shrubs sampled in 1988 were heavily utilized with 48% of the shrubs displaying heavily hedging. Density was 6,933 plants/acre, 19% of which were young shrubs. Vigor was generally good, but 46% percent of the population was classified as decadent. By 1994, there was an estimated 6,200 mostly mature sagebrush (71%). No seedlings were encountered and young plants numbered only 220 plants/acre. Utilization was light and vigor had improved. Percent decadency also declined to 25%. Currently, the population is estimated at 7,540 plants/acre, with 62% of these being mature plants. Biotic potential is very low (1%), with moderate recruitment from the young age class (10%). Percent decadency slightly increased from 25% to 28%, with plants displaying poor vigor remaining nearly the same. Deer use of the area has greatly increased since the 1994 reading as evidenced by pellet group counts and the level of use on the mature shrubs. Heavy use was displayed on 56% of the population in 1999, where no plants were classified as such in 1994. Seed production is currently very low. Continued heavy use coupled with drought could result in the decline of the sagebrush population in the future.

Clumps of pricklypear cactus are exceptionally abundant. The cactus has been nearly as abundant as sagebrush over all sampling years in terms of strip frequency, and currently provides 4% cover, or 24% of the browse cover. Age class analysis indicates a mostly mature population with increasing decadency since the last reading (1% to 10%). The fragile pricklypear spreads readily, as the joints easily break off and then root. A few curleaf mountain mahogany and winterfat occur in the vicinity, but these valuable species are relatively uncommon.

The most abundant grass is needle-and-thread with a quadrat frequency on average of 88% over all sampling periods. Cover provided by this species was high in 1994 at nearly 9%, increasing to nearly 10% in 1999. Needle-and-thread currently provides 69% of the grass cover, and 31% of the total vegetation cover on the site. Generally vigorous, some individuals had a black fungus on the seed heads in 1988. Other grasses present at the site include: Indian ricegrass, bottlebrush squirreltail and Salina wildrye. Several species of annual forbs and also cheatgrass are present, but are not very common. Perennial forbs include scarlet globemallow, longleaf phlox, and lobeleaf groundsel.

1994 TREND ASSESSMENT

Ground cover characteristics have improved on this site. Aerial cover of vegetation currently covers nearly 28% of the ground surface. Fifty-three percent of that cover comes from grasses and forbs. Litter cover has declined, but this trend is common during these dry years. Bare ground has also declined from 43% to 35%, and erosion is not currently a problem. The browse trend is currently stable. Percent decadency has declined from 46% to 25%. No seedlings were encountered in 1994, and young plants only make up almost 4% of the population. Reproductive potential will likely improve with normal precipitation patterns.

Sum of nested frequency of grasses and forbs have both increased indicating an improving trend. The most abundant grass, needle-and-thread, declined slightly in nested frequency while Salina wildrye and squirreltail both increased significantly. Perennial forbs are lacking on this site with only 5 species encountered in 1994. The only perennial forb that is very abundant is scarlet globemallow which makes up 81% of the forb cover.

TREND ASSESSMENT

soil - slightly improving

browse - stable

herbaceous understory - up

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover from herbaceous vegetation increased while cover from litter and bare ground decreased. Erosion is minimal due to the gentle slope. Trend for browse is stable. Wyoming big sagebrush has a stable density with a moderate level of recruitment (10%). Biotic potential is very low at 1%. Percent decadency only slightly increased in 1999 to 28%. A major factor that will influence the condition of the sagebrush population in the future is the level of use, associated with drought, if applicable. In 1994, no plants displayed heavy use, while 56% of the population were heavily browsed in 1999. If continued, this high level of use could cause a downward trend in the sagebrush on this critical winter range. Trend for the herbaceous understory is stable. Sum of nested frequency and cover for perennial species slightly increased since 1994. Annual species such as cheatgrass are still insignificant in the understory.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 18

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Bouteloua gracilis</i>	a1	ab8	b11	1	3	7	.06	.22
G	<i>Bromus tectorum</i> (a)	-	3	-	-	1	-	.00	-
G	<i>Elymus salina</i>	a21	b91	b84	9	35	31	.67	1.79
G	<i>Oryzopsis hymenoides</i>	59	40	67	28	19	29	1.26	2.12
G	<i>Sitanion hystrix</i>	b43	b77	a13	21	31	7	1.15	.28
G	<i>Sporobolus cryptandrus</i>	a3	b13	a-	1	7	-	.39	-
G	<i>Stipa comata</i>	262	250	256	96	88	90	8.67	9.88
Total for Annual Grasses		0	3	0	0	1	0	0.00	0
Total for Perennial Grasses		389	479	431	156	183	164	12.24	14.31
Total for Grasses		389	482	431	156	184	164	12.24	14.31
F	<i>Astragalus convallarius</i>	b10	a-	ab4	3	-	1	-	.00
F	<i>Calochortus nuttallii</i>	-	-	5	-	-	2	-	.03
F	<i>Castilleja</i> spp.	-	-	2	-	-	1	-	.00
F	<i>Chenopodium leptophyllum</i> (a)	-	b19	a-	-	7	-	.03	-
F	Cruciferae	6	-	-	2	-	-	-	-
F	<i>Eriogonum alatum</i>	-	-	2	-	-	1	-	.00
F	<i>Eriogonum cernuum</i> (a)	-	b8	a-	-	3	-	.01	-
F	<i>Lappula occidentalis</i> (a)	-	b16	a-	-	6	-	.05	-
F	<i>Lesquerella</i> spp.	ab5	b7	a-	2	3	-	.01	-
F	<i>Lomatium</i> spp.	-	-	4	-	-	2	-	.01
F	<i>Machaeranthera canescens</i>	2	-	-	1	-	-	-	-
F	<i>Orobancha</i> spp.	1	-	-	1	-	-	-	-
F	<i>Penstemon caespitosus</i>	1	-	-	1	-	-	-	.00
F	<i>Phlox longifolia</i>	a-	b4	c68	-	3	30	.04	.32
F	<i>Plantago patagonica</i> (a)	-	b37	a9	-	16	3	.08	.01
F	<i>Schoenrambe linifolia</i>	-	-	3	-	-	1	-	.00
F	<i>Senecio multilobatus</i>	6	5	6	3	2	3	.01	.04
F	<i>Sphaeralcea coccinea</i>	a94	a125	b126	44	55	53	1.13	1.59
F	<i>Taraxacum officinale</i>	a-	b10	a-	-	3	-	.01	-
F	<i>Tragopogon dubius</i>	3	-	-	1	-	-	-	-
F	<i>Zigadenus paniculatus</i>	-	-	3	-	-	1	-	.00
Total for Annual Forbs		0	80	9	0	32	3	0.18	0.01
Total for Perennial Forbs		128	151	223	58	66	95	1.22	2.02
Total for Forbs		128	231	232	58	98	98	1.40	2.04

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

BROWSE TRENDS --
Herd unit 16B, Study no: 18

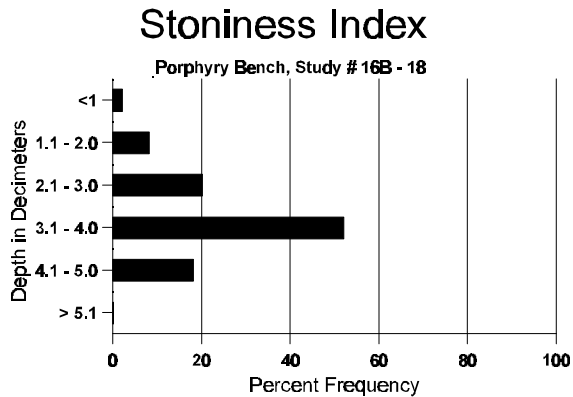
Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia tridentata wyomingensis	85	95	10.81	11.91
B	Cercocarpus ledifolius	0	0	-	-
B	Chrysothamnus viscidiflorus	0	4	-	.03
B	Gutierrezia sarothrae	3	11	.03	.10
B	Opuntia fragilis	93	93	2.96	3.74
Total for Browse		181	203	13.81	15.78

BASIC COVER --
Herd unit 16B, Study no: 18

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	327	336	5.50	27.77	31.73
Rock	1	-	0	.00	0
Pavement	29	3	0	.05	.00
Litter	386	377	49.50	35.52	29.25
Cryptogams	76	176	2.25	.90	7.30
Bare Ground	346	333	42.75	35.40	26.54

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 18, Study Name: Porphyry Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.1	58.4 (12.6)	8.1	47.3	30.2	22.6	1.1	12.3	25.6	0.6



PELLET GROUP DATA --
Herd unit 16B, Study no: 18

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	21	32	n/a
Elk	11	2	1 (2)
Deer	52	79	149 (368)
Cattle	-	1	4 (10)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 18

A G 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 wyomingensis</i>																		
S	'88	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
Y	'88	8	4	3	-	-	-	5	-	-	18	-	1	1	1333			20
	'94	11	-	-	-	-	-	-	-	11	-	-	-	220			11	
	'99	13	22	2	-	-	-	2	-	39	-	-	-	780			39	
M	'88	1	13	22	-	-	-	-	-	36	-	-	-	2400	17	21	36	
	'94	215	3	-	3	-	-	-	-	221	-	-	-	4420	17	24	221	
	'99	-	16	69	4	55	78	10	-	232	-	-	-	4640	16	24	232	
D	'88	4	19	25	-	-	-	-	-	37	-	8	3	3200			48	
	'94	74	4	-	-	-	-	-	-	59	-	-	19	1560			78	
	'99	1	4	19	9	21	43	7	-	80	-	-	26	2120			106	
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	1360			68	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	1740			87	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		35%			48%			13%			-11%							
'94		02%			00%			06%			+18%							
'99		31%			56%			07%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	6933	Dec:	46%				
											'94	6200		25%				
											'99	7540		28%				
<i>Cercocarpus ledifolius</i>																		
Y	'88	1	-	-	-	-	-	-	-	1	-	-	-	66			1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	'88	-	1	1	-	-	-	-	-	2	-	-	-	133	15	8	2	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		33%			33%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	199	Dec:	-				
											'94	0		-				
											'99	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>Chrysothamnus viscidiflorus</i>																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	5	-	-	-	-	-	-	-	-	-	-	-	100	4	10	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	0		-		
												'99	100		-		
<i>Gutierrezia sarothrae</i>																	
Y	88	4	-	-	-	-	-	-	-	-	-	-	-	266			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	28	-	-	-	-	-	-	-	-	-	-	-	560			28
M	88	12	-	-	-	-	-	-	-	-	-	-	-	800	8	4	12
	94	4	-	-	-	-	-	-	-	-	-	-	-	80	6	7	4
	99	24	-	-	-	-	-	-	-	-	-	-	-	480	3	5	24
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-92%						
'94		00%			00%			00%			+92%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	1066	Dec:	-		
												'94	80		-		
												'99	1040		-		
<i>Opuntia fragilis</i>																	
S	88	4	-	-	-	-	-	-	-	-	-	-	-	266			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	-	-	-	20			1
Y	88	53	-	-	-	-	-	-	-	-	-	-	-	3533			53
	94	3	-	-	-	-	-	-	-	-	-	-	-	60			3
	99	14	-	-	-	-	-	-	-	-	-	-	-	280			14
M	88	63	-	-	-	-	-	-	-	-	-	-	-	4200	3	9	63
	94	342	-	-	-	-	-	-	-	-	-	-	-	6840	3	12	342
	99	316	-	-	-	-	-	-	-	-	-	-	-	6320	3	12	316
D	88	6	-	-	-	-	-	-	-	-	-	-	-	400			6
	94	3	-	-	-	-	-	-	-	-	-	-	-	60			3
	99	37	-	-	1	-	-	-	-	-	-	-	-	760			38
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			04%			-14%						
'94		00%			00%			00%			+ 5%						
'99		00%			00%			15%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	8133	Dec:	5%		
												'94	6960		1%		
												'99	7360		10%		

Trend Study 16B-19-99

Study site name: North Spring Bench .

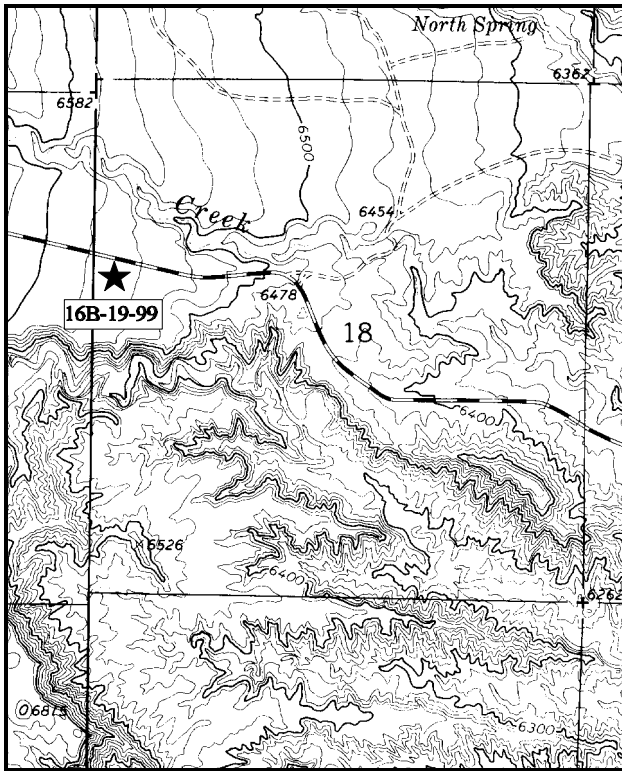
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Compass bearing: frequency baseline 165°M.

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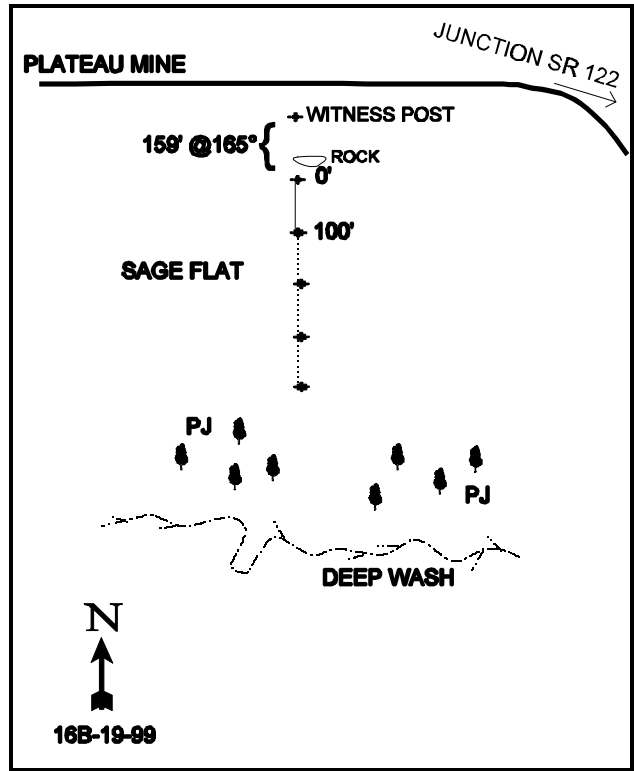
LOCATION DESCRIPTION

From the junction of state highways 10 and 122 south of Price, go west on SR 122. Go 3.1 miles to a major fork. Go right towards Wattis for 5.1 miles. Look for a witness post 10 feet off the south side of the road in a sagebrush flat. The first baseline stake is 28 paces south of the witness post, and located behind a large rock. It is marked with a red browse tag (#9013). The other study posts, all 18" fenceposts, are south at 100 foot intervals.



Map Name: Pinnacle Peak

Township 15S , Range 9E , Section 18



Diagrammatic Sketch

UTM 4374590.746 N, 502898.434 E

DISCUSSION

Trend Study No. 16B-19 (30-5)

The North Spring Bench trend study samples part of the critical deer winter range below Wattis in the Spring Creek area. In most years, deer occupy the area until the first of May. This southern end of the Gordon Creek sagebrush range receives heavy use by deer as evidenced by the high quadrat frequency of pellet-groups on the site. Managed by the BLM, the North Springs allotment is used by 1,000 sheep from May 1 to June 30. Deer use is currently extremely high with an estimated 159 deer days use/acre (392 ddu/ha) estimated from 1999 on site pellet group transect data. Several deer beds were found underneath large pinyon trees near the end of the sampling baseline.

The study is on a nearly level, natural sagebrush flat surrounded by mature pinyon-juniper at an elevation of 6,600 feet. Drainage and aspect is generally to the east. The soil is a sandy clay loam with a neutral pH (7.2). The soil is moderately deep with an estimated effective rooting depth of 16 inches. A stoniness index shows rock to be uniformly distributed throughout the upper 20 inches of the profile. A calcium carbonate hardpan is present about 12 inches below the surface which may be restrictive to plants roots. Surface runoff has caused plant pedestaling and moderate soil movement. However, the gentle slope and adequate vegetation and litter cover help keep erosion at a minimal level. There are no major gullies, but nearby washes show continued down cutting and active erosion. Bare ground has continually decreased since the initial reading in 1988.

The key browse species is Wyoming big sagebrush. Although the shrubs displayed fair leader growth, there were many indicators of a downward trend during the 1988 and 1994 readings. The population declined by 24% between 1988 and 1994, however much of this change can be attributed to the much larger sample size which began in 1994 giving significantly improved population estimates for discontinuous browse distributions. One should probably pay more attention to other measured parameters. For example, over half the population was decadent (52% in 1988, and 62% in 1994), and one in four shrubs was classified as dead. The majority of the moderately dense population was mature, with very few young in either 1988 or 1994. During the 1994 reading more seedlings were encountered but the number of young declined by almost half. Use was heavy in 1988 with 32% of the population classified as heavily browsed. In 1994, only 8% showed heavy use. Vigor declined however, from 10% with poor vigor in 1988 to 27% by 1994. Currently, the population of Wyoming big sagebrush appears to be improving. In 1999, percent decadency decreased from 62% to 31%, and plants with poor vigor decreased from 27% to 14%. Biotic potential is good at 12%, and recruitment from young plants is high at 23%. The proportion of decadent plants classified as dying also slightly decreased in 1999, from 43% to 36%. One area of concern is that use increased again in 1999 with heavy use displayed on 48% of the population. Continued heavy use, coupled with other environmental parameters, could cause the current improvements to reverse the improving trend in the future.

Increaser species, most notably broom snakeweed, was very abundant in 1988 (17,266 plants/acre) and age class composition indicated an increasing population. Due to the recent drought conditions, snakeweed died off in large numbers in 1994 with only 860 plants/acre being estimated. In 1999, the population drastically increased to an estimated 16,500 plants/acre with most of these being mature plants. The return to more normal precipitation patterns in recent years is most likely one of the main catalysts for this increase. Prickly pear is also quite abundant with the population currently estimated at 4,900 plants/acre.

Pinyon and juniper trees surround the site and are encroaching into the sagebrush flat. Point quarter data taken during the 1999 reading estimate a density of 100 pinyon trees/acre, and 19 juniper trees/acre. Average stem diameter for pinyon is 2 1/8 inches, while that of juniper is 2 2/3 inches.

The abundant and vigorous warm-season grass, blue grama, is not an important forage source on this site, although it does provide good ground cover. In 1994, it provided over 6% cover, in 1999, it provided just under 6% cover. Other perennial grasses that are common include: western wheatgrass, Indian ricegrass, and

bottlebrush squirreltail. Western wheatgrass is the most abundant species in sum of nested frequency and quadrat frequency. It also provides the second highest cover of the grasses. Needle-and-thread significantly decreased in 1999 as it was only sampled in one quadrat. Forbs are not significant at this site, currently providing less than 1% cover.

1994 TREND ASSESSMENT

Ground cover characteristics have improved on this site. Vegetation cover is quite high for a Wyoming big sagebrush site. Even though grasses and forbs make up only 33% of the vegetation cover, it appears to be evenly dispersed. Percent cover of litter has improved from 27% to 34%. The high sum of nested frequency for litter indicates well dispersed litter cover. Percent bare ground declined from 53% to 47%. Erosion on the site is minimal due to the protective cover combined with the gentle terrain. Even with decreased heavy use on the Wyoming big sagebrush, the browse trend is down because the sagebrush community has increased percent decadence (52-62%), the proportion of shrubs in poor vigor has increased (10-27%), and there is one dead plant in every five. Trend for herbaceous understory has also declined since 1988. Sum nested frequency of perennial grasses and forbs have declined. Normal precipitation patterns will likely reverse this trend.

TREND ASSESSMENT

soil - improving

browse - down

herbaceous understory - down slightly

1999 TREND ASSESSMENT

Trend for soil is slightly improved. Some soil movement is apparent, but the gentle terrain keeps erosion at minimal levels directly on the site. Vegetation cover increased and bare ground decreased. Trend for browse is stable overall. The key species, Wyoming big sagebrush, shows improving trends with decreased decadency from 62% to 31%. Plants displaying poor vigor also decreased from 27% to 14%. Recruitment from young plants is currently high at 23%, and biotic potential is moderate at 12%. The main concern is that heavy use increased to 48%. This species is stable at the present time, but with continued heavy use (and drought), these improvements will most likely reverse current trend. Broom snakeweed drastically increased in 1999 due to more normal precipitation patterns in recent years. The herbaceous understory trend is stable. Sum of nested frequency for perennial species increased in 1999. Perennial grasses dominate the herbaceous component at this site.

TREND ASSESSMENT

soil - slightly improved, but still only fair condition

browse - stable for the key species Wyoming big sagebrush

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 19

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Agropyron smithii</i>	a ⁹⁹	a ¹²⁵	b ¹⁷¹	34	42	61	.85	2.81
G	<i>Bouteloua gracilis</i>	b ²¹³	a ¹⁴⁷	a ¹³⁶	74	49	49	6.20	5.74
G	<i>Bromus tectorum</i> (a)	-	a ⁷	b ⁹⁶	-	3	35	.01	.88
G	<i>Oryzopsis hymenoides</i>	a ³⁷	a ²³	b ⁶⁴	19	11	28	.22	1.22
G	<i>Sitanion hystrix</i>	b ¹⁵³	a ⁷⁶	a ⁸⁰	65	30	38	1.57	1.72
G	<i>Sporobolus cryptandrus</i>	a ⁻	b ⁹	a ⁻	-	3	-	.04	-
G	<i>Stipa columbiana</i>	-	-	-	-	-	-	-	.00
G	<i>Stipa comata</i>	b ³⁵	b ³⁵	a ¹	18	18	1	.36	.15
Total for Annual Grasses		0	7	96	0	3	35	0.01	0.87
Total for Perennial Grasses		537	415	452	210	153	177	9.26	11.65
Total for Grasses		537	422	548	210	156	212	9.27	12.53
F	<i>Astragalus convallarius</i>	-	-	3	-	-	1	-	.00
F	<i>Caulanthus crassicaulis</i>	2	-	-	2	-	-	-	-
F	<i>Castilleja linariaefolia</i>	-	-	1	-	-	1	-	.03
F	<i>Castilleja</i> spp.	-	-	1	-	-	1	-	.03
F	<i>Chaenactis douglasii</i>	-	-	1	-	-	1	-	.00
F	<i>Cymopterus</i> spp.	-	-	1	-	-	1	-	.00
F	<i>Descurainia pinnata</i> (a)	-	b ¹⁹	a ⁵	-	7	2	.03	.01
F	<i>Eriogonum cernuum</i> (a)	-	5	-	-	2	-	.03	-
F	<i>Erigeron</i> spp.	3	-	-	1	-	-	-	-
F	<i>Lappula occidentalis</i> (a)	-	a ⁻	b ¹⁵	-	-	7	-	.06
F	<i>Phlox longifolia</i>	a ¹¹	a ¹	b ⁴⁷	6	1	21	.00	.15
F	<i>Plantago patagonica</i> (a)	-	a ¹⁰	b ⁵⁰	-	5	21	.02	.15
F	<i>Schoenrambe linifolia</i>	-	-	22	-	-	8	-	.04
F	<i>Sphaeralcea coccinea</i>	ab ²³	a ²³	b ⁴⁸	11	11	20	.05	.17
F	<i>Thermopsis montana</i>	-	-	1	-	-	1	-	.00
F	<i>Townsendia</i> spp.	-	-	2	-	-	1	-	.00
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	34	70	0	14	30	0.09	0.22
Total for Perennial Forbs		40	24	127	21	12	56	0.05	0.46
Total for Forbs		40	58	197	21	26	86	0.15	0.68

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

BROWSE TRENDS --
Herd unit 16B, Study no: 19

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	<i>Artemisia tridentata wyomingensis</i>	86	95	12.75	13.66
B	<i>Atriplex canescens</i>	0	1	-	-
B	<i>Chrysothamnus spp.</i>	0	0	-	-
B	<i>Gutierrezia sarothrae</i>	28	88	.08	3.01
B	<i>Juniperus osteosperma</i>	0	0	1.25	-
B	<i>Opuntia fragilis</i>	75	76	1.29	2.41
B	<i>Pinus edulis</i>	0	3	3.08	4.51
Total for Browse		189	263	18.48	23.60

CANOPY COVER --
Herd unit 16B, Study no: 19

Species	Percent Cover '09
<i>Pinus edulis</i>	10

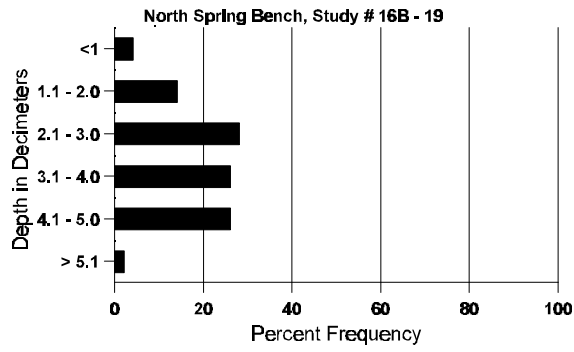
BASIC COVER --
Herd unit 16B, Study no: 19

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	315	331	12.25	26.72	36.40
Rock	88	25	1.25	1.11	.79
Pavement	101	77	.25	.20	.27
Litter	396	382	27.25	34.23	32.38
Cryptogams	107	211	6.50	2.03	8.32
Bare Ground	342	339	52.50	46.56	36.29

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 19, Study Name: North Spring Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.0	56.4 (15.6)	7.2	57.3	20.2	22.6	1.2	10.9	51.2	0.6

Stoniness Index



PELLET GROUP DATA --
Herd unit 16B, Study no: 19

Type	Quadrat Frequency	
	04	09
Rabbit	45	54
Elk	4	-
Deer	76	82
Cattle	0	0

Pellet Transect Days Use/Acre (ha)
09
n/a
0
159 (393)
2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 19

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 wyomingensis</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	59	-	-	-	-	-	-	-	-	-	56	-	3	-	1180		59
	99	27	-	5	6	-	-	-	-	-	-	36	-	-	-	760		38
Y	88	2	2	-	-	-	-	-	-	-	-	4	-	-	-	266		4
	94	6	-	-	-	-	-	-	-	-	-	6	-	-	-	120		6
	99	45	8	3	5	9	2	2	-	-	-	74	-	-	-	1480		74
M	88	1	23	14	1	-	-	1	-	-	-	40	-	-	-	2666	14 18	40
	94	43	34	5	-	-	-	-	-	-	-	81	-	-	1	1640	37 35	82
	99	7	-	-	-	14	96	28	-	-	-	139	1	5	-	2900	17 26	145
D	88	9	22	14	-	1	1	-	-	-	-	38	-	2	7	3133		47
	94	48	79	14	-	-	-	-	-	-	-	80	-	-	61	2820		141
	99	3	1	-	-	16	52	24	-	-	-	57	-	3	36	2000		100
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1180		59
	99	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1640		82
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		53%			32%			10%			-24%							
'94		49%			08%			27%			+28%							
'99		15%			48%			14%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	6065	Dec:	52%				
											'94	4580		62%				
											'99	6380		31%				
<i>Atriplex canescens</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	60		-				

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 spp.																		
Y	88	-	-	-	-	-	-	1	-	-	-	-	1	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133	6	5	2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		67%			00%			33%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	-			
												'94	0		-			
												'99	0		-			
Gutierrezia sarothrae																		
S	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	51	-	-	-	-	-	-	-	-	51	-	-	-	1020		51	
Y	88	71	-	-	-	-	-	-	-	-	71	-	-	-	4733		71	
	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	99	156	27	3	10	-	-	-	-	-	193	-	-	3	3920		196	
M	88	166	10	2	-	-	-	1	-	-	178	1	-	-	11933	7	5	179
	94	32	-	-	-	-	-	-	-	-	32	-	-	-	640	6	6	32
	99	562	47	-	18	-	-	-	-	-	627	-	-	-	12540	4	6	627
D	88	8	-	-	1	-	-	-	-	-	8	-	1	-	600		9	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		04%			.77%			.38%			-95%							
'94		00%			00%			00%			+95%							
'99		09%			.36%			.60%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	17266	Dec:	3%			
												'94	860		2%			
												'99	16500		0%			
Juniperus osteosperma																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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>Opuntia fragilis</i>																		
Y	'88	35	-	-	-	-	-	-	-	-	32	-	3	-	2333		35	
	'94	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
	'99	36	-	-	1	-	-	-	-	-	37	-	-	-	740		37	
M	'88	56	-	-	-	-	-	-	-	42	-	12	2	3733	2	4	56	
	'94	232	-	-	-	-	-	-	-	232	-	-	-	4640	2	8	232	
	'99	190	-	-	-	-	-	-	-	160	1	29	-	3800	2	6	190	
D	'88	17	-	-	-	-	-	-	-	10	-	5	2	1133		17		
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'99	17	-	-	1	-	-	-	-	1	-	1	16	360		18		
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'99	-	-	-	-	-	-	-	-	-	-	-	-	100		5		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			22%			-33%							
'94		00%			00%			00%			+ 2%							
'99		00%			00%			19%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	7199	Dec:	16%				
											'94	4800		0%				
											'99	4900		7%				
<i>Pinus edulis</i>																		
Y	'88	1	2	-	-	-	-	-	-	3	-	-	-	200		3		
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	'99	2	-	-	-	-	-	-	-	2	-	-	-	40		2		
M	'88	-	-	-	-	1	-	-	-	1	-	-	-	66	109	118	1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'99	-	-	-	-	-	-	1	-	1	-	-	-	20	-	-	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		75%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	266	Dec:	-				
											'94	0		-				
											'99	60		-				

Trend Study 16B-20-99

Study site name: Telephone Bench .

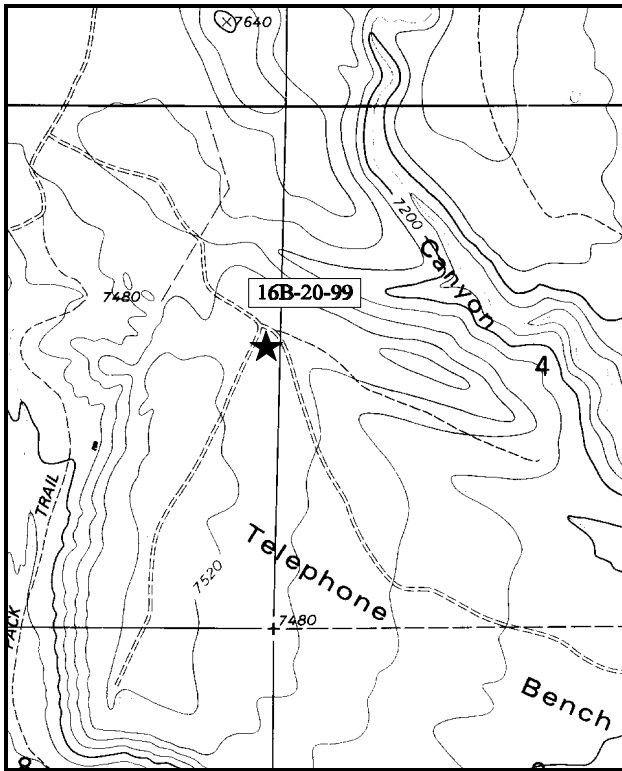
Range type: Big Sagebrush - Grass .

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).

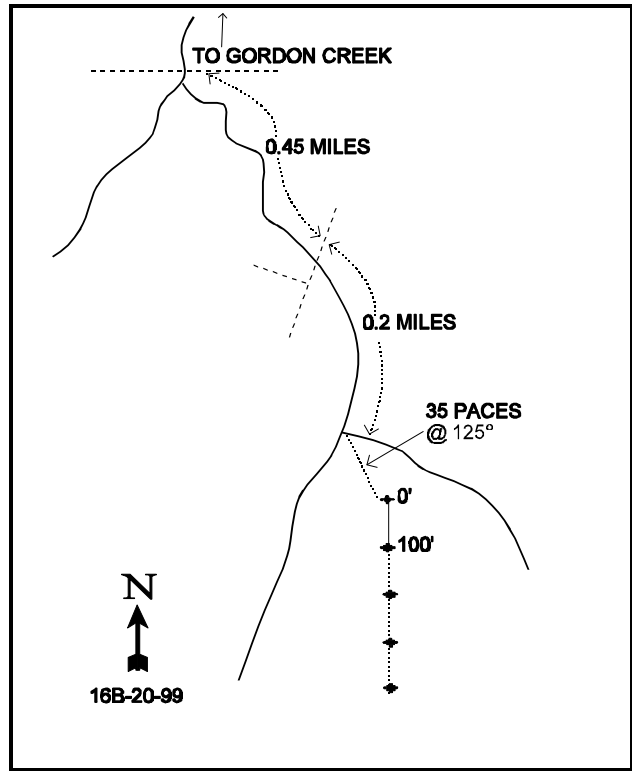
LOCATION DESCRIPTION

From the intersection of US 6 and the Consumers Road south of Helper, go 3.5 miles to a railroad crossing. Continue up the oiled road 6.0 miles. Turn left onto a dirt road, cross Gordon Creek and proceed approximately 2.3 miles to a cattleguard. Go 1.2 miles to a wire fence. Just beyond the fence, turn left at the fork and go 0.45 miles to another fence. Continue on 0.2 miles to a fork at the top of the hill. The study site is between the forks. The 0-foot baseline stake is 35 paces southeast of fork. The study is marked by cut green fenceposts about 18" tall.



Map Name: Jump Creek

Township 14S ,Range 8E , Section 5



Diagrammatic Sketch

UTM 4387379.745 N, 496438.981 E

DISCUSSION

Trend Study No. 16B-20 (30-6)

The Telephone Bench is on Division owned winter range located on Telephone Bench, southwest of Price. This study samples a big sagebrush/grass type on the northern end of Telephone Bench. At one time, the area was heavily grazed by cattle, but currently no livestock grazing is permitted. Data from a nearby pellet group transect indicates widely fluctuating deer use. During the 1990-91 winter, 125 deer days use/hectare were estimated. This number dropped to only 12 ddu/ha in 1992-93. During the winter of 1994-95, there was an estimated 42 ddu/ha. The 1999 pellet transect data read on the study area indicated light to moderate use by deer, but high use by elk. Deer use was estimated at 19 days use/acre (48 ddu/ha), and elk use at 72 days use/acre (179 edu/ha). One cattle pat was sampled during 1999.

On top of the bench, the elevation is 7,360 feet. The land faces east-northeast with an average slope of 5%. Compared to other deer winter range sites studied in the area, the higher elevation at this site affords more precipitation resulting in the presence of mountain big sagebrush intermixed with black sagebrush. The soil is somewhat shallow as black sagebrush predominates (estimated effective rooting depth of 11 inches), but there are some deeper areas allowing mountain big sagebrush to occur. The soil is a dense clay loam with a slightly alkaline pH (7.4). Phosphorus is low at 5.7 ppm where 10 ppm has been shown necessary for normal plant growth and development. There is moderate localized erosion on the site with some pedestaling noted around the base of the shrubs. Litter cover substantially decreased in 1999 which could cause increased erosion in the future, especially during severe thunderstorms.

The most abundant shrub on the site is black sagebrush which had a density of 6,932 plants/acre in 1988 and 6,680 in 1994. The current density is estimated at 6,840 plants/acre, with 70% of the population classified as mature. Further age class analysis indicates the potential for this species to expand with a high biotic potential (21%) and recruitment from young plants (16%). Percent decadency substantially decreased from 55% in 1994 to 15% in 1999. Apparently, many of the plants classified as decadent in 1994 regained their vigor and were classified as mature plants with normal vigor in 1999. The proportion of the population displaying poor vigor decreased from 34% in 1994, to 3% in 1999. The drought conditions probably accounted for a lot of the high decadency and poor vigor of black sage during the 1994 reading. It appears that more normal precipitation patterns in the past few years have reversed the downward trends for black sagebrush.

Mountain big sagebrush currently has a low population density on this site. There were only 466 plants/acre in 1988, and 180 by 1994. The population is currently estimated at 360 plants/acre. The available mature shrubs were heavily hedged in 1988, mostly moderately utilized in 1994, with heavy use increasing to 28% in 1999. Poor vigor was displayed on 11% of the population in both 1994 and 1999. Seed production has been low with few seedlings encountered in 1994, however, seedlings were estimated at 120 plants/acre in 1999. This is likely a marginal site for big sagebrush due to soil conditions, and when coupled with drought, has caused a decline in population density. Improved precipitation should help to increase reproduction for mountain big sagebrush in the future. There are a few scattered serviceberry on the site which receive moderate to heavy use. The height and crown diameter for serviceberry dropped significantly in 1999 on this marginal site. Dwarf rabbitbrush and broom snakeweed are very abundant, currently estimated at 6,260 plants/acre and 5,940 plants/acre respectively. These species appear to have stable populations as over 90% of their populations are classified as mature. Use is mostly light on both.

Grasses are the dominate type as they provide over half of the total vegetative cover in both 1994 and 1999. Identification of grasses in past readings resulted in several species being "lumped" together including: bluebunch and slender wheatgrass, and mutton and Sandberg bluegrass. These species were separated in the 1999 reading. Slender wheatgrass was the most prominent species accounting for 55% of the grass cover in 1994. This species is actually much less abundant, with bluebunch wheatgrass being the dominant species

after they were separated in 1999. Bluebunch wheatgrass currently provides 60% of the grass cover and 32% of the total vegetative cover. Mutton bluegrass, which also was very abundant in past readings greatly decreased due to the splitting of this species with Sandberg bluegrass. Currently, Sandberg bluegrass is the second most abundant species in nested and quadrat frequency. Salina wildrye is also present and provides 19% of the grass cover in 1999. Grasses are vigorous, with mutton bluegrass showing some utilization. Forbs are diverse, with many species being moderately frequent, however no one species is particularly dominant. Twenty perennial forbs were sampled in 1999.

1994 TREND ASSESSMENT

Ground cover characteristics have remained basically stable since the last reading. The abundant herbaceous ground cover and litter cover adequately protect the soil on the site. Due in part to drought conditions, mountain big sagebrush and serviceberry are not doing well on this marginal site. Black sagebrush, the key browse species, is also suffering the effects of drought. It has a stable population density at the present time, however percent decadency has increased (from 45 to 55%), coupled with the reduced vigor (those with poor vigor have gone from 10 to 34%), there has also been an increase in percentage of decadent plants classified as dying (from 9 to 50%). All of these downward indicators indicate a decline in population density in the future if current drought conditions persist. These factors, and the abundance of increaser rabbitbrush and broom snakeweed, combine to cause a slightly downward browse trend on this site. Like many of the sites on this unit, the herbaceous understory trend is mixed. Sum of nested frequency for grasses increased 66% while those of forbs declined 63%. Combined nested frequencies of grasses and forbs combined remained fairly stable indicating a stable trend.

TREND ASSESSMENT

soil - stable

browse - slightly down

herbaceous understory - stable overall, up for grasses and down for forbs

1999 TREND ASSESSMENT

Trend for soil is stable. While percent litter substantially decreased, vegetative cover increased, and bare ground decreased. Herbaceous vegetation provides 64% of the vegetation cover at the site with most of this coming from perennial species which are good at holding soils in place. Evidence of erosion is slight at the present time, although it could increase in the future with a continuing decline in litter cover. Trend for browse is slightly up. Many of the browse parameters measured showed a declining trend 5 years ago due to drought. With better moisture in the past few years, these parameters currently are showing improvement. Percent decadency for black sagebrush has declined from 55% to 15%, with many of the decadent plants regaining their vigor and being classified as mature with normal vigor in 1999. Biotic potential and recruitment are high, increasing to 21% and 16% respectively. Use has increased however, with 40% of the population showing moderate use. Mountain big sagebrush is not particularly abundant, although density increased in 1999, and biotic potential is currently high at 33%. Percent decadency also decreased from 33% in 1994 to 17% in 1999. One negative aspect is the abundance of broom snakeweed. Trend for the herbaceous understory is stable. Although sum of nested frequency for perennial species declined as a whole, perennial grass nested frequency increased. Since grasses make up over half of the total vegetative cover at the site, trend is stable for herbaceous species.

TREND ASSESSMENT

soil - stable

browse - slightly up

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 20

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Agropyron spicatum</i>	a-	a-	b239	-	-	79	-	12.92
G	<i>Agropyron trachycaulum</i>	b265	b238	a72	90	79	27	8.94	.72
G	<i>Bouteloua gracilis</i>	15	13	22	5	4	10	.48	.46
G	<i>Elymus salina</i>	a-	b65	b78	-	24	31	2.37	4.17
G	<i>Koeleria cristata</i>	-	3	3	-	2	1	.01	.03
G	<i>Oryzopsis hymenoides</i>	-	3	3	-	1	1	.00	.00
G	<i>Poa fendleriana</i>	b95	c250	a36	45	91	18	4.42	.41
G	<i>Poa secunda</i>	a-	a-	b156	-	-	67	-	2.30
G	<i>Sitanion hystrix</i>	16	26	22	8	12	11	.13	.44
G	<i>Stipa comata</i>	4	-	-	2	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		395	598	631	150	213	245	16.36	21.48
Total for Grasses		395	598	631	150	213	245	16.36	21.48
F	<i>Agoseris glauca</i>	a-	a-	b5	-	-	3	-	.04
F	<i>Antennaria rosea</i>	b59	b46	a15	27	19	8	.90	.26
F	<i>Arabis spp.</i>	8	2	4	4	1	2	.00	.01
F	<i>Astragalus convallarius</i>	b91	a40	a52	42	18	24	.14	.77
F	<i>Astragalus tenellus</i>	10	1	9	4	1	7	.00	.64
F	<i>Balsamorhiza hookeri</i>	b22	a-	a-	11	-	-	-	-
F	<i>Castilleja chromosa</i>	b137	a21	a29	62	13	14	.06	.19
F	<i>Calochortus nuttallii</i>	-	4	3	-	2	1	.01	.00
F	<i>Comandra pallida</i>	20	24	31	7	10	11	.15	.37
F	<i>Collinsia parviflora (a)</i>	-	3	-	-	1	-	.00	-
F	<i>Crepis acuminata</i>	a2	b36	a1	1	19	1	.26	.03
F	<i>Descurainia pinnata (a)</i>	-	3	1	-	1	1	.00	.03
F	<i>Erigeron eatonii</i>	b64	a37	a15	32	18	7	.19	.04
F	<i>Eriogonum jamesii</i>	11	12	10	7	5	5	.34	.24
F	<i>Gilia spp. (a)</i>	-	4	-	-	2	-	.01	-
F	<i>Hymenoxys acaulis</i>	10	-	4	5	-	2	-	.06
F	<i>Lappula occidentalis (a)</i>	-	3	-	-	1	-	.00	-
F	<i>Lesquerella spp.</i>	a20	ab47	b63	10	21	27	.10	.48
F	<i>Lomatium spp.</i>	-	6	1	-	3	1	.01	.03
F	<i>Machaeranthera grindelioides</i>	26	11	15	10	6	6	.03	.39
F	<i>Paronychia sessiliflora</i>	b10	a-	a-	4	-	-	-	-
F	<i>Penstemon watsonii</i>	45	38	50	22	21	22	.10	.79
F	<i>Phlox longifolia</i>	c175	b119	a8	72	54	3	.27	.01
F	<i>Polygonum douglasii (a)</i>	-	2	-	-	1	-	.00	-
F	<i>Senecio multilobatus</i>	2	-	5	2	-	2	-	.01

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Sphaeralcea coccinea	a1	ab5	b20	1	3	8	.06	.09
F	Trifolium gymnocarpon	30	16	3	18	8	1	.04	.00
Total for Annual Forbs		0	15	1	0	6	1	0.02	0.03
Total for Perennial Forbs		743	465	343	341	222	155	2.71	4.48
Total for Forbs		743	480	344	341	228	156	2.74	4.51

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

BROWSE TRENDS --

Herd unit 16B, Study no: 20

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	9	10	.56	.38
B	Artemisia nova	94	96	5.24	7.77
B	Artemisia tridentata vaseyana	8	12	.83	.03
B	Chrysothamnus depressus	84	80	2.48	4.32
B	Chrysothamnus nauseosus nauseosus	0	0	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	48	38	.90	.66
B	Eriogonum corymbosum	3	5	.03	.09
B	Gutierrezia sarothrae	54	68	1.54	1.50
B	Opuntia spp.	2	0	.00	-
B	Pediocactus simpsonii	1	1	.01	-
B	Sambucus cerulea	0	0	-	-
B	Tetradymia canescens	2	5	-	.00
Total for Browse		305	315	11.61	14.75

BASIC COVER --

Herd unit 16B, Study no: 20

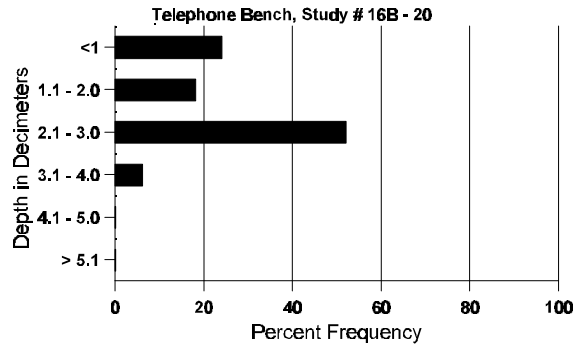
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	344	345	14.00	32.61	37.92
Rock	107	59	4.25	2.26	1.97
Pavement	148	95	1.00	.54	.61
Litter	395	365	42.00	42.15	24.82
Cryptogams	142	176	3.75	4.62	6.30
Bare Ground	350	317	35.00	34.70	31.67

SOIL ANALYSIS DATA --

Herd Unit 16B, Study # 20, Study Name: Telephone Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	54.8 (12.4)	7.4	38.4	29.8	31.8	1.7	5.7	83.2	0.5

Stoniness Index



PELLET GROUP DATA --

Herd unit 16B, Study no: 20

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Sheep	-	1	0
Rabbit	20	6	n/a
Elk	51	37	179 (442)
Deer	18	16	19 (47)
Cattle	0	0	1 (2)

BROWSE CHARACTERISTICS --
Herd unit 16B, 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				
Amelanchier utahensis																		
S	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	1	2	4	-	-	-	-	-	-	7	-	-	-	466		7	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	3	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	3	4	1	-	-	1	-	-	-	9	-	-	-	180	63	88	
	99	-	-	6	-	-	1	-	-	-	7	-	-	-	140	24	28	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		29%			57%			00%			-61%							
'94		44%			22%			00%			+10%							
'99		30%			70%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	466	Dec:	-			
												'94	180		-			
												'99	200		-			
Artemisia nova																		
S	88	35	-	-	1	-	-	-	-	-	36	-	-	-	2400		36	
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
	99	73	-	-	-	-	-	-	-	-	73	-	-	-	1460		73	
Y	88	28	-	-	-	-	-	-	-	-	28	-	-	-	1866		28	
	94	22	23	-	-	-	-	-	-	-	45	-	-	-	900		45	
	99	50	1	3	-	-	-	-	-	-	54	-	-	-	1080		54	
M	88	26	3	-	-	-	-	-	-	-	27	-	2	-	1933	10	12	
	94	69	31	3	1	-	-	-	-	-	100	-	-	4	2080	9	14	
	99	78	119	41	-	-	-	-	-	-	236	-	2	-	4760	8	16	
D	88	38	8	-	1	-	-	-	-	-	39	-	4	4	3133		47	
	94	119	58	1	-	5	-	2	-	-	75	-	-	110	3700		185	
	99	24	17	6	-	-	3	-	-	-	43	-	-	7	1000		50	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	1920		96	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1580		79	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		11%			00%			10%			- 4%							
'94		35%			01%			34%			+ 2%							
'99		40%			15%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	6932	Dec:	45%			
												'94	6680		55%			
												'99	6840		15%			

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	88	1	-	-	-	-	-	-	1	66		1	
	94	-	-	-	-	-	-	-	-	0		0	
	99	6	-	-	-	-	-	-	6	120		6	
Y	88	2	1	-	-	-	-	-	3	200		3	
	94	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	2	40		2	
M	88	-	-	2	-	-	-	-	2	133	11 12	2	
	94	2	4	-	-	-	-	-	6	120	18 21	6	
	99	2	8	3	-	-	-	-	13	260	14 19	13	
D	88	-	-	2	-	-	-	-	2	133		2	
	94	-	3	-	-	-	-	-	2	60		3	
	99	-	-	2	-	1	-	-	1	60		3	
X	88	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	260		13	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		14%		57%		00%		-61%					
'94		78%		00%		11%		+50%					
'99		50%		28%		11%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	466	Dec:	29%
										'94	180		33%
										'99	360		17%
<i>Chrysothamnus depressus</i>													
S	88	3	-	-	-	-	-	-	3	200		3	
	94	-	-	-	-	-	-	-	-	0		0	
	99	34	-	-	-	-	-	-	34	680		34	
Y	88	33	-	-	-	-	-	-	32	2200		33	
	94	2	-	-	-	-	-	-	2	40		2	
	99	16	-	-	-	-	-	-	15	320		16	
M	88	40	1	1	-	-	-	-	41	2800	5 7	42	
	94	301	-	-	-	-	-	-	301	6020	4 8	301	
	99	232	60	-	-	-	-	-	292	5880	4 10	294	
D	88	2	-	-	-	-	-	-	1	133		2	
	94	4	-	-	-	-	-	-	3	80		4	
	99	3	-	-	-	-	-	-	3	60		3	
X	88	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	120		6	
	99	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		01%		01%		04%		+16%					
'94		00%		00%		.32%		+ 2%					
'99		19%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	5133	Dec:	3%
										'94	6140		1%
										'99	6260		1%

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 nauseosus																	
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			100%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	100%			
											'94	0		0%			
											'99	0		0%			
Chrysothamnus viscidiflorus viscidiflorus																	
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	29	-	-	-	-	-	-	-	-	29	-	-	-	1933		29
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	88	50	2	-	-	-	1	-	-	-	53	-	-	-	3533	4 6	53
	94	121	-	-	-	-	-	-	-	-	121	-	-	-	2420	4 10	121
	99	78	1	-	-	-	-	-	-	-	79	-	-	-	1580	5 10	79
D	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		02%			00%			00%			-55%						
'94		00%			00%			00%			-37%						
'99		01%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	5599	Dec:	2%			
											'94	2520		1%			
											'99	1600		0%			
Eriogonum corymbosum																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	2	1	-	-	-	-	-	-	-	3	-	-	-	60	13 27	3
	99	8	1	-	-	-	-	-	-	-	9	-	-	-	180	10 18	9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		33%			00%			00%			+67%						
'99		11%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	60		-			
											'99	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					
<i>Gutierrezia sarothrae</i>													
S	88	-	-	-	-	-	-	-	0		0		
	94	1	-	-	-	-	-	-	20		1		
	99	5	-	-	-	-	-	-	100		5		
Y	88	5	-	-	-	-	1	-	400		6		
	94	25	-	-	-	-	-	-	500		25		
	99	22	-	-	-	-	-	-	440		22		
M	88	6	-	-	-	-	-	-	400	5	4	6	
	94	114	-	-	-	-	-	-	2280	5	6	114	
	99	275	-	-	-	-	-	-	5500	6	7	275	
D	88	-	-	-	-	-	-	-	0		0		
	94	15	-	-	-	-	-	-	300		15		
	99	-	-	-	-	-	-	-	0		0		
X	88	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	140		7		
	99	-	-	-	-	-	-	-	40		2		
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		00%		00%		00%		+74%					
'94		00%		00%		.64%		+48%					
'99		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	800	Dec:	0%
										'94	3080		10%
										'99	5940		0%
<i>Opuntia spp.</i>													
Y	88	-	-	-	-	-	-	-	0		0		
	94	1	-	-	-	-	-	-	20		1		
	99	-	-	-	-	-	-	-	0		0		
M	88	-	-	-	-	-	-	-	0	-	-	0	
	94	1	-	-	-	-	-	-	20	2	7	1	
	99	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		00%		00%		00%							
'94		00%		00%		00%							
'99		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-
										'94	40		-
										'99	0		-
<i>Pediocactus simpsonii</i>													
M	88	-	-	-	-	-	-	-	0	-	-	0	
	94	1	-	-	-	-	-	-	20	-	-	1	
	99	-	-	1	-	-	-	-	20	6	3	1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		00%		00%		00%							
'94		00%		00%		00%		+ 0%					
'99		00%		100%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-
										'94	20		-
										'99	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	
Sambucus cerulea																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	2	11	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	0		-				
										'99	0		-				
Tetradymia canescens																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	-	1	-	-	-	-	-	-	1	-	-	-	66	12	16	1
	94	2	-	-	-	-	-	-	-	2	-	-	-	40	11	14	2
	99	3	1	-	-	-	-	-	-	4	-	-	-	80	8	16	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		100%			00%			00%			-39%						
'94		00%			00%			00%			+60%						
'99		20%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	66	Dec:	-				
										'94	40		-				
										'99	100		-				

Trend Study 16B-21-99

Study site name: Huntington Canyon .

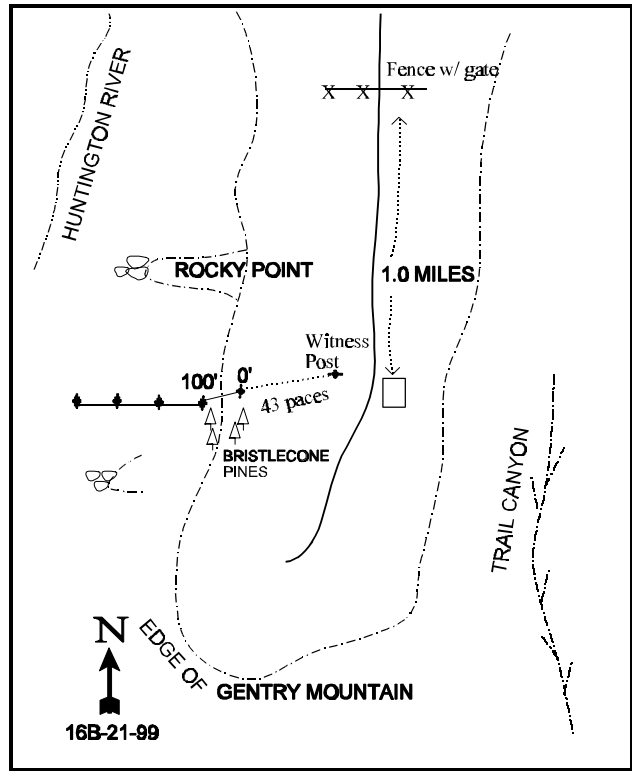
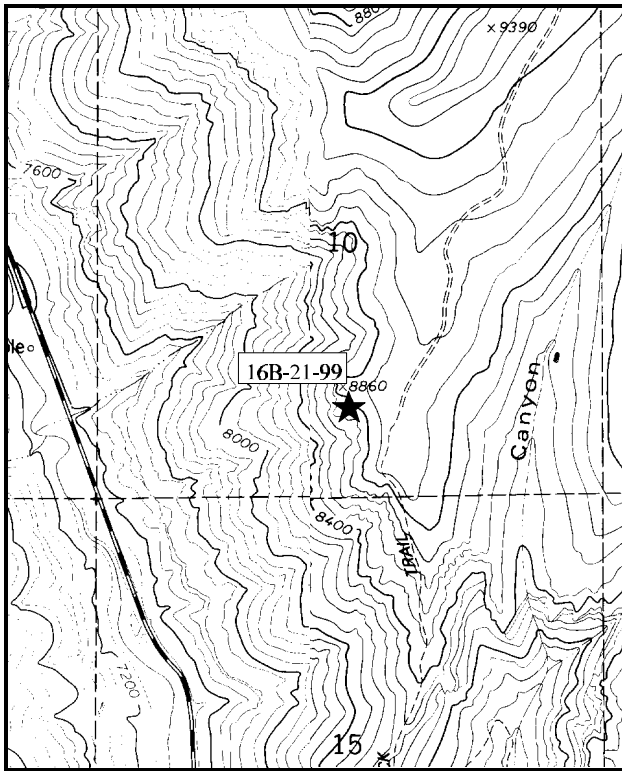
Range type: Perennial Grass .

Compass bearing: frequency baseline Line 1-235°M, Lines 2-4-248°M.

Footmark (first frame placement) 5 feet, foot marks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the ghost town of Mohrland, proceed past the coal loadout and up Cedar Creek. Go 4.5 miles to the top of Gentry Mountain and a three-way junction. Take the middle road (#252) and go 0.1 mile to a fence and cattleguard at the Forest Boundary. Continue 0.65 miles to a fork with a sign, and turn right toward McCadden Hollow. Go 0.7 miles to a cattleguard. Continue 2.1 miles on the main road, passing a few minor forks, to a gated fence. Continue down the road for one mile. There is a witness post on the right. Walk west from the road 43 paces to the edge by a patch of bristlecone pine. The 0' stake is just north of these trees.



Map Name: Hiawatha

Diagrammatic Sketch

Township 16S , Range 7E , Section 10

UTM 4365594.881 N, 489475.494 E

DISCUSSION

Trend Study No. 16B-21 (30-7)

The Huntington Canyon study samples a very steep Salina wildrye slope on the east side of Huntington Canyon. The windswept ridgetops and steep sidehills are important winter range for the elk on Gentry Mountain. Adjacent stands of curlleaf mountain mahogany show signs of elk use. Although the stands provide good thermal cover, much of the forage is unavailable because the mature trees are highlined. The land is managed by the Forest Service. Although 1,440 cows graze Gentry Mountain during the summer (June 27 to September 30), they very seldom use the steep side hills near the study site. Wildlife use is mostly by elk, with light deer use. Pellet group transect data in 1999 estimate 53 elk days use/acre (131 edu/ha), and 3 deer days use/acre (7 ddu/ha) on the site.

The slope on the study site is variable from 35% to over 50% in some places. It has a west-southwest aspect and an elevation of 8,800 feet. The soil is very rocky on the surface with rock and pavement fragments loose and easily dislodged downslope. The soil is moderately deep beneath the rock with an estimated effective rooting depth of 16 inches. Soil texture is a clay loam with a slightly alkaline pH (7.5). Both potassium (64 ppm) and phosphorus (2.8 ppm) are below the minimum levels that have been shown necessary for normal plant growth and development (70 ppm and 10 ppm respectively). The steep slope and rocky surface increases runoff, but armor the soil from severe erosion.

There is little browse directly on the study site. There were scattered young mahogany that showed evidence of heavy browsing in 1988. Currently, curlleaf mahogany number 80 plants/acre on the site. Mountain big sagebrush are also found on the site, but the density was moderately low at 820 plant/acre in 1999. It averages less than two feet tall, and shows only light to moderate hedging. This species appears to be stable with a mostly mature population and low recruitment. Biotic potential is currently zero. The most numerous shrubs are broom snakeweed and fringed sagebrush. Fringed sagebrush is expanding with a 25% increase in density, and a high biotic potential (18%) and recruitment level (24%) in 1999. If available, the fringed sagebrush can be nutritious, palatable winter forage. Moderate use was sampled on 20% of the population in 1999. Broom snakeweed is stable with 89% of the population being mature.

Salina wildrye dominates the plant community on the steep upper slopes with a quadrat frequency of over 80% in all sampling years. It currently provides 99% of the grass cover, 59% of the herbaceous cover, and 40% of the total vegetative cover at the site. There was some evidence of grazing in the past, but generally the large bunch grass is choked with old growth and a substantial build-up of litter. Other grasses and forbs are relatively uncommon, except for a large *Astragalus* that was called timber poisonvetch. This species currently provides 22% of the herbaceous cover and 15% of the total vegetative cover.

1994 TREND ASSESSMENT

Soil trend is currently stable with similar ground cover characteristics in 1994 compared to 1988. The well dispersed bunch grasses combined with the extensive rock and pavement cover adequately protect the soil. Useful browse is lacking on this site but those that do exist display stable trends. Sum of nested frequency for grasses increased while those of forbs declined. Nested frequency of Salina wildrye increased significantly. Combined nested frequencies of grasses and forbs remained about the same. Trend for herbaceous understory is currently stable.

TREND ASSESSMENT

soil - stable

browse - stable but lacking

herbaceous understory - stable, up for grasses and down for forbs

1999 TREND ASSESSMENT

Trend for soil is stable. Bare ground cover decreased in 1999, with vegetation cover increasing. Erosion continues to be held in check with abundant rock and pavement cover even with the extremely steep slope. Browse trend is stable. Mountain big sagebrush is the most abundant key species and increased in density in 1999, however, recruitment is low at the present time. Percent decadency increased from 7% to 20% in 1999, with 40% of the population displaying moderate use. Fringed sagebrush is the most abundant species in number, increasing to 2,300 plants/acre in 1999. This species can be a palatable browse source if not buried too deep under winter snows, but not critical for a site that is normally too high for deer and mostly utilized by elk. The herbaceous understory is stable with perennial sum of nested frequency increasing in 1999. Overall, Salina wildrye dominates, and diversity is lacking.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable but lacking diversity

HERBACEOUS TRENDS --

Herd unit 16B, Study no: 21

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
G	Agropyron intermedium	-	3	-	-	1	-	.00	-
G	Elymus salina	222	252	237	85	84	83	12.20	12.80
G	Poa fendleriana	_a -	_b 12	_b 17	-	4	7	.24	.11
G	Poa secunda	-	1	3	-	1	1	.00	.03
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		222	268	257	85	90	91	12.45	12.93
Total for Grasses		222	268	257	85	90	91	12.45	12.93
F	Agoseris spp.	7	-	-	3	-	-	-	-
F	Antennaria rosea	4	-	-	1	-	-	-	-
F	Arenaria spp.	8	6	-	4	3	-	.01	-
F	Astragalus convallarius	_a -	_b 9	_c 97	-	5	41	.12	4.75
F	Astragalus coltoni	_b 82	_a -	_a -	37	-	-	-	-
F	Astragalus tenellus	12	27	9	7	11	4	1.16	.69
F	Chaenactis douglasii	11	2	12	5	1	7	.00	.06
F	Hymenoxys acaulis	_b 65	_a 19	_a 17	28	9	8	.05	.16
F	Hymenoxys richardsonii	_a 63	_b 97	_{ab} 91	32	48	46	1.93	1.85
F	Lesquerella spp.	-	-	1	-	-	1	-	.00
F	Lupinus spp.	-	-	-	-	-	-	.00	.06
F	Machaeranthera grindelioides	_a 14	_{ab} 19	_b 30	7	10	15	.17	.98
F	Penstemon spp.	-	1	1	-	1	1	.01	.00
F	Phlox spp.	-	-	4	-	-	2	-	.15
F	Unknown forb-perennial	1	-	-	1	-	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
	Total for Annual Forbs	0	0	0	0	0	0	0	0
	Total for Perennial Forbs	267	180	262	125	88	125	3.48	8.75
	Total for Forbs	267	180	262	125	88	125	3.48	8.75

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

BROWSE TRENDS --

Herd unit 16B, Study no: 21

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia frigida	41	44	.56	.94
B	Artemisia tridentata vaseyana	17	23	2.44	5.01
B	Cercocarpus ledifolius	6	2	.01	.15
B	Chrysothamnus nauseosus glabratus	34	20	.76	.77
B	Chrysothamnus viscidiflorus viscidiflorus	0	4	-	.15
B	Eriogonum corymbosum	1	1	-	-
B	Gutierrezia sarothrae	57	38	1.14	.42
B	Juniperus osteosperma	0	0	.15	-
B	Juniperus scopulorum	-	-	-	.85
B	Pinus flexilis	-	-	.53	1.38
B	Pinus edulis	0	1	-	-
B	Pinus longaeva	0	0	-	-
B	Pseudotsuga menziesii	-	-	.15	-
B	Symphoricarpos oreophilus	3	2	.15	.45
	Total for Browse	159	135	5.91	10.15

CANOPY COVER --

Herd unit 16B, Study no: 21

Species	Percent Cover '09
Cercocarpus ledifolius	5
Pinus flexilis	2
Pseudotsuga menziesii	.60

BASIC COVER --

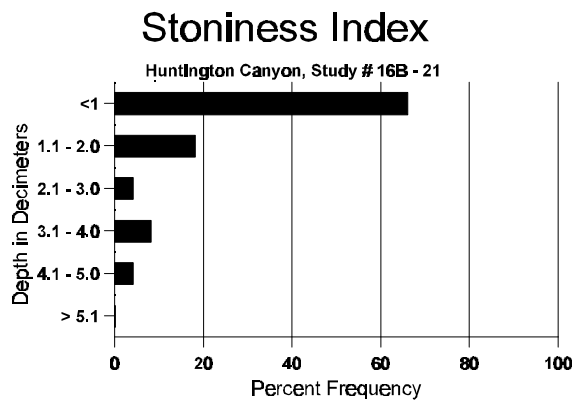
Herd unit 16B, Study no: 21

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	294	306	13.25	20.46	34.86
Rock	346	274	21.75	30.95	18.72
Pavement	338	278	16.50	6.52	14.21
Litter	373	308	23.50	22.46	20.60
Cryptogams	17	8	0	.08	.04
Bare Ground	343	274	25.00	33.02	17.42

SOIL ANALYSIS DATA --

Herd Unit 16B, Study # 21, Study Name: Huntington Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.0	48.8 (16.7)	7.5	36.0	25.4	38.6	1.6	2.8	64.0	0.6



PELLET GROUP DATA --

Herd unit 16B, Study no: 21

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	7	7	n/a
Elk	29	24	53 (131)
Deer	4	3	3 (7)

BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 21

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 frigida</i>																		
S	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	21	-	-	-	-	-	-	-	-	21	-	-	-	420		21	
Y	88	20	-	-	-	-	-	-	-	-	20	-	-	-	666		20	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	23	5	-	-	-	-	-	-	-	28	-	-	-	560		28	
M	88	13	2	-	-	-	-	-	-	-	15	-	-	-	500	4	6	15
	94	73	11	-	-	-	-	-	-	-	73	-	11	-	1680	6	7	84
	99	68	18	-	1	-	-	-	-	-	87	-	-	-	1740	8	7	87
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		06%			00%			00%			+32%							
'94		13%			00%			14%			+25%							
'99		20%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	1166	Dec:	0%				
											'94	1720		1%				
											'99	2300		0%				
<i>Artemisia tridentata vaseyana</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	8	-	-	-	-	-	-	-	-	8	-	-	-	266	19	28	8
	94	26	-	-	-	-	-	-	-	-	26	-	-	-	520	10	22	26
	99	16	13	2	-	-	-	-	-	-	31	-	-	-	620	18	28	31
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	6	2	-	-	-	-	-	-	-	7	-	-	1	160		8	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+17%							
'94		00%			00%			00%			+32%							
'99		41%			05%			02%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	465	Dec:	7%				
											'94	560		7%				
											'99	820		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				
Cercocarpus ledifolius																	
S	88	1	-	1	-	-	-	-	-	-	2	-	-	-	66		2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1
Y	88	1	4	8	-	-	-	-	-	-	13	-	-	-	433		13
	94	3	-	-	1	-	-	-	-	-	4	-	-	-	80		4
	99	-	-	3	-	-	-	-	-	-	3	-	-	-	60		3
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	33	24
	99	-	-	-	-	-	-	-	1	-	1	-	-	-	20	149	121
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		31%			62%			00%			-63%						
'94		00%			00%			00%			-50%						
'99		00%			75%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	433	Dec:	-			
											'94	160		-			
											'99	80		-			
Chrysothamnus nauseosus glabratus																	
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
M	88	20	6	-	-	-	-	-	-	-	26	-	-	-	866	11	13
	94	59	-	-	-	-	-	-	-	-	59	-	-	-	1180	41	34
	99	25	-	-	-	-	-	-	-	-	25	-	-	-	500	17	20
D	88	6	-	-	-	-	-	-	-	-	6	-	-	-	200		6
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		17%			00%			00%			+ 1%						
'94		00%			00%			00%			-51%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	1166	Dec:	17%			
											'94	1180		0%			
											'99	580		7%			
Chrysothamnus viscidiflorus viscidiflorus																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	16
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	14	18
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		25%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	0		-			
											'99	160		-			

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>Eriogonum corymbosum</i>												
Y	88	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	0	-	0	
	94	-	1	-	-	-	-	-	20	3	14	
	99	1	-	-	-	-	-	-	20	6	15	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		00%		00%		00%						
'94		100%		00%		00%		+50%				
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	0	Dec:	-
									'94	20		-
									'99	40		-
<i>Gutierrezia sarothrae</i>												
S	88	21	-	-	-	-	-	-	21	-	21	
	94	-	-	-	-	-	-	-	0	-	0	
	99	5	-	-	-	-	-	-	100	-	5	
Y	88	70	-	-	-	-	-	-	2333	-	70	
	94	16	-	-	-	-	-	-	320	-	16	
	99	6	2	-	-	-	-	-	160	-	8	
M	88	37	4	1	-	-	-	-	1400	8	7	
	94	130	-	-	-	-	-	-	2600	6	7	
	99	81	5	-	-	-	-	-	1720	8	8	
D	88	3	1	-	-	-	-	-	133	-	4	
	94	11	-	-	-	-	-	-	220	-	11	
	99	4	-	-	-	-	-	-	80	-	4	
X	88	-	-	-	-	-	-	-	0	-	0	
	94	1	-	-	-	-	-	-	100	-	5	
	99	-	-	-	-	-	-	-	20	-	1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		04%		.86%		.86%		-19%				
'94		00%		00%		04%		-38%				
'99		07%		00%		01%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	3866	Dec:	3%
									'94	3140		7%
									'99	1960		4%
<i>Juniperus osteosperma</i>												
Y	88	1	-	-	-	-	-	-	33	-	1	
	94	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	0	-	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		00%		00%		00%						
'94		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	33	Dec:	-
									'94	0		-
									'99	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>Pinus edulis</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	20		-			
<i>Pinus longaeva</i>																		
S	88	1	-	-	-	-	-	-	-	-	-	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			
<i>Symphoricarpos oreophilus</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	3	-	-	-	-	-	-	-	-	-	-	-	-	60	16	48	3
	99	1	1	-	-	-	-	-	-	-	-	-	-	-	40	19	54	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%			-50%							
'99		50%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	80		-			
												'99	40		-			

Trend Study 16B-22-99

Study site name: Poison Spring Bench .

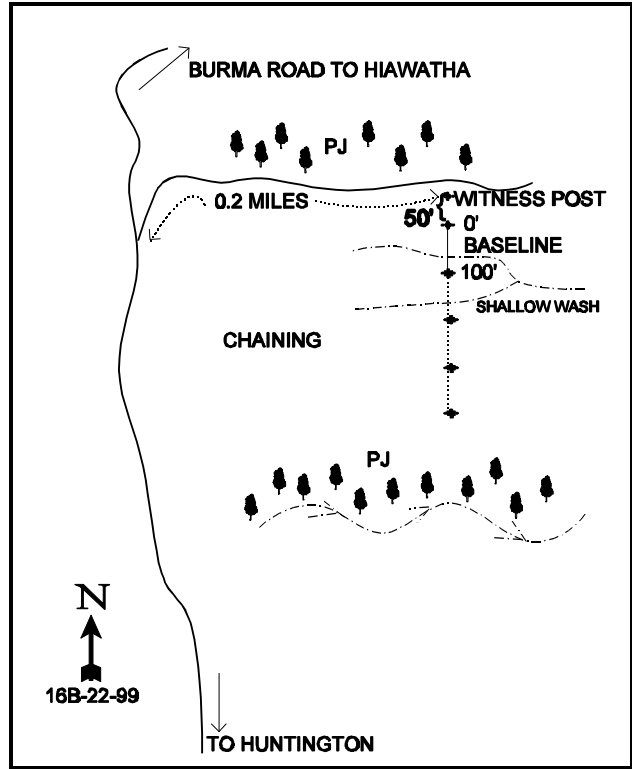
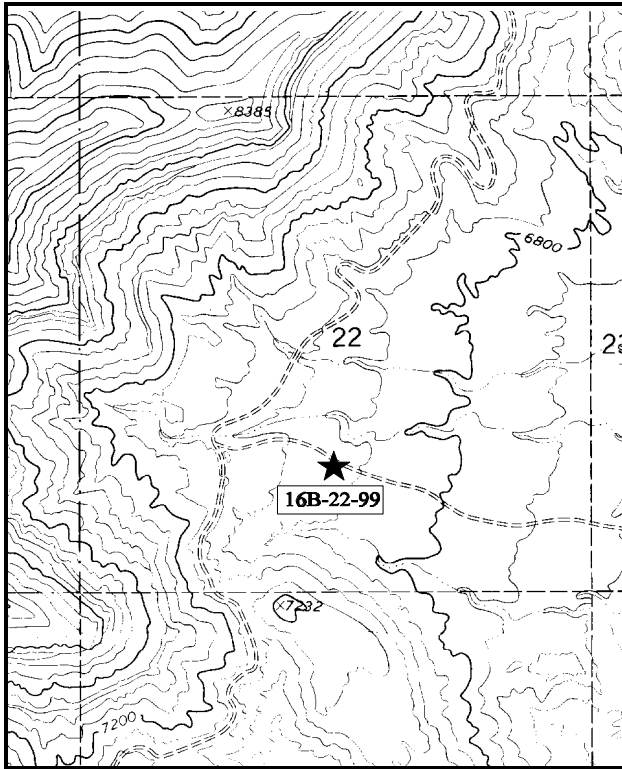
Range type: Chained, Seeded, P-J .

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

To reach Poison Spring Bench, go up the Huntington Canyon Road to the Huntington research farm below the power plant. Across from the farm gate, turn right onto the Burma Road. Follow the Burma Road for 6 miles. Turn right onto a faint road that goes into the chaining below the road. Go down along the edge of the chaining for 0.2 miles to the study witness post. The baseline starts 50 feet south of the witness post, and runs south.



Map Name: Hiawatha

Diagrammatic Sketch

Township 16S , Range 8E , Section 22

UTM 4362530.369 N, 498981.103 E

DISCUSSION

Trend Study No. 16B-22 (30-8)

The Poison Spring Bench study is located south of Cedar Creek and southwest of Poison Spring Bench. This trend study is on BLM land. It is part of the North Huntington cattle allotment which is grazed in the spring and fall. The marginal site was chained and seeded in the late 1960's. The area is now dominated by black sagebrush with a large number mostly released pinyon and juniper trees present. The area is considered critical deer winter range, but judging by deer sign there is only light to moderate use. It also receives a small amount of elk use. The 1999 pellet group transect data estimate 13 deer days use/acre (32 ddu/ha), and 8 elk days use/acre (20 edu/ha). Livestock use is light with an estimated 15 cow days use/acre (36 cdu/ha). Elevation at the site is about 6,800 feet. General aspect is to the east, with a gentle slope of 3-5%.

The soil is a gravelly, sandy clay loam with a slightly alkaline pH (7.6). There is a concentration of large rocks, boulders, and pavement on the surface, with a high number of rock in the upper profile. Although there are calcium carbonate (alkali) deposits on the rocks, no hardpan was evident. Soil depth is moderately shallow with an estimated effective rooting depth of just over 12 inches. Phosphorus (4.4 ppm) and potassium (57.6) are both below the level thought necessary for normal plant growth and development (10 ppm and 70 ppm respectively). Some soil erosion is apparent with pedestaling occurring around the base of black sagebrush and small gullies running through the site. However, erosion is not severe and is within acceptable limits for the site.

The site is dominated by browse as these species made up 88% of the total vegetation cover in both 1994 and 1999. Perfectly suited to the dry, rocky country, black sagebrush is the most common browse species. In 1994 and 1999, black sagebrush made up respectively 82% and 74% of the browse cover, and 73% and 65% of the total vegetation cover. The plants are vigorous and show signs of light to moderate hedging. In 1999, 26% of the population was moderately hedged, with only 3% being rated as poor in vigor. Population density was estimated at 15,333 plants/acre in 1988, 78% percent of these were young plants. Seedlings numbered 1,400 plants/acre. During the 1994 reading, 9,740 mostly mature plants/acre were estimated using a much larger sample size. The population was estimated at 11,200 plants/acre in 1999 with vast majority (88%) being mature plants. Recruitment and biotic potential remain low with 80 seedlings/acre and 420 young plants/acre being estimated in 1999. No seedlings were encountered in 1994. Percent decadence decreased in 1999, down to 9% from a high of 15% in 1994.

Other desirable browse species occur on the site in low densities. These include serviceberry, true mountain mahogany, ephedra, and four-wing saltbush. Although heavily browsed, the mature mahogany produces abundant seed. Average height of the bushy shrubs is three feet, but some plants have stems escaping up to six feet in height. Young pinyon and juniper trees that survived the chaining are increasing in size. Current point quarter estimates have pinyon at 103 trees/acre, and juniper at 43 trees/acre. Average stem diameter for pinyon is estimated at 2.1 inches and that of juniper at just over 3 inches.

Overall, herbaceous density and diversity is extremely low. Crested wheatgrass is the most abundant grass on the site. This species has remained at a stable frequency over all sampling years, but plants are small, and produce very little aboveground biomass compared to other chained and seeded sites. This is due to the poor site potential of the area that results from shallow, less fertile soils. All grasses combined provide only 3% cover in 1999, which equates to 10% of the total vegetative cover at the site. Forbs are even less abundant, with all species combined providing less than 1% cover in 1999.

1994 TREND ASSESSMENT

Even though shrubs dominate the site, bare ground cover is still quite low at 22%. It has increased since 1988, but only slightly. There is still abundant litter cover from chaining debris but it is declining. Currently

the soil trend is slightly down. Due to the gentle terrain and protective ground cover, erosion is not a serious problem. However, if the chaining litter is not replaced by herbaceous vegetation the soil trend will continue to decline. There is a variety of palatable browse on the site but only black sagebrush is abundant. Population density of this shrub has declined, but this is primarily because of the sampling design was greatly enlarged. The sampling design now gives significantly better estimates for browse populations that have discontinuous distributions. The biotic and reproductive potentials have declined. Percent decadency has increased but is still low at 15%. Most of these changes would be due to the increased sample size used in 1994. Trend for browse is stable to slightly down. A return to normal precipitation patterns will likely improve the trend. Herbaceous vegetation is seriously lacking on this site. Combined nested frequencies of grasses and forbs sum to only 266. Several forb species encountered in 1988 were not seen in 1994. Trend for herbaceous vegetation is slightly down.

TREND ASSESSMENT

soil - slightly down

browse - stable to slightly declining for black sagebrush

herbaceous understory - slightly down and seriously lacking

1999 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics remain at similar levels to those in 1994. Erosion remains low due to the gentle slope and low precipitation at the site. Trend for browse is stable. The key species, black sagebrush, shows decreased decadency and slightly improved vigor. The population remains stable and use is light to moderate. True mountain mahogany shows improvements in biotic potential and recruitment although density remains relatively low. No plants were classified as decadent in 1999, down from 7% in 1994. Trend for the herbaceous understory is stable, but depleted. The only species that is somewhat abundant is crested wheatgrass, which is low compared to other chained and seeded sites. Sum of nested frequency for perennial grasses and forbs increased in 1999.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable, but depleted

HERBACEOUS TRENDS --

Herd unit 16B, Study no: 22

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	172	143	175	72	56	70	2.30	2.82
G	Elymus junceus	-	-	3	-	-	1	-	.15
G	Oryzopsis hymenoides	-	1	-	-	1	-	.00	-
G	Sitanion hystrix	6	11	2	4	4	1	.02	.03
G	Stipa comata	-	3	-	-	1	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		178	158	180	76	62	72	2.34	3.00
Total for Grasses		178	158	180	76	62	72	2.34	3.00
F	Arabis spp.	4	12	9	4	5	3	.05	.01

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
F	Castilleja spp.	-	-	2	-	-	2	-	.03
F	Cirsium spp.	5	-	-	2	-	-	-	-
F	Cryptantha confertiflora	44	51	46	21	24	22	.56	.28
F	Cruciferae	_b 8	_a -	_a -	4	-	-	-	-
F	Descurainia pinnata (a)	-	1	6	-	1	2	.00	.01
F	Eriogonum cernuum (a)	-	5	-	-	2	-	.01	-
F	Ipomopsis aggregata	_b 9	_a 1	_{ab} 8	8	1	4	.00	.04
F	Lepidium spp. (a)	2	6	-	1	4	-	.04	-
F	Medicago sativa	3	-	3	2	-	1	-	.00
F	Penstemon caespitosus	18	19	29	11	13	15	.11	.09
F	Penstemon spp.	_c 22	_a -	_b 9	12	-	4	-	.04
F	Salsola iberica (a)	-	_b 13	_a -	-	5	-	.07	-
F	Schoenrambe linifolia	-	-	2	-	-	1	-	.00
F	Senecio multilobatus	4	-	5	2	-	2	-	.01
Total for Annual Forbs		2	25	6	1	12	2	0.13	0.01
Total for Perennial Forbs		117	83	113	66	43	54	0.73	0.54
Total for Forbs		119	108	119	67	55	56	0.87	0.56

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

BROWSE TRENDS --
Herd unit 16B, Study no: 22

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	0	0	-	-
B	Artemisia nova	97	98	19.75	19.35
B	Atriplex canescens	0	0	-	-
B	Atriplex confertifolia	0	0	-	-
B	Cercocarpus montanus	10	14	1.14	3.25
B	Chrysothamnus viscidiflorus	0	0	-	-
B	Cowania mexicana stansburiana	0	0	-	-
B	Ephedra viridis	4	7	.18	.00
B	Eriogonum microthecum	13	12	.06	.04
B	Gutierrezia sarothrae	0	4	-	-
B	Juniperus osteosperma	0	3	1.78	2.67
B	Opuntia spp.	5	5	.00	.03
B	Pinus edulis	0	4	1.03	.85
B	Purshia tridentata	1	0	.03	-
Total for Browse		130	147	24.00	26.20

CANOPY COVER --
Herd unit 16B, Study no: 22

Species	Percent Cover '09
Juniperus osteosperma	1

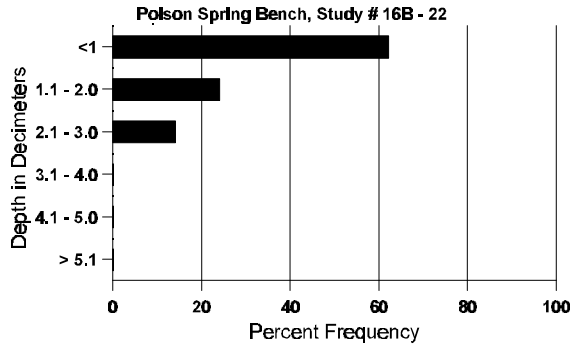
BASIC COVER --
Herd unit 16B, Study no: 22

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	251	258	6.00	26.07	29.60
Rock	261	193	12.25	9.63	9.84
Pavement	261	248	7.00	4.24	8.36
Litter	386	373	56.75	38.77	41.91
Cryptogams	8	69	0	.01	1.03
Bare Ground	296	281	18.00	22.43	23.83

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 22, Study Name: Poison Spring Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.3	54.0 (13.6)	7.6	50.7	27.4	21.8	3.9	4.4	57.6	0.8

Stoniness Index



PELLET GROUP DATA -- Herd unit 16B, Study no: 22

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	26	18	n/a
Elk	7	6	8 (20)
Deer	24	24	13 (32)
Cattle	7	5	15 (37)

BROWSE CHARACTERISTICS -- Herd unit 16B, Study no: 22

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				
Amelanchier utahensis																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17	21	0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'88			00%			00%			00%							
		'94			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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>Artemisia nova</i>																		
S	88	17	-	-	-	-	-	4	-	-	20	-	1	-	1400		21	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	1	-	-	4	-	-	-	80		4	
Y	88	171	5	-	-	-	-	4	-	-	179	-	1	-	12000		180	
	94	44	-	-	-	-	-	-	-	-	44	-	-	-	880		44	
	99	16	-	-	3	-	-	2	-	-	21	-	-	-	420		21	
M	88	22	15	-	-	-	-	1	-	-	38	-	-	-	2533	9 19	38	
	94	342	14	2	11	-	-	-	-	-	369	-	-	-	7380	10 27	369	
	99	325	125	-	19	5	-	17	-	-	486	-	5	-	9820	9 20	491	
D	88	11	1	-	-	-	-	-	-	-	11	-	1	-	800		12	
	94	36	31	-	7	-	-	-	-	-	51	-	-	23	1480		74	
	99	27	18	-	3	-	-	-	-	-	34	-	-	11	960		48	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	200		10	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	300		15	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		09%			00%			.86%			-36%							
'94		09%			.41%			05%			+13%							
'99		26%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	15333	Dec:	5%			
												'94	9740		15%			
												'99	11200		9%			
<i>Atriplex canescens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	40	37	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	52	41	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			
<i>Atriplex confertifolia</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	25	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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					
Cercocarpus montanus										
S	88	-	-	-	-	-	-	0	0	
	94	-	-	-	-	-	-	0	0	
	99	1	-	-	2	-	-	60	3	
Y	88	-	-	-	-	-	-	0	0	
	94	-	-	-	-	-	-	0	0	
	99	-	-	-	2	-	-	40	2	
M	88	-	-	-	-	-	-	0	0	
	94	9	3	1	1	-	-	280	33 38	14
	99	3	-	1	-	1	13	360	36 47	18
D	88	-	-	-	-	-	-	0	0	
	94	1	-	-	-	-	-	20	1	
	99	-	-	-	-	-	-	0	0	
X	88	-	-	-	-	-	-	0	0	
	94	-	-	-	-	-	-	20	1	
	99	-	-	-	-	-	-	20	1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'88		00%		00%		00%				
'94		20%		07%		00%		+25%		
'99		05%		70%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'88	0	Dec:	0%	
						'94	300		7%	
						'99	400		0%	
Chrysothamnus viscidiflorus										
Y	88	1	-	-	-	-	-	66	1	
	94	-	-	-	-	-	-	0	0	
	99	-	-	-	-	-	-	0	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'88		00%		00%		00%				
'94		00%		00%		00%				
'99		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'88	66	Dec:	-	
						'94	0		-	
						'99	0		-	
Cowania mexicana stansburiana										
S	88	-	-	-	-	-	-	0	0	
	94	-	-	-	-	-	-	0	0	
	99	1	-	-	-	-	-	20	1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'88		00%		00%		00%				
'94		00%		00%		00%				
'99		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)						'88	0	Dec:	-	
						'94	0		-	
						'99	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>Ephedra viridis</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	1	-	-	-	-	5	-	-	-	100		5	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	1	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	2	4	2	-	-	-	-	-	6	-	-	2	160	25	32	8
	99	5	4	1	-	-	-	-	-	10	-	-	-	200	23	30	10
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	-	-	-	60		3	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		00%		00%		00%											
'94		50%		25%		25%		+47%									
'99		33%		07%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	0%				
										'94	160		0%				
										'99	300		20%				
<i>Eriogonum microthecum</i>																	
S	88	5	-	-	-	-	-	-	-	5	-	-	-	333		5	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	6	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	88	5	-	-	-	-	1	-	-	6	-	-	-	400		6	
	94	5	-	-	-	-	-	-	-	5	-	-	-	100		5	
	99	1	-	-	1	-	-	-	-	2	-	-	-	40		2	
M	88	8	-	-	-	-	-	-	-	5	-	3	-	533	3	3	8
	94	22	-	-	4	-	-	-	-	26	-	-	-	520	3	6	26
	99	19	-	2	1	-	-	-	-	22	-	-	-	440	2	3	22
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	1	-	-	-	-	-	-	-	-	3	60		3	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		00%		00%		21%		-34%									
'94		00%		00%		00%		-13%									
'99		00%		11%		11%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	933	Dec:	0%				
										'94	620		0%				
										'99	540		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	5	6	7	8	9	1	2	3	4					
Gutierrezia sarothrae																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	8	8	0	
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	4	4	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	120		-			
Juniperus osteosperma																		
S	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	60		-			
Opuntia spp.																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333	3	4	5
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	9	4
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	3	14	4
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	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%			-70%							
'94		00%			00%			00%			+ 0%							
'99		00%			00%			20%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	0%			
												'94	100		0%			
												'99	100		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				
Pinus edulis																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	80		-			
Purshia tridentata																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8	8	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	11	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	20		-			
												'99	0		-			

Trend Study 16B-23-99

Study site name: Consumer Bench .

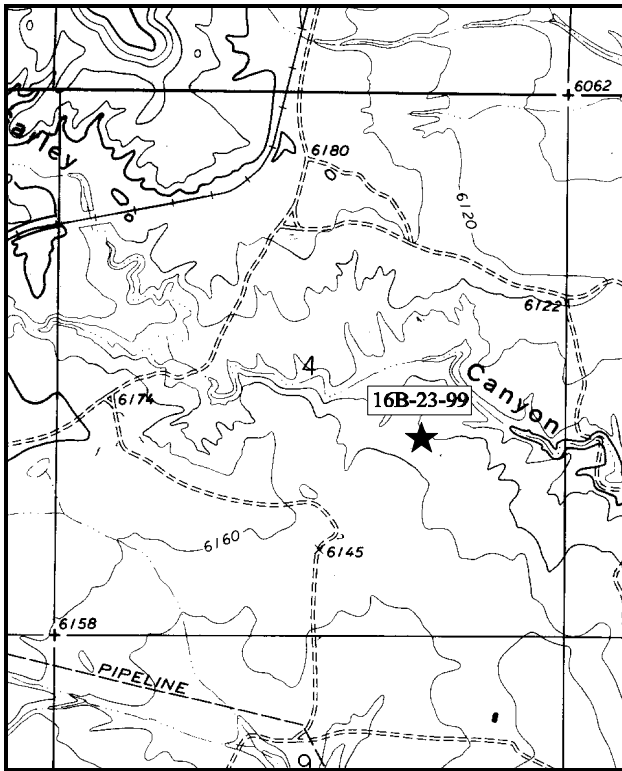
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 328°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

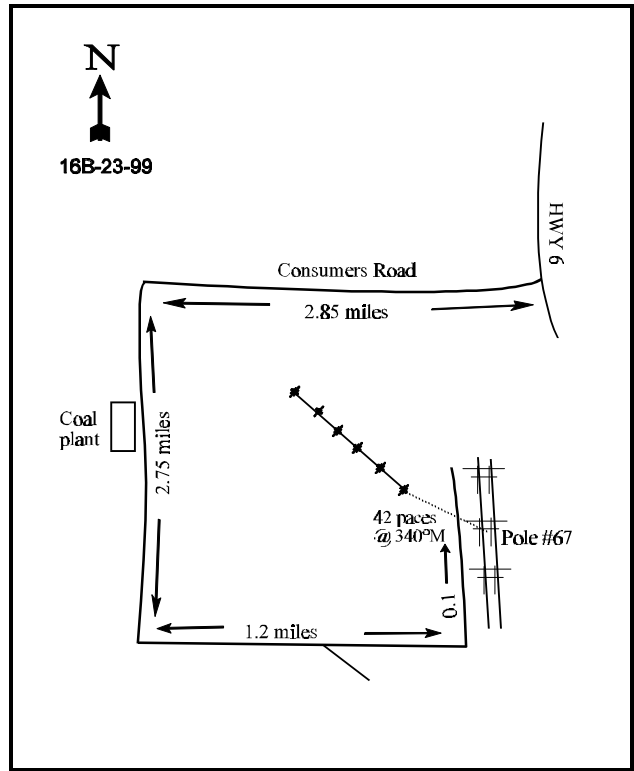
LOCATION DESCRIPTION

On US 6 south of Helper, turn right (west) on Consumer Road and travel 2.85 miles. Turn left on a dirt road, and go 2.75 miles passing a coal plant. Turn left and travel 0.7 miles to a fork. Stay left for an additional 0.5 miles to another fork. Turn left and go 0.1 miles to a telephone pole (#67). The 0' stake is 42 paces away at 340°M from the telephone pole.



Map Name: Standardville

Township 14S , Range 9E , Section 4



Diagrammatic Sketch

UTM 4386343.503 N , 507495.860 E

DISCUSSION

Trend Study No. 16B-23 (30-9)

The Consumer Bench trend study was established on this bench to monitor deer and elk winter range administered by the BLM. The site monitors a Wyoming big sagebrush/grass vegetation type with a few scattered junipers at an elevation of 6,000 feet. The aspect is southwest and the slope is gentle at approximately 5%. The site occurs within the Consumers Wash allotment. The area where the site sits is allotted for 54 sheep from October 1 to April 21, with an additional 821 sheep from April 21 until June 20. Use by wildlife is currently high. Pellet group transect data in 1999 estimate 90 deer days use/acre (223 ddu/ha) and 64 elk days use/acre (159 edu/ha).

The soil is a sandy loam with few rocks on the surface or within the profile. The estimated stoniness index is more a measure of a compacted layer about 12 inches below the surface than the presence of rock. The soil is moderately deep with an estimated effective rooting depth of over 16 inches. The soil has a slightly alkaline pH (7.8), and is low in both phosphorus (3.3 ppm) and potassium (41.6 ppm), which are well below the minimum levels of 10 ppm and 70 ppm determined necessary for normal plant development. Bare ground cover was high at 46% in 1994, but decreased to 36% in 1999. The well dispersed vegetation cover and gentle terrain limit erosion so it is not a serious problem.

The key browse species consists of a moderate stand of Wyoming big sagebrush. The BLM is concerned that the sagebrush in the area is in a state of decline. Currently, the population density is estimated at 4,480 plants/acre, an increase of 15% since 1994. Currently, the population shows a well balanced age class with 55% mature, 27% decadent, and 17% young. Biotic potential is moderate with 300 seedlings/acre being estimated in 1999. This age class structure is nearly identical to that sampled in 1994. Percent decadence is average at 28% in 1994, and 27% in 1999. The proportion of decadent plants classified as dying decreased from 37% in 1994 to 28% in 1999. Utilization was mostly light in 1994, however use has increased to 26% moderate use and 47% heavy use in 1999. Plants with poor vigor were similar between 1994 and 1999, 10% and 11% respectively. There are a high number of dead sagebrush on the site indicating a larger population in the past. Currently, 1 out of every 5 plants is dead. The only other preferred browse on the site consists of a few small winterfat. Snakeweed and prickly pear are the only other abundant browse on the site. Snakeweed is expanding with an 84% increase in 1999, and appears it will continue to increase in the future with half of the population being young.

The herbaceous understory is quite abundant for a Wyoming big sagebrush site. Grasses provide over half of the total vegetation cover in both 1994 and 1999, with nearly all of this coming from perennial species. Six perennial species are present including: blue grama, Salina wildrye, Indian ricegrass, bottlebrush squirreltail, subalpine needlegrass, and needle-and-thread. All perennial grasses increased or remained stable in nested and quadrat frequency except for needle-and-thread which decreased in both. Forbs are diverse but not abundant. Scarlet globemallow is the dominant forb providing 46% of the forb cover in 1999, and occurring in 62% of the sampling quadrats.

1994 APPARENT TREND ASSESSMENT

Average cover of bare ground is high at 45.9%, but due to the gentle terrain and the abundance of herbaceous vegetation, erosion does not seem to be a major problem. The apparent trend for soil is stable. The browse trend is also stable for the time being. The biotic potential (number of seedlings) and reproductive potential (number of young) are sufficient at 7% and 17% respectively to replace dying shrubs on the site. It is apparent by the large number of dead shrubs counted that the population was once larger. Increaser shrubs, broom snakeweed and rabbitbrush are not abundant and do not have age classes of expanding populations. The herbaceous understory is abundant. Perennial forbs are lacking somewhat. Currently, grasses and forbs account for 60% of the vegetation cover. Blue grama, a warm season grass, and needle-and-thread are the dominant grasses on the site.

1999 TREND ASSESSMENT

Trend for soil is slightly improved. Bare ground is still moderately high at 36%, but decreased from 46% in 1994. Vegetation and litter cover both increased in 1999, resulting in better protective ground cover to hold soils in place. The key browse species, Wyoming big sagebrush, shows a stable trend. Age class distribution of the population is nearly identical to the 1994 reading. The proportion of the population classified as decadent, and those showing poor vigor are about the same as 1994 levels. Biotic potential and recruitment remain at moderate levels, currently at 7% and 17% respectively. The only negative aspect with Wyoming big sagebrush is that the level of use has greatly increased. In 1999, 26% of the population displayed moderate use, with an additional 47% showing heavy use. Continued high use could reverse the stability of this species in the future, especially if accompanied by drought. Broom snakeweed is expanding with an 84% increase in density in 1999. Half of the population is young plants which indicates more expansion in the future. The overall trend for browse is stable. The herbaceous understory shows a slightly upward trend. Sum of nested frequency for grasses and forbs increased in 1999. Perennial grasses are the most abundant group in cover and frequency.

TREND ASSESSMENT

soil - slightly improved

browse - stable for the key species Wyoming big sagebrush

herbaceous understory - slightly up

HERBACEOUS TRENDS --

Herd unit 16B, Study no: 23

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	<i>Bouteloua gracilis</i>	195	193	55	54	6.22	4.79
G	<i>Elymus salina</i>	86	105	24	32	.95	2.59
G	<i>Oryzopsis hymenoides</i>	114	*159	47	58	2.06	3.80
G	<i>Sitanion hystrix</i>	24	22	10	14	.39	.56
G	<i>Sporobolus cryptandrus</i>	1	-	1	-	.00	-
G	<i>Stipa columbiana</i>	14	*64	5	18	.39	2.44
G	<i>Stipa comata</i>	167	*78	56	26	4.30	1.88
G	<i>Vulpia octoflora</i> (a)	-	6	-	3	-	.01
Total for Annual Grasses		0	6	0	3	0	0.01
Total for Perennial Grasses		601	621	198	202	14.34	16.09
Total for Grasses		601	627	198	205	14.34	16.11
F	<i>Astragalus convallarius</i>	6	*39	2	16	.01	.19
F	<i>Astragalus</i> spp.	7	*-	4	-	.04	-
F	<i>Castilleja linariaefolia</i>	-	*17	-	8	-	.04
F	<i>Calochortus nuttallii</i>	-	*11	-	8	-	.04
F	<i>Comandra pallida</i>	-	*10	-	5	-	.02
F	<i>Collinsia parviflora</i> (a)	17	15	6	6	.06	.25
F	<i>Cymopterus</i> spp.	-	3	-	1	-	.00
F	<i>Descurainia pinnata</i> (a)	3	1	1	1	.00	.01

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	Eriogonum cernuum (a)	4	-	2	-	.01	-
F	Eriogonum ovalifolium	5	16	3	6	.04	.34
F	Lepidium montanum	12	3	4	2	.21	.01
F	Machaeranthera canescens	1	3	1	1	.00	.03
F	Penstemon linarioides	3	-	1	-	.00	-
F	Penstemon spp.	11	*3	4	1	.02	.03
F	Phlox longifolia	26	*50	9	15	.05	.15
F	Plantago patagonica (a)	3	2	1	2	.00	.01
F	Schoenrambe linifolia	7	*17	3	10	.01	.07
F	Sphaeralcea coccinea	128	166	51	62	.93	1.04
F	Tragopogon dubius	-	2	-	1	-	.00
Total for Annual Forbs		27	18	10	9	0.08	0.26
Total for Perennial Forbs		206	340	82	136	1.33	2.00
Total for Forbs		233	358	92	145	1.41	2.27

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 16B, Study no: 23

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Artemisia tridentata wyomingensis	77	74	9.19	10.31
B	Ceratoides lanata	2	1	-	.00
B	Chrysothamnus viscidiflorus	1	2	-	.15
B	Gutierrezia sarothrae	28	62	.78	.97
B	Opuntia spp.	29	21	.51	.66
B	Pinus edulis	0	1	-	-
Total for Browse		137	161	10.49	12.11

BASIC COVER --

Herd unit 16B, Study no: 23

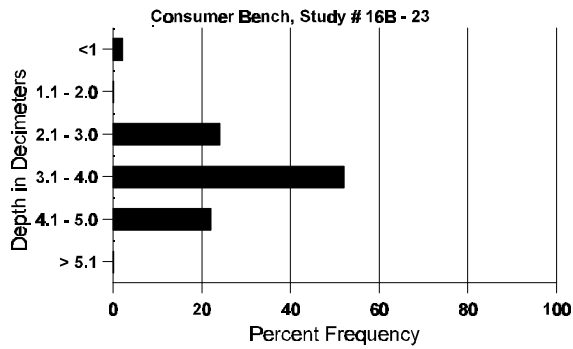
Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	411	423	24.62	32.35
Rock	33	4	.05	.01
Pavement	35	39	.44	.26
Litter	473	470	17.95	24.32
Cryptogams	119	292	1.43	11.09
Bare Ground	457	400	45.88	36.49

SOIL ANALYSIS DATA --

Herd Unit 16B, Study # 23, Study Name: Consumer Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.4	56.4 (16.3)	7.8	54.7	27.4	17.8	1.7	3.3	41.6	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 23

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	6	66	n/a
Elk	20	17	64 (158)
Deer	55	58	90 (222)
Cattle	0	0	1 (2)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 23

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	94	3	-	-	10	-	-	-	-	-	13	-	-	-	260			13
	99	15	-	-	-	-	-	-	-	-	15	-	-	-	300			15
Y	94	32	1	-	-	-	-	-	-	-	33	-	-	-	660			33
	99	31	2	-	-	6	-	-	-	-	34	-	-	5	780			39
M	94	90	12	-	2	-	-	-	-	-	104	-	-	-	2080	16	26	104
	99	15	36	42	-	5	21	5	-	-	119	4	1	-	2480	17	30	124
D	94	35	15	-	4	-	-	-	-	-	34	-	-	20	1080			54
	99	5	5	18	2	4	25	2	-	-	42	-	2	17	1220			61
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	1660			83
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1200			60
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		15%			00%			10%			+15%							
'99		26%			47%			11%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	3820	Dec:	28%			
												'99	4480		27%			
<i>Ceratoides lanata</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	9	8	3
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	4	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-67%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	-			
												'99	20		-			
<i>Chrysothamnus viscidiflorus</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	7	18	3
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	10	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	-			
												'99	60		-			

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>Gutierrezia sarothrae</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	111	-	-	-	-	-	-	-	-	111	-	-	-	2220		111	
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	160	-	-	-	-	2	-	-	-	162	-	-	-	3240		162	
M	94	49	-	-	-	-	-	-	-	-	49	-	-	-	980	8	9	
	99	159	1	-	-	-	-	-	-	-	159	-	1	-	3200	4	4	
D	94	-	-	2	-	-	-	-	-	-	2	-	-	-	40		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			04%			00%			+84%							
'99		.30%			.61%			.30%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1020	Dec:	4%			
												'99	6460		0%			
<i>Opuntia spp.</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	94	42	-	-	-	-	-	-	-	-	42	-	-	-	840	3	10	
	99	25	-	-	-	-	-	-	-	-	25	-	-	-	500	3	9	
D	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	5	-	-	-	-	-	-	-	-	3	-	-	2	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-24%							
'99		00%			00%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	920	Dec:	4%			
												'99	700		14%			
<i>Pinus edulis</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	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%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	20		-			

Trend Study 16B-24-99

Study site name: Wiregrass Bench .

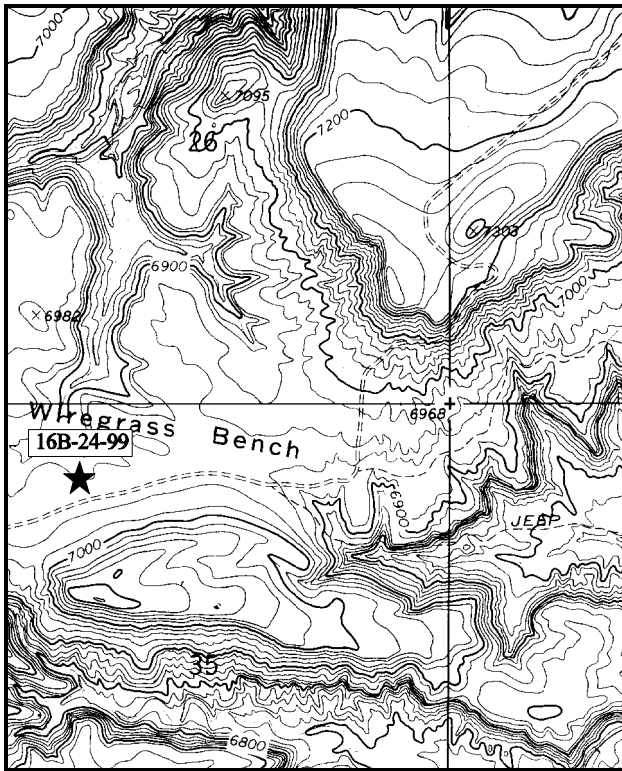
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 0°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

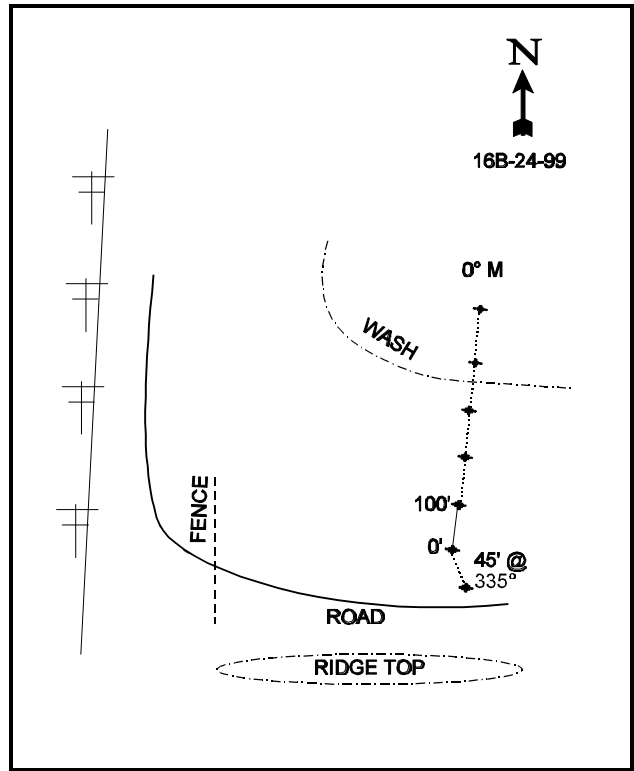
LOCATION DESCRIPTION

Take exit 240 on highway 6 in Price just past the hospital. Turn right at the stop sign, continue to another stop sign and turn right again. Stay on this road until you go over a canal, then turn right at the first road on the right. Proceed 6.8 miles to a railroad crossing. From the railroad tracks, travel 4.1 miles. Just before reaching the power lines turn left and travel 0.5 miles along the fence to a "T" in the road. Turn left through a gate and travel 0.3 miles to the witness post on the left. The 0' stake is 9 paces at 330/ M. The baseline runs in the direction of 0°M.



Map Name: Pinnacle Peak

Township 14S , Range 8E , Section 35



Diagrammatic Sketch

UTM 4379739.980 N, 500290.613 E

DISCUSSION

Trend Study No. 16B-24 (30-10)

The Wire Grass Bench was a new study established in 1994 on Wiregrass Bench. It was placed to monitor possible sagebrush die-off on important winter range. The site occurs within the Haley allotment which is grazed from May 16 to October 31 by 27 cattle. Pellet group frequency data from 1994 indicated a high proportion of rabbit and deer use on the site as well as some elk use. Pellet group transect data taken in 1999 estimate moderate use by wildlife with 38 deer days use/acre (93 ddu/ha) and 23 elk days use/acre (56 edu/ha). Livestock use is currently estimated at 15 cow days use/acre (38 cdu/ha).

The site has a west aspect and a gentle slope of 5%. Elevation is 6,900 feet. Soil depth is quite deep with an estimated effective rooting depth of over 20 inches. The soil is slightly alkaline pH (7.6). Rock is fairly uniformly distributed throughout the profile as evidenced by the stoniness index data. Phosphorus levels in the soil (6.8 ppm) are somewhat lower than 10 ppm thought necessary for normal plant growth and development. Percent bare ground is fairly low for a Wyoming big sagebrush site at 32% in both 1994 and 1999.

The key browse species on this site is Wyoming big sagebrush which had a population density of only 1,860 plants/acre in 1994. The population increased between 1994 and 1999, and is currently estimated at 2,380 plants/acre. Age class analysis indicates a continued expansion of Wyoming big sage with increases in biotic potential (1% to 11%) and recruitment (10% to 18%) in 1999. Percent cover for this species nearly doubled in 1999, from 5.5% to 9.7%. Half of the shrubs were decadent (50%) in 1994, with most of the remainder being mature (41%). Percent decadency decreased to 29% in 1999, while the proportion of mature plants increased to 54%. Utilization increased considerably in 1999, with half of the population showing moderate use, and 10% showing heavy use. However, those plants classified as having poor vigor decreased from 14% in 1994 to 4% in 1999. Also, the proportion of decadent plants classified as dying decreased from 26% in 1994, to 12% in 1999. These parameters all indicate an improving trend for Wyoming big sagebrush. The number of dead shrubs to live ones is currently about 1 in 4, another improvement. Some of the mature and decadent plants sampled in 1999 show evidence of insect infestation.

The most numerous shrub on the site is the increaser low rabbitbrush, however it only provided 23% of the browse cover in 1999. This species had a 41% increase in density in 1999, currently estimated at 7,480 plants/acre. Much of this increase is a result of the young age class which increased by over 30-fold between 1994 and 1999. The majority of population is mature plants in both 1994 and 1999. Height and crown for rabbitbrush has greatly decreased in 1999, currently mature plants measure 4 inches by 8 inches. Broom snakeweed is present at the site and shows a stable population of mostly mature plants estimated at 3,260 plants/acre and 3,480 plants/acre in 1994 and 1999 respectively.

The herbaceous understory is very abundant and diverse. Grasses provide 66% and 50% of the total vegetation cover in 1994 and 1999 respectively. Unfortunately, blue grama and Salina wildrye account for the majority of the cover. Blue grama is a warm season grass which provides little forage and increases under excessive spring livestock grazing. This species did significantly decrease in sum of nested frequency in 1999, and its cover value was less than half that in 1994. Salina wildrye provides poor to fair forage for livestock and big game. This species significantly increased in nested frequency in 1999, and currently provides 27% of the total vegetation cover. Other perennial species include: mutton bluegrass, Indian ricegrass, and bottlebrush squirreltail. Forbs are diverse but not abundant. However, perennial forbs nearly doubled in sum of nested frequency in 1999. A few important perennial species like paint brush, redroot eriogonum and globemallow occur on the site.

1994 APPARENT TREND ASSESSMENT

Ground cover characteristics show adequate cover to control soil erosion. Herbaceous ground cover is high at 25% and litter cover is also high for a Wyoming big sagebrush site at 23%. The apparent browse trend is declining somewhat for Wyoming big sagebrush. Biotic and reproductive potentials are low and the majority of the population is decadent. This is likely caused by a combination of drought and competition from the abundant herbaceous understory and increaser shrubs rabbitbrush and broom snakeweed. The herbaceous understory is abundant and diverse but the composition of grasses is dominated by blue grama and Salina wildrye, both of which offer only fair forage value.

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of vegetation, litter and bare ground all stayed nearly the same over the last 5 years. Erosion is not a problem at the site, and herbaceous sum of nested frequency increased in 1999. Trend for the key browse Wyoming big sagebrush is up. Percent decadency decreased from 49% to 29%, the proportion of decadent plants classified as dying decreased from 26% to 12%, and plants showing poor vigor decreased from 14% to 4%. Biotic potential and recruitment both increased in 1999 as well. Improved precipitation patterns in last few years has helped restore vigor and increase the number of seedlings and young. The only negative aspect for this population of Wyoming big sagebrush is that use has increased. Currently, 50% of the population is classified as moderately browsed, up from 16% in 1994. An additional 10% show heavy use. Trend for the herbaceous understory is slightly up. Perennial species dominate the understory. Sum of nested frequency for perennial grasses and forbs increased in 1999.

TREND ASSESSMENT

soil - stable

browse - up for the key species Wyoming big sagebrush

herbaceous understory - slightly up

HERBACEOUS TRENDS --

Herd unit 16B, Study no: 24

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	Agropyron spicatum	10	2	3	2	.53	.01
G	Bouteloua gracilis	274	*230	77	72	10.33	4.77
G	Bromus tectorum (a)	5	20	2	6	.01	.20
G	Elymus salina	263	*294	73	84	9.56	8.72
G	Oryzopsis hymenoides	25	19	12	10	.38	.20
G	Poa fendleriana	91	98	23	35	.51	1.27
G	Sitanion hystrix	95	*53	39	20	1.06	1.19
G	Stipa comata	17	*4	6	1	.32	.00
Total for Annual Grasses		5	20	2	6	0.00	0.20
Total for Perennial Grasses		780	700	233	224	22.71	16.18
Total for Grasses		785	720	235	230	22.72	16.38
F	Agoseris glauca	-	*55	-	24	-	.24
F	Alyssum alyssoides (a)	-	*15	-	4	-	.02

Type	Species	Nestled Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	<i>Astragalus convallarius</i>	42	38	21	23	.41	.14
F	<i>Astragalus</i> spp.	7	13	2	5	.30	.21
F	<i>Castilleja chromosa</i>	14	*51	6	24	.05	.38
F	<i>Calochortus nuttallii</i>	3	*31	1	14	.00	.07
F	<i>Comandra pallida</i>	35	*69	16	29	.36	.19
F	<i>Collinsia parviflora</i> (a)	21	*27	10	13	.05	.06
F	<i>Crepis acuminata</i>	-	3	-	1	-	.03
F	<i>Cryptantha</i> spp.	2	-	2	-	.01	-
F	<i>Cymopterus</i> spp.	-	*7	-	3	-	.04
F	<i>Delphinium occidentale</i>	-	5	-	1	-	.00
F	<i>Descurainia pinnata</i> (a)	1	-	1	-	.00	-
F	<i>Eriogonum alatum</i>	4	*33	2	17	.03	.16
F	<i>Eriogonum racemosum</i>	44	45	20	23	.39	.32
F	<i>Eriogonum umbellatum</i>	3	1	2	1	.03	.00
F	<i>Hymenoxys acaulis</i>	1	-	1	-	.00	-
F	<i>Lappula occidentalis</i> (a)	-	3	-	1	-	.00
F	<i>Lepidium</i> spp. (a)	18	*-	8	-	.04	-
F	<i>Lesquerella</i> spp.	1	-	1	-	.00	-
F	<i>Machaeranthera grindelioides</i>	8	11	3	5	.06	.10
F	<i>Penstemon caespitosus</i>	5	*20	4	9	.05	.09
F	<i>Penstemon palmeri</i>	3	-	2	-	.01	-
F	<i>Phlox longifolia</i>	43	*74	17	32	.08	.56
F	<i>Plantago patagonica</i> (a)	42	37	14	12	.12	.08
F	<i>Polygonum douglasii</i> (a)	21	*6	9	3	.04	.01
F	<i>Schoenrambe linifolia</i>	14	12	6	5	.03	.02
F	<i>Sphaeralcea coccinea</i>	52	48	21	23	.18	.48
F	<i>Taraxacum officinale</i>	7	12	2	4	.01	.02
F	<i>Zigadenus paniculatus</i>	-	*24	-	13	-	.06
Total for Annual Forbs		103	88	42	33	0.26	0.18
Total for Perennial Forbs		288	552	129	256	2.05	3.16
Total for Forbs		391	640	171	289	2.31	3.35

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 16B, Study no: 24

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Amelanchier utahensis	2	2	-	-
B	Artemisia tridentata wyomingensis	58	66	5.51	9.74
B	Chrysothamnus viscidiflorus	72	76	2.94	2.96
B	Echinocereus spp.	0	4	-	-
B	Gutierrezia sarothrae	63	34	.61	.18
B	Opuntia spp.	9	3	.01	-
B	Pinus edulis	0	1	.38	.15
Total for Browse		204	186	9.46	13.05

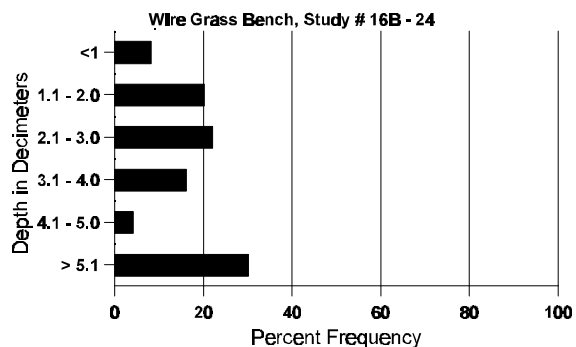
BASIC COVER --
Herd unit 16B, Study no: 24

Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	438	433	34.32	32.04
Rock	131	30	1.33	.57
Pavement	118	60	.41	.33
Litter	479	475	23.33	24.23
Cryptogams	231	278	3.75	13.03
Bare Ground	433	384	31.76	32.17

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 24, Study Name: Wire Grass Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
20.2	51.6 (16.8)	7.6	34.7	41.4	23.8	1.7	6.8	121.6	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 24

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) '09
	'94	'99	
Rabbit	33	56	n/a
Elk	12	5	23 (57)
Deer	36	53	38 (94)
Cattle	6	7	15 (37)

BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 24

A Y G R E	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>Amelanchier utahensis</i>																	
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	-	-	-	-	-	-	-	-	-	40			2
M	94	1	1	-	-	-	-	-	-	-	-	-	-	40	17	20	2
	99	-	-	-	-	1	-	-	-	-	-	-	-	20	37	42	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		50%			00%			00%			+33%						
'99		33%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'94	40	Dec:	-			
											'99	60		-			
<i>Artemisia tridentata wyomingensis</i>																	
S	94	1	-	-	-	-	-	-	-	-	-	-	-	20			1
	99	4	-	-	9	-	-	-	-	-	-	-	-	260			13
Y	94	7	-	-	2	-	-	-	-	-	-	-	-	180			9
	99	17	1	-	2	1	-	-	-	-	-	-	-	420			21
M	94	34	5	-	-	-	-	-	-	-	-	-	-	780	22	33	39
	99	19	39	5	-	1	-	-	-	-	-	-	-	1280	23	34	64
D	94	32	10	1	3	-	-	-	-	-	-	-	-	920			46
	99	8	16	5	-	1	2	2	-	-	-	-	-	680			34
X	94	-	-	-	-	-	-	-	-	-	-	-	-	580			29
	99	-	-	-	-	-	-	-	-	-	-	-	-	760			38
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		16%			01%			14%			+21%						
'99		50%			10%			04%									
Total Plants/Acre (excluding Dead & Seedlings)											'94	1880	Dec:	49%			
											'99	2380		29%			

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</i>																
S	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	10	-	-	-	-	-	-	-	10	-	-	-	200		10
Y	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2
	99	62	2	-	-	-	-	-	-	64	-	-	-	1280		64
M	94	212	-	-	6	-	-	-	-	218	-	-	-	4360	21 25	218
	99	297	12	1	-	-	-	-	-	310	-	-	-	6200	4 8	310
X	94	-	-	-	-	-	-	-	-	-	-	-	-	20		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'94		00%		00%		00%		+41%								
'99		04%		.26%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'94	4400	Dec:	-			
										'99	7480		-			
<i>Echinocereus spp.</i>																
M	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	1 2	4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'94		00%		00%		00%										
'99		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'94	0	Dec:	-			
										'99	80		-			
<i>Gutierrezia sarothrae</i>																
Y	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2
	99	27	-	-	-	-	-	-	-	27	-	-	-	540		27
M	94	159	-	-	-	-	-	-	-	159	-	-	-	3180	31 6	159
	99	146	-	-	-	-	-	-	-	146	-	-	-	2920	3 4	146
D	94	2	-	-	-	-	-	-	-	1	-	-	1	40		2
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1
X	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2
	99	-	-	-	-	-	-	-	-	-	-	-	-	100		5
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'94		00%		00%		.61%		+ 6%								
'99		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'94	3260	Dec:	1%			
										'99	3480		1%			
<i>Opuntia spp.</i>																
M	94	10	-	-	3	-	-	-	-	13	-	-	-	260	3 7	13
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	2 5	4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'94		00%		00%		00%		-69%								
'99		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'94	260	Dec:	-			
										'99	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			
Pinus edulis																	
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>					
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-		
												'99	20		-		

SUMMARY

WILDLIFE MANAGEMENT UNIT 16B - MANTI-NEBO, MANTI NORTH

The twelve range trend studies on the old NE Manti unit focus on two different types of key areas related to the big game species involved. Three studies were established to monitor key elk winter range; Ford Ridge (#15), Hardscrabble (#16) and Huntington Canyon (#21). The other studies are on ranges critical to deer, although many receive elk use. Most of the sites on the unit sample sagebrush-grass ranges. The Poison Spring Bench study (#22) is located in a pinyon-juniper chaining and Huntington Canyon samples a perennial grass range. Two studies established in 1994 at Consumer Bench (#23) and Wiregrass Bench (#24) were placed to monitor possible Wyoming big sagebrush die-off on important winter ranges for deer. The Starvation Mahogany (#8) and Starvation Mountain Brush (#9) sites were established on Division property in 1989 to monitor use by elk and mule deer, especially winter use.

The higher elevation site at Ford Ridge shows downward trends for soil and browse, with a slightly upward trend for the herbaceous component. This site will be dropped due to lack of use by elk, the primary reason the site was established. Two other high elevation sites at Hardscrabble and Huntington Canyon that were established to monitor elk use, currently show stable or upward trends in all categories. The chained pinyon-juniper site at Poison Spring Bench shows stable trends in soil, browse and herbaceous understory. The mountain big sagebrush/black sagebrush site at Telephone Bench has stable soil and herbaceous understory trends, with an improved browse trend. The other sagebrush-grass sites at Slackpile, Porphyry Bench, North Spring Bench, Consumer Bench, and Wiregrass Bench, all have improving or stable soil trends. Browse trends are stable at Porphyry Bench, North Spring Bench, and Consumer Bench, upward at Wiregrass Bench, and down at Slackpile. The herbaceous understory shows stable to upward trends on all of these sagebrush-grass winter range sites. The mahogany and mountain brush sites in the Starvation drainage show stable browse trends at the present time. Soil trend is stable at Starvation Mahogany, but down at Starvation Mountain Brush, with herbaceous trends stable or up at both sites.

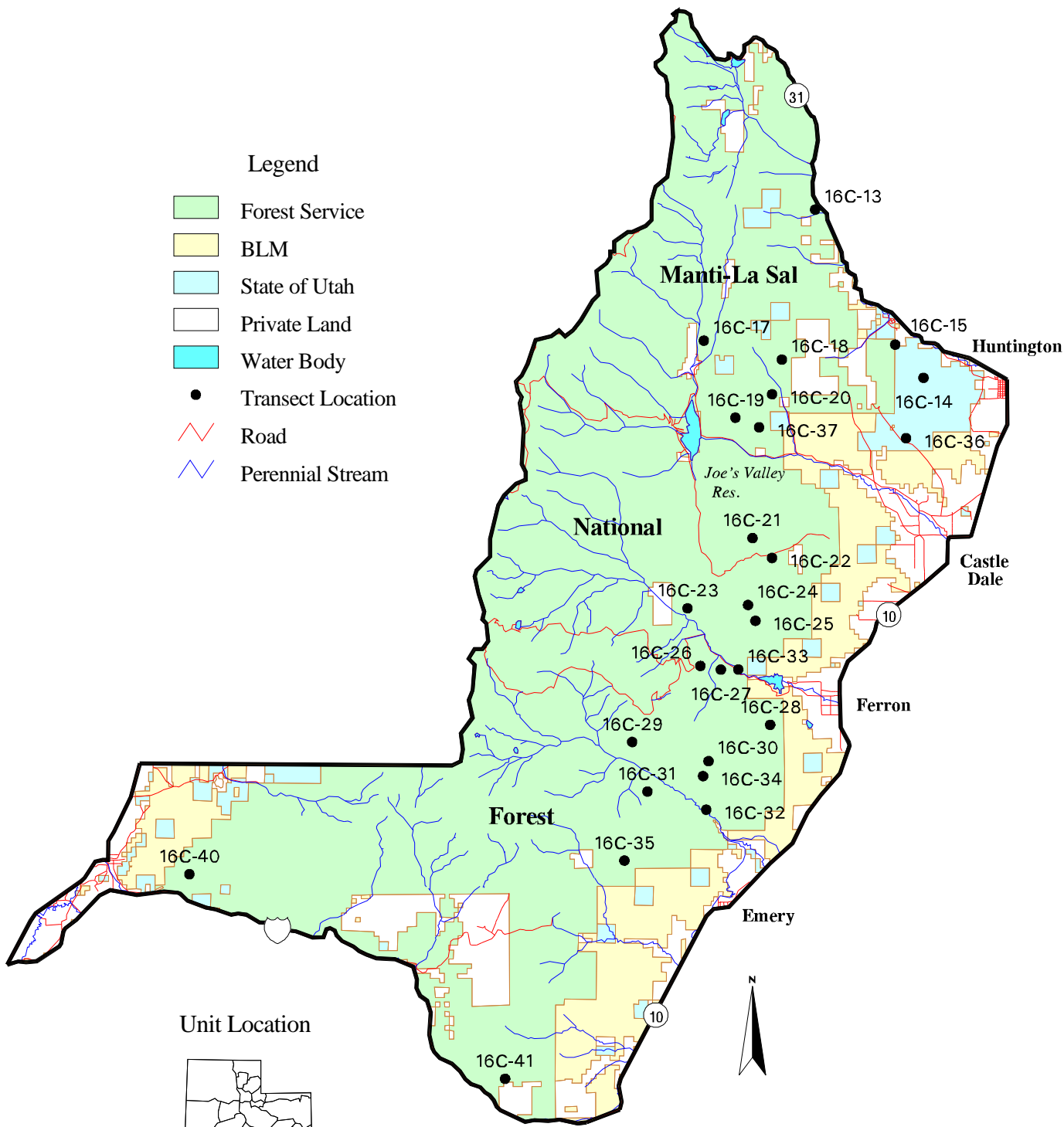
This unit shows increasing deer use on the Wyoming big sagebrush sites at the lower elevations. Use in 1999 was moderate to heavy on these areas, ranging from 38 deer days use/acre at Wiregrass Bench to 159 deer days use/acre at North Spring Bench. With better precipitation patterns in recent years, the browse trends are stable to up at these sites. However, continued heavy wildlife use on these critical sagebrush ranges could result in the reversal of these improving trends, especially if associated with extended drought.

Site	Category	1989	1999
16B-8 Starvation Mahogany	soil	est	0
	browse	est	0
	herbaceous understory	est	0
16B-9 Starvation Mountain Brush	soil	est	-
	browse	est	0
	herbaceous understory	est	+
Site	Category	1994	1999
16B-15 Ford Ridge	soil	0	-
	browse	0	-
	herbaceous understory	-	+

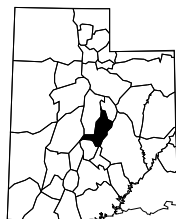
Site	Category	1994	1999
16B-16 Hardscrabble	soil	-	+
	browse	0	+
	herbaceous understory	-	+
16B-17 Slackpile	soil	+	0
	browse	-	-
	herbaceous understory	0	0
16B-18 Porphyry Bench	soil	+	0
	browse	0	0
	herbaceous understory	+	0
16B-19 North Spring Bench	soil	+	+
	browse	-	0
	herbaceous understory	-	0
16B-20 Telephone Bench	soil	0	0
	browse	-	+
	herbaceous understory	0	0
16B-21 Huntington Canyon	soil	0	0
	browse	0	0
	herbaceous understory	0	0
16B-22 Poison Spring Bench	soil	-	0
	browse	0/-	0
	herbaceous understory	-	0
16B-23 Consumer Bench	soil	est	+
	browse	est	0
	herbaceous understory	est	+
16B-24 Wiregrass Bench	soil	est	0
	browse	est	+
	herbaceous understory	est	+

(0) = stable, (+) = upward, (-) = downward, (0/-) = stable to slightly downward, (0/+) = stable to slightly upward, (est) = trend study established

Management Unit 16C



Unit Location



Map Scale 1:503,712
(1" = 7.95 miles)

WILDLIFE MANAGEMENT UNIT 16C (31) - SOUTH-EAST MANTI

Boundary Description

Sanpete, Emery and Sevier counties - Boundary begins at the junction of Highway SR-10 and Highway SR-31 at Huntington; then south on SR-10 to Interstate 70; west on I-70 to Highway US-89 at Salina; north on US-89 to SR-31 at Fairview; southeast on SR-31 to SR-10 at Huntington.

Herd Unit Description

Unit 16C was previously called Deer Herd Unit 31- South East Manti. It was enlarged in the spring of 1998 to include both the east and west sides of the Wasatch Plateau and renamed Wildlife Management Unit 16C. Unit 16C is a subunit of the very large management unit 16 which encompasses areas in Utah, Carbon, Juab, Sevier, and Sanpete Counties. Approximately 54% of unit 16's winter range is on land administered by the U.S. Forest Service and the BLM. Another 35% is on private land. The U.S. Forest Service administers 72% of the summer range, while 22% is private.

The upper limits of the winter range on subunit 16C - South-East Manti, generally follow the rim of the plateau and the 9,000 foot level of the south and west exposures of the large canyons and mountain slopes. A good description of winter range limits and prominent vegetative types can be found in the 1980 Utah Big Game Range Inventory (Giunta 1982).

The upper portions of the winter range on Forest Service lands are managed primarily for livestock grazing. Widespread watershed rehabilitation, contour trenching and seeding, was done on this rangeland in the 1960's. An extensive road system provides access to a large percentage of the winter range. Many roads in critical areas are open or maintained and used winter long in relation to various activities, namely mining, gas wells, the Horn Mountain TV towers, and for recreation. Access is more restricted further south in the Ferron and Muddy Creek drainages.

The lowest foothill ranges are accessible year-round, and are usually adjacent to agricultural areas. Coal mining and the power plants are the major economic activities in the area. Other associated impacts include road improvements, truck traffic, and an increased human population. This all assuredly has an effect on the distribution and abundance of big game animals. Outdoor recreation is popular in the area. These activities include camping, hunting, fishing, four-wheeling, and snowmobiling which are facilitated by the extensive road system in the mountains and foothills. The very lowest portion of the herd unit supports a low desert shrub type on unproductive shale hills. This acreage is not considered part of the winter range.

Key Areas

The key deer wintering areas are the lower end of Muddy Creek and Ferron Creek, Black Dragon, Biddlecome Hollow, Cottonwood Canyon, and Huntington Canyon. Elk winter higher on Trail Mountain, North and South Horn Mountain, and Sage Flat. Deer also utilize these areas during mild winters. Elk utilize the mahogany and sagebrush on the lower points of the plateau, such as North and South Horn Mountain and Trail Mountain.

On the Southeast Manti Unit, much of the key winter range is on Forest Service lands. Pinyon-juniper benches become more limited to the south and there are mostly low desert shrub foothills associated with Muddy Creek. Overall, the pinyon-juniper type occupies a fair amount of the winter range at low elevations, but is not critical to the trend monitoring program. However, the chained and seeded portions of this type provide important wintering areas where many are monitored for trend. Chainings are sampled in the foothills from Huntington Canyon to south of Dry Wash. Other key areas at Middle Mountain and Dry Mountain are also sampled. The big sagebrush/grass range type is found on many key areas, especially on the

North East Manti Unit, but also on high elevation elk winter range on Trail, East, and Horn Mountains. Big sagebrush/grass is limited on critical deer winter range, but key areas are found on Black Dragon and Muddy Creek. Large areas of key winter range, also identified by the U.S. Forest Service in their Land and Resource Management Plan, are found on Trail Mountain, North Horn and South Horn Mountain, in lower Dry Wash, and along Muddy Creek. Mixed mountain brush and curlleaf mountain mahogany types are especially important in these areas.

Grazing Summary

The livestock grazing programs on Forest Service lands in the Southeast Manti Unit generally involve a deferred or rest-rotation system for cattle, or sheep grazing during the summer and fall. Specific allotment management plans vary as to exact season dates. Several study sites receive little impact from livestock due to accessibility, livestock distribution and management. The study site on Middle Mountain (#17), the only trend study on a sheep allotment, apparently receives little livestock use because the sheep are not grazed on the west side due to closure of the area after the chaining. Although contained in the Gentry Mountain cattle allotment, West Huntington Canyon (#13) above Crandall Canyon is not used by cows due to the long steep slopes up to the ridge top. The trend study on East Mountain (#18) is in the East Mountain Allotment which is made up of both private and USFS land. It is permitted for grazing June 21 to September 10 by 526 cattle in a four pasture rest rotation system. There are two studies in the Trail Mountain Cattle allotment. The area around the Trail Mountain Exclosure (#19) has been closed to grazing since the late 1960's after a watershed treatment. However, there is some trespass. The site at Miles Point (#20) is grazed from June 21 to September 20 by 901 cows under a deferred-rotation system.

There are five studies in the Horn Mountain cattle allotment (#21, #22, #23, #24, #25). The season of use on this allotment is June 6 to September 30, with 849 cows (4,371 AUM's) under a five pasture rest-rotation grazing system. All study sites are used by cattle. In the Black Dragon (#23) area, also in the Horn Mountain allotment, part of the herd is grazed for a short period early in the season. There is little grazing pressure in the sagebrush flat where the trend study is located because of the distance to water.

Water also limits cattle use on three study sites in the Ferron cattle allotment. The Dry Mountain (#26) and the isolated bench south of Dry Wash show little sign of use by cattle. Cattle grazing was limited on the isolated Birch Creek chaining (#27) in 1988 and 1994, but was moderate to heavy in 1999. The allotment is permitted for 1,607 cows, from June 21 to October 5. The plan follows a rest-rotation schedule utilizing eight pastures. The two other trend studies on the Ferron grazing allotment, Scab Hollow (#29) and Upper Hole Trail (#30), receive considerably more use by cows. Cattle trail up and down the old Hole Trail, but they should not holdover in the basin at the top of the trail where the study is located because there is no water. Cattle use to trail up Muddy Creek (#32), however there is not much livestock use on Forest Service land in the canyon anymore, except for some trespass from private land downstream. The new sites at Little Nelson Mountain (#33) and South Sage Flat (#34) also occur in the Ferron allotment.

The Emery cattle allotment is permitted for 6,402 AUM's, 1,387 cows from June 16 to September 30 in a six pasture rest rotation schedule. The area around Box Canyon Knolls (#31) is generally an early unit in the rest-rotation schedule.

The grazing programs for the BLM lands sampled on this unit are contained in the West Huntington and Wilberg Allotment Management Plans. Historically, there has been heavy cattle use on the West Huntington allotment. The deferred rotation system planned in 1968 was never implemented. A new plan was initiated in 1988, calling for closure of one pasture and a 50% reduction in spring AUM'S instead of the recommended elimination of all spring grazing permits. Currently, 177 cows use the unit from May 1 to June 26 and 140 cows from November 1 to December 15. Monitoring will continue, and there is a possibility of more reductions if there is no improvement in range conditions. The Wilberg allotment is also a cattle allotment, grazed in spring and late fall. Eighty-nine cows use the unit from November 1 to December 15 and April 16

to June 15. Fencing and water developments planned in 1969 were never completed so the two pastures are grazed on a continuous basis, one in winter and one in spring.

Herd Unit Management Objectives

There are no current specific management objectives for sub unit 16C, only unit wide objectives. The current target winter herd size for all of unit 16 is to achieve a target population size of 60,600 (38,000 wintering deer on the Wasatch Plateau or Manti Mountain Portion of the unit and 22,600 on the Nebo portion). A post season buck to doe ration of 15:100 is sought with 30% of these bucks being 3 point or better.

Trend Study Site Description

Unit 16C contains 26 trend study sites. Twenty sites were originally established in 1988 and reread in 1994 and 1999. In the summer of 1994, it was determined at an Interagency meeting of DWR, Forest Service, and BLM personnel that five new key area studies were necessary. The new studies were established in July and August of 1994 and include; Little Nelson Mountain #33 (sagebrush/grass), South Sage Flat #34 (sagebrush/grass), Wildcat Knolls #35 (black sagebrush/grass), Danish Bench #36 (chaining), and Joe's Valley Overlook #37 (mixed mountain brush). The study at Danish Bench, was established to replace Church Mine Road #16, which was eliminated due to light utilization. Two trend studies, Cedar Mountain #40 and Trough Hollow #41, were originally in other herd units but are now part of the Manti-Nebo Manti South unit. These two studies were established in 1985 and reread in 1991 and 1999.

Trend Study 16C-13-99

Study site name: West Huntington Canyon .

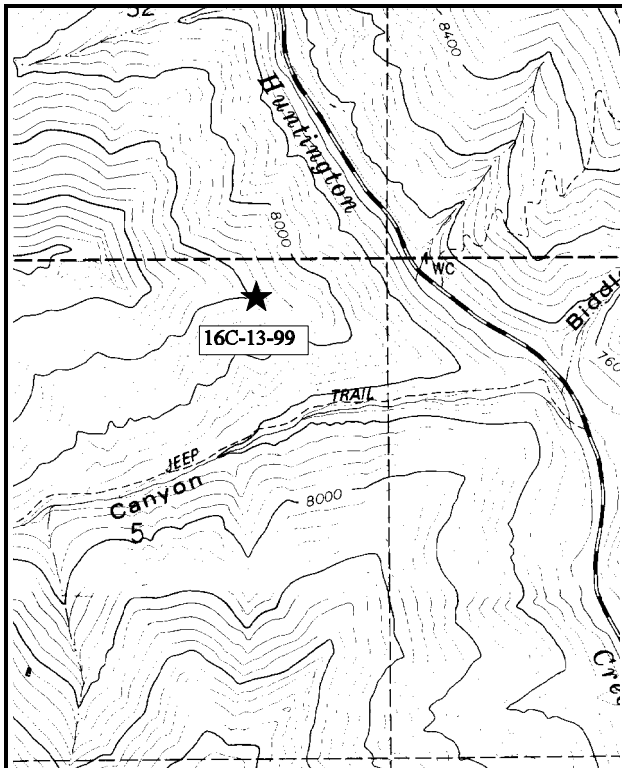
Range type: Curleaf Mountain Mahogany .

Compass bearing: frequency baseline 117°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

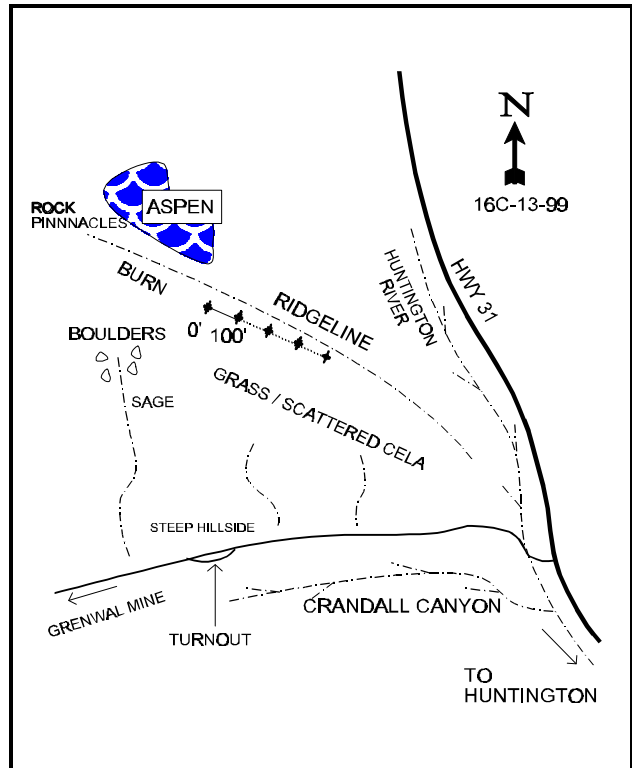
LOCATION DESCRIPTION

From Highway 31, the Huntington Canyon road, turn onto the Crandall Canyon road. Go up the canyon 0.7 miles to a turnout. From the turnout, look up the ridge to the north. The study site is on the top of the ridge on the eastern edge of an old burn; now sagebrush/grass and scattered mahogany. The site can be reached by a 1/4 mile hike up the steep rocky face, or a 3/4 mile hike up the ridge starting by the Huntington River. Once the top of the ridge below the rock pinnacles is reached, the study stakes are not difficult to locate. The 0-foot baseline stake is marked by browse tag #902S.



Map Name: Rilda Canyon

Township 16S , Range 7E , Section 5



Diagrammatic Sketch

UTM 4368314.158 N, 486551.276 E

DISCUSSION

Trend Study No. 16C-13 (31-11)

The West Huntington Canyon trend study is located on the west side of Huntington Canyon along the top of the ridge, north of Crandall Canyon. The south-facing slopes and ridge tops in this area are used by elk in the winter. Clumps of aspen also provide summer deer habitat. This area does not appear to be used by livestock, probably due to its inaccessibility and lack of water. Pellet group data from 1999 estimate 10 deer and 96 elk days use/acre (25 ddu/ha, 237 edu/ha). All pellet groups appear to be from the previous winter. The study is within a curlleaf mountain mahogany type that burned many years ago. Along with the sparse mahogany over story, there is an understory of bluebunch wheatgrass, Salina wildrye, Oregon grape, and mountain big sagebrush.

The study is on the south side of the ridge, just below the ridge top with a southeast aspect. The elevation is 8,400 feet. The slope is very steep (45%) and rocky. Cliffs are formed by exposure of the underlying sandstone. The rocky nature of the site allows for generally shallow soils, but there are deep spots between rocks which provide good rooting sites for trees. Effective rooting depth is actually moderately deep and is estimated at just over 16 inches. The texture is a clay with a slightly alkaline pH (7.4). Phosphorus is limited at only 5.5 ppm where values less than 10 ppm can limit normal plant growth and development. In spite of severe pedestalling and exposed roots, the large bluebunch wheatgrass and Salina Wildrye play a major role in holding the soil in place. For the most part, the soil is moderately protected. Erosion is inevitable due to the steepness of the slope, but it does not appear to be excessive.

The dominant overstory on the site consists of a few scattered mature curlleaf mountain mahogany, some of which are mostly unavailable due to height and highlining. Smaller, more available mahogany sampled on the site were heavily browsed in 1999. Mountain big sagebrush, the key browse species, provides more than half of the browse cover. It had a density of 3,466 plants/acre in 1988, 1,520 in 1994, and 1,760 by 1999. Due to the apparent lack of dead plants in 1994 and 1999, the large decrease in population density between 1988 and 1994 is the result of the much larger sample size used in 1994. The study site baseline was lengthened in 1994 which more than tripled the original sample size for browse. Sagebrush was mostly lightly utilized in 1988 and 1994, with more moderate use in 1999. The population is healthy with good vigor and low decadence.

Snowberry, low rabbitbrush, pinyon, and Rocky Mountain juniper are present on the mountainside but in low numbers. The most numerous browse is Oregon grape, which provided 33% of the browse cover in 1994 and 29% in 1999. Although no signs of a hedged growth form can be found on these small shrubs, elk have been known to utilize this species as part of their winter diet.

Salina wildrye is the most abundant grass followed by bluebunch wheatgrass. It appears that there was an identification problem between bluebunch wheatgrass and Salina wildrye in 1994. Currently ('99) Salina wildrye provides 87% of the grass cover and 49% of the total vegetation cover. Bluebunch wheatgrass provides an additional 13% of the grass cover. There is also a small amount of Carex. Forbs are rare and only aster is common. The aster currently ('99) provides 63% of the limited forb cover.

1994 TREND ASSESSMENT

Ground cover characteristics have changed somewhat since 1988. Percent litter cover has declined considerably due to drought conditions and percent bare ground has increased. However, the herbaceous understory is abundant and adequately protects the soil from erosion indicating a stable soil trend for the time being. The browse trend is stable for the key browse species, mountain big sagebrush, but down for seedlings, and young. Percent decadency rates are low. Overall, trend for browse is slightly down. Trend for herbaceous understory is stable with improvements in species composition. Nested frequency of grasses declined slightly, while nested frequency of forbs increased.

TREND ASSESSMENT

soil - stable

browse - slightly down due to declining biotic and reproductive potentials of sagebrush

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil continues to be stable. Percent litter cover remains similar to 1994 estimates, but percent bare ground has declined. There is some enviable erosion occurring due to the steep slope. Pedestaling and terracing are evident, however the abundant herbaceous cover helps stabilize the soil. Trend for browse is stable. The key species, mountain big sagebrush has a relatively stable density of 1,760 plants/acre. Vigor is good, percent decadence is low, and use is light to moderate. The preferred curleaf mountain mahogany occurs in low densities. It is moderately to heavily hedged where available. Trend for the herbaceous understory is stable. The dominate species is Salina wildrye which provides 87% of the grass cover, 74% of the herbaceous cover or 49% of the total vegetation cover. It appears that much of this grass was misidentified as bluebunch wheatgrass in 1994. Forbs are limited, yet they have increased slightly in nested frequency since 1994. Aster is the only abundant forb.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable but dominated by Salina wildrye

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 13

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	a40	b194	a68	18	68	29	10.87	2.84
G	Carex spp.	b15	a5	a5	10	2	2	.03	.06
G	Elymus salina	c279	a80	b229	91	33	79	3.08	19.46
G	Koeleria cristata	-	-	2	-	-	1	-	.00
G	Poa pratensis	-	-	1	-	-	1	-	.06
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		334	279	305	119	103	112	13.98	22.43
Total for Grasses		334	279	305	119	103	112	13.98	22.43
F	Achillea millefolium	a-	a2	b9	-	1	4	.03	.23
F	Antennaria microphylla	-	3	-	-	1	-	.03	-
F	Artemisia ludoviciana	a-	ab3	b6	-	1	5	.15	.07
F	Aster chilensis	a19	b44	a4	7	16	2	.76	.06
F	Astragalus convallarius	a2	ab12	b19	1	5	9	.07	.88
F	Aster spp.	a20	a32	b69	9	13	24	.26	2.43
F	Astragalus spp.	-	4	-	-	2	-	.18	-
F	Chenopodium album (a)	-	2	-	-	1	-	.00	-
F	Chaenactis douglasii	-	4	-	-	2	-	.01	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Cirsium spp.	-	1	-	-	1	-	.03	.00
F	Hymenoxys richardsonii	1	-	-	1	-	-	-	-
F	Ipomopsis aggregata	-	-	1	-	-	1	-	.00
F	Machaeranthera canescens	4	5	11	2	3	5	.22	.13
F	Phlox longifolia	_a	_{ab} 6	_b 11	-	2	5	.01	.02
F	Sanguisorba minor	-	-	-	-	-	-	-	.00
F	Schoenocrambe linifolia	-	3	-	-	1	-	.00	-
F	Taraxacum officinale	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	2	0	0	1	0	0.00	0
Total for Perennial Forbs		47	119	130	21	48	55	1.77	3.86
Total for Forbs		47	121	130	21	49	55	1.78	3.86

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

BROWSE TRENDS --

Herd unit 16C, Study no: 13

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia tridentata vaseyana	44	49	4.25	8.53
B	Cercocarpus ledifolius	7	5	.15	.00
B	Chrysothamnus nauseosus	0	0	-	-
B	Chrysothamnus viscidiflorus	1	4	.00	.30
B	Gutierrezia sarothrae	0	2	-	.03
B	Juniperus osteosperma	-	-	.63	-
B	Mahonia repens	65	60	2.47	3.85
B	Pachistima myrsinites	1	2	-	.09
B	Sambucus cerulea	0	2	-	-
B	Symphoricarpos oreophilus	6	5	.06	.53
Total for Browse		124	129	7.58	13.34

BASIC COVER --

Herd unit 16C, Study no: 13

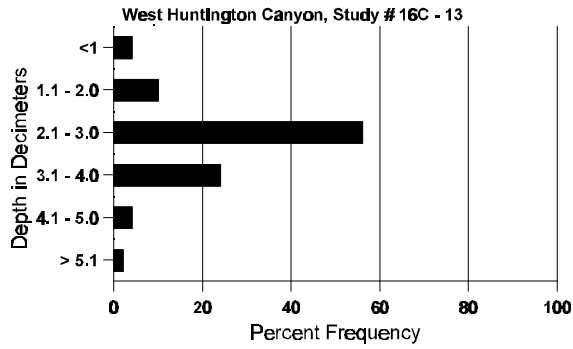
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	300	316	10.25	24.57	40.22
Rock	285	189	10.00	9.04	10.68
Pavement	227	247	1.25	1.21	5.88
Litter	382	360	53.00	32.40	33.01
Cryptogams	8	1	0	.04	.00
Bare Ground	311	298	25.50	30.77	25.76

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 13, Study Name: West Huntington Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.3	54.6 (16.3)	7.4	23.3	32.2	44.6	3.2	5.5	99.2	0.7

Stoniness Index



PELLET GROUP DATA --

Herd unit 16C, Study no: 13

Type	Quadrat Frequency	
	04	09
Rabbit	13	7
Elk	47	54
Deer	4	6

Pellet Transect Days Use/Acre (ha)
09
n/a
96 (237)
10 (24)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 13

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	88	22	-	-	-	-	-	2	-	-	24	-	-	-	1600		24	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	28	1	-	1	-	-	-	-	-	29	-	1	-	2000		30	
	94	6	-	-	-	-	-	-	-	6	-	-	-	120		6		
	99	11	-	-	-	-	-	-	-	11	-	-	-	220		11		
M	88	19	-	-	-	-	-	-	-	18	-	1	-	1266	13	21	19	
	94	50	9	1	-	-	-	-	-	60	-	-	-	1200	20	32	60	
	99	32	29	7	1	-	-	-	-	69	-	-	-	1380	16	24	69	
D	88	3	-	-	-	-	-	-	-	3	-	-	-	200		3		
	94	5	5	-	-	-	-	-	-	3	-	-	7	200		10		
	99	3	5	-	-	-	-	-	-	7	-	-	1	160		8		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	100		5		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		02%			00%			04%			-56%							
'94		18%			01%			09%			+14%							
'99		39%			08%			01%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	3466	Dec:	6%				
											'94	1520		13%				
											'99	1760		9%				
<i>Cercocarpus ledifolius</i>																		
Y	88	-	1	-	-	-	-	-	-	1	-	-	-	66		1		
	94	9	-	-	-	-	-	-	-	9	-	-	-	180		9		
	99	1	-	-	-	-	2	-	-	3	-	-	-	60		3		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	3	-	-	1	-	-	-	-	4	-	-	-	80	27	18	4	
	99	-	-	-	-	3	1	-	-	4	-	-	-	80	15	14	4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
	99	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		100%			00%			00%			+75%							
'94		00%			00%			00%			-46%							
'99		43%			43%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-				
											'94	260		-				
											'99	140		-				

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					
<i>Chrysothamnus nauseosus</i>																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	11	15	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	29	53	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	0		-				
										'99	0		-				
<i>Chrysothamnus viscidiflorus</i>																	
Y	88	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	1	-	-	-	-	-	-	-	1	-	-	-	66	10	10	1
	94	1	-	-	-	-	-	-	-	1	-	-	-	20	10	15	1
	99	6	-	-	-	-	-	-	-	6	-	-	-	120	9	14	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-85%						
'94		00%			00%			00%			+83%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	132	Dec:	-				
										'94	20		-				
										'99	120		-				
<i>Gutierrezia sarothrae</i>																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	8	12	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	0		-				
										'99	80		-				

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				
Mahonia repens																	
S	88	163	-	-	-	-	-	27	-	-	190	-	-	-	12666		190
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	13	-	-	-	-	-	-	-	-	13	-	-	-	260		13
Y	88	143	-	-	-	-	-	-	-	143	-	-	-	9533		143	
	94	56	-	-	-	-	-	-	-	56	-	-	-	1120		56	
	99	297	2	-	-	-	-	-	-	299	-	-	-	5980		299	
M	88	489	-	-	-	-	-	20	-	509	-	-	-	33933	5	4	509
	94	777	-	-	4	-	-	-	-	781	-	-	-	15620	9	12	781
	99	644	-	-	28	-	-	-	-	672	-	-	-	13440	4	5	672
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-61%						
'94		00%			00%			00%			+14%						
'99		.20%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	43466	Dec:	-			
											'94	16740		-			
											'99	19420		-			
Pachistima myrsinites																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	1	-	-	-	20	3	2	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	9	9	0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%			+67%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	20		-			
											'99	60		-			
Sambucus cerulea																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	8	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	40	52	0
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	57	68	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	0		-			
											'99	240		-			

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								
Symphoricarpos oreophilus																
Y	'88	-	-	-	3	-	-	-	-	3	-	-	200			3
	'94	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'88	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	8	-	-	-	-	-	-	-	8	-	-	160	11	26	8
	'99	5	-	-	-	-	-	-	-	5	-	-	100	14	26	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		00%			00%			00%			-20%					
'94		00%			00%			00%			-38%					
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	200	Dec:	-			
										'94	160		-			
										'99	100		-			

Trend Study 16C-14-99

Study site name: Red Point .

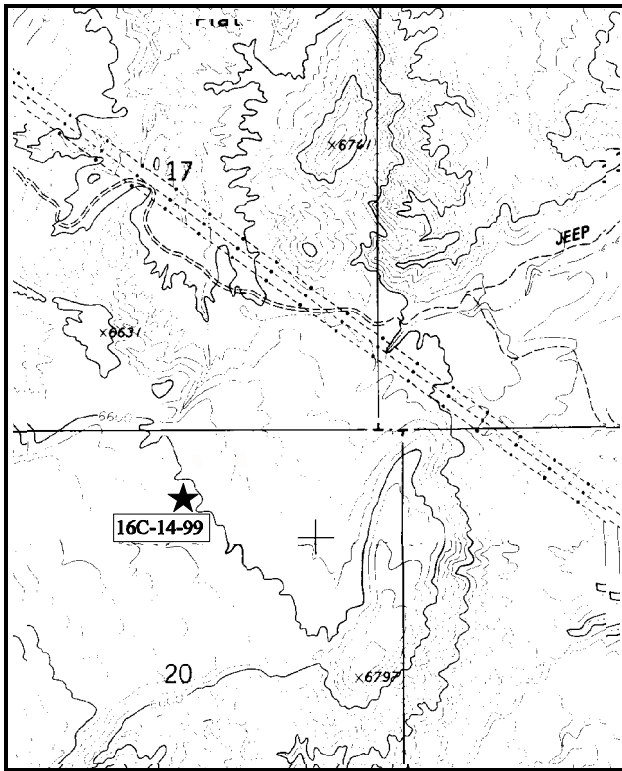
Range type: Chained, Seeded P-J .

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).

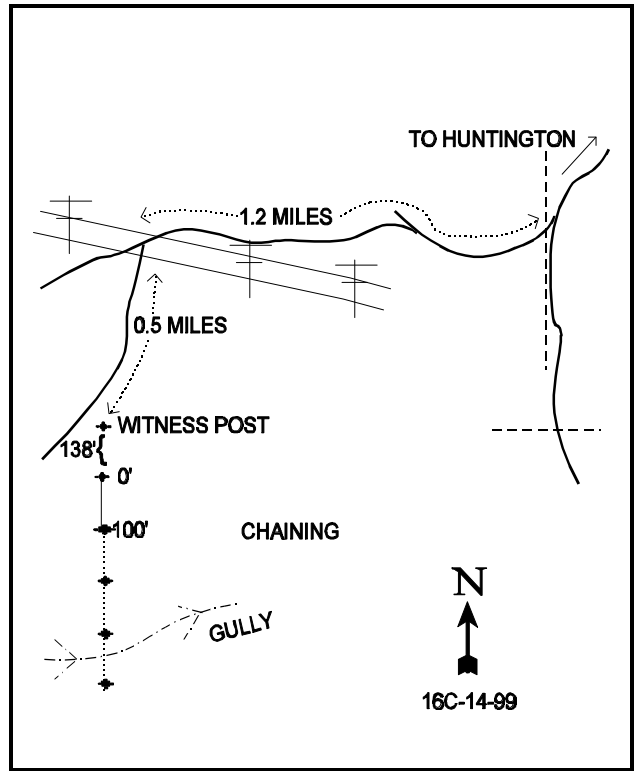
LOCATION DESCRIPTION

From Main Street in Huntington, go west on 400 North. Pass the old mill on the edge of town, cross the canal and continue 0.75 miles. Turn left off the old Huntington River road at a major fork. Proceed 1.55 miles, turn right, and go through a gate. Continue straight 0.2 miles to another fork and stay left for 1 mile. From here, stay straight for an additional 0.2 miles to a two-way fork. Turn left and go 0.5 miles to a witness post on the left side of the road in the chaining. The frequency baseline start 138 feet south of the witness post. The 18" tall fencepost marking the 0-foot baseline has browse tag #9012 attached.



Map Name: Red Point

Township 17S, Range 8E, Section 20



Diagrammatic Sketch

UTM 4353803.603 N, 495895.797 E

DISCUSSION

Trend Study No. 16C-14 (31-12)

The Red Point study is located in a chaining at the base of East Mountain, below the prominent Red Point. The 300 acre bench was chained and seeded in 1973. The large bench where the study is located slopes gradually (8-9%) with a northeast aspect. The elevation is 6,400 feet. The fractured sandstone bedrock allows true mountain mahogany and green ephedra to become well established on an otherwise shallow soil.

Overall declining trends and poor range condition observed in the West Huntington allotment led the BLM to recommend changes in grazing, eventually resulting in a 50% reduction in spring AUM'S and closure of one pasture. As part of the Huntington Canyon winter range, deer and elk utilize the area in winter. Pellet group data from 1999 estimate 25 deer, 55 elk, and 4 cow days use/acre (62 ddu/ha, 136 edu/ha, 10 cdu/ha). All cow sign appeared to be from last season. Some of the deer pellet groups were fresh and about 12 deer were observed near the site in 1999. All elk pellet groups appeared to be from winter use. Rabbits are common and several Cottontails were seen.

Soil at the site is relatively deep with the effective rooting depth estimated at 16 inches. Soil texture is a loam with a slightly alkaline pH (7.6). Phosphorus is low at 4.1 ppm. Values below 10 ppm may limit normal plant growth and development. There are large numbers of boulders, smaller rocks, and pavement on the surface. These rocks are mostly sandstone and many have white calcite deposits. Rock and pavement currently ('99) produce 27% cover, while litter cover is estimated at 35%. Most of the litter consists of large debris from the chaining. Soil pedestaling and localized surface water movement is evident, but erosion is minimal due to the excessively well-drained nature of the soil, although there is evidence of erosion during high intensity summer storms.

An even-aged stand of surviving pinyon and juniper have regrown on the chained bench. Point-center quarter data from 1994 estimated 198 trees/acre, with 55% being pinyon and 45% being juniper. In 1999, mature pinyon and juniper trees averaged 10 to 12 feet in height. They provide 42% of the browse cover and overhead canopy cover averages 4%. Point quarter data from 1999 estimate 141 pinyon and 99 juniper trees/acre. Average diameter of pinyon is 2.5 inches while juniper averages 1.8 inches.

Green ephedra, slenderbush eriogonum, true mountain mahogany, and antelope bitterbrush provide the bulk of the winter forage on this site. None of these species are very abundant however. Both green ephedra and slenderbush eriogonum showed very light hedging in 1994, and moderate to heavy use in 1999. True mountain mahogany displays consistent moderate to heavy browsing since 1988. Yucca is very common with no utilization evident. The yuccas stiff, sharp leaves also protect the closely associated grasses from use.

The herbaceous understory is poor. Grasses produced only 10% cover in 1994 and 12% in 1999. The predominant grass is crested wheatgrass which currently ('99) provides 95% of the grass cover. A few other species are present but occur rarely. Forbs are uncommon and provide very little cover or forage. Nearly all herbaceous species have steadily declined in nested frequency since 1988.

1994 TREND ASSESSMENT

Ground cover characteristics have improved on the site since 1988. Percent bare ground has declined considerably while litter cover has increased. The only negative aspect of the soil trend is the decline in nested frequency of the herbaceous understory. Trend for soil is considered slightly up. Browse are not very abundant on the site but the trend is stable. Changes in density of true mountain mahogany and slenderbush eriogonum are mostly due to the greatly increased sample size used in 1994. Trend for the herbaceous understory is slightly down due to a decline in sum nested frequency of grasses and forbs. However, the dominant grass, crested wheatgrass, did not decline significantly.

TREND ASSESSMENT

soil - slightly up

browse - stable

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is stable. Percent bare ground has remained similar to 1994 estimates, but litter cover declined and percent cover of rock and pavement increased. Some localized erosion is occurring, however it is not a serious problem due to the gentle terrain. Trend for browse is stable. Densities for the key species, true mountain mahogany and green ephedra, are stable and vigor is normal. Utilization of mahogany has remained moderate to heavy, while ephedra, dwarf rabbitbrush, and bitterbrush display heavier use compared to 1994. Trend for the herbaceous understory is stable yet poor. Sum of nested frequency of grasses has increased slightly, with nested frequency of forbs has declined slightly. Crested wheatgrass dominates the herbaceous understory by providing 91% of the herbaceous cover. It has increased slightly in nested frequency since 1994, but not significantly. Forbs are rare and have steadily declined in frequency since 1988. Overall, grasses and forbs provide only about 12% cover.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable but poor

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 14

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	270	265	284	91	88	94	8.66	11.28
G	Agropyron intermedium	_b 50	_a 1	_a -	22	1	-	.00	-
G	Elymus junceus	_a 2	_b 16	_{ab} 9	1	7	4	.35	.25
G	Oryzopsis hymenoides	24	25	20	12	14	7	.52	.37
G	Sitanion hystrix	_b 45	_a 1	_a -	22	1	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		391	308	313	148	111	105	9.54	11.91
Total for Grasses		391	308	313	148	111	105	9.54	11.91
F	Arabis perennans	-	2	5	-	1	2	.00	.01
F	Caulanthus crassicaulis	-	1	-	-	1	-	.00	-
F	Chenopodium album (a)	-	1	-	-	1	-	.01	-
F	Cryptantha spp.	_c 74	_b 45	_a 17	33	21	8	.65	.35
F	Descurainia pinnata (a)	-	10	3	-	4	1	.02	.00
F	Eriogonum alatum	-	-	-	-	-	-	.00	-
F	Erigeron spp.	4	-	-	1	-	-	-	-
F	Eriogonum spp.	-	4	2	-	2	2	.03	.01
F	Euphorbia spp.	_c 137	_b 41	20	55	18	9	.17	.04

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Gilia congesta</i>	4	-	-	1	-	-	-	-
F	<i>Hymenoxys richardsonii</i>	-	-	5	-	-	2	-	.01
F	<i>Lappula occidentalis</i> (a)	-	-	3	-	-	1	-	.00
F	<i>Leucelene ericoides</i>	a-	b3	ab3	-	1	1	.15	.03
F	<i>Lepidium montanum</i>	2	-	-	1	-	-	-	-
F	<i>Machaeranthera grindelioides</i>	-	1	-	-	1	-	.00	-
F	<i>Medicago sativa</i>	b5	a-	a-	3	-	-	.00	-
F	<i>Penstemon cyananthus</i>	b32	a2	a2	19	2	1	.03	.00
F	<i>Salsola iberica</i> (a)	-	5	-	-	2	-	.01	-
F	<i>Schoenrambe linifolia</i>	10	4	4	6	3	2	.02	.04
F	<i>Thelesperma subnudum</i>	15	16	-	7	6	-	.08	-
F	<i>Townsendia incana</i>	b6	ab6	a5	4	2	2	.01	.01
F	Unknown forb-perennial	3	-	-	1	-	-	-	-
Total for Annual Forbs		0	16	6	0	7	2	0.03	0.00
Total for Perennial Forbs		292	125	63	131	58	29	1.17	0.51
Total for Forbs		292	141	69	131	65	31	1.21	0.52

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

BROWSE TRENDS --

Herd unit 16C, Study no: 14

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	<i>Ceratoides lanata</i>	0	0	-	-
B	<i>Cercocarpus montanus</i>	6	6	.63	1.28
B	<i>Chrysothamnus nauseosus</i>	0	1	-	-
B	<i>Ephedra viridis</i>	15	15	1.08	4.49
B	<i>Eriogonum microthecum</i>	11	4	.00	.03
B	<i>Juniperus osteosperma</i>	0	6	.93	3.20
B	<i>Opuntia</i> spp.	1	0	-	-
B	<i>Pinus edulis</i>	0	13	3.31	4.06
B	<i>Purshia tridentata</i>	1	3	.03	-
B	<i>Yucca harrimaniae</i>	28	33	2.65	4.41
Total for Browse		62	81	8.65	17.49

CANOPY COVER --

Herd unit 16C, Study no: 14

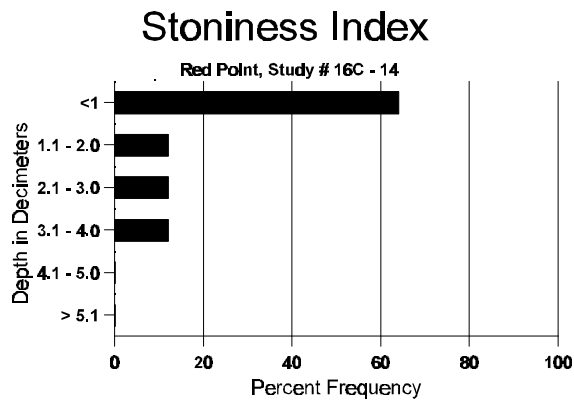
Species	Percent Cover '09
<i>Juniperus osteosperma</i>	2
<i>Pinus edulis</i>	2

BASIC COVER --
Herd unit 16C, Study no: 14

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	282	307	3.50	19.52	27.82
Rock	251	234	14.25	13.35	18.65
Pavement	274	258	7.00	4.23	8.49
Litter	382	363	37.25	41.90	34.64
Cryptogams	10	40	0	.02	1.52
Bare Ground	248	244	38.00	17.68	17.72

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 14, Study Name: Red Point

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.1	34.6 (17.4)	7.6	46.7	29.4	23.8	3.4	4.1	102.4	0.9



PELLET GROUP DATA --
Herd unit 16C, Study no: 14

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	30	56	n/a
Elk	35	40	55 (136)
Deer	19	33	25 (62)
Cattle	-	4	4 (10)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 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																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	11	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			
Cercocarpus montanus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	1	-	-	-	-	-	-	2	-	-	-	40			2
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	-	2	3	1	-	-	-	-	-	5	1	-	-	400	50	41	6
	94	-	3	1	-	-	-	-	-	-	4	-	-	-	80	46	69	4
	99	-	2	1	-	-	1	1	-	-	5	-	-	-	100	54	58	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		33%			50%			00%			-70%							
'94		50%			33%			00%			+14%							
'99		29%			29%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	400	Dec:	-			
												'94	120		-			
												'99	140		-			
Chrysothamnus nauseosus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	10	0
	99	-	-	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%										
'94		00%			00%			00%										
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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				
Ephedra viridis																		
Y	88	1	5	1	-	-	-	-	-	-	7	-	-	-	466		7	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	2	-	1	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	6	-	-	-	-	-	-	-	6	-	-	-	400	24	30	6
	94	22	-	-	-	-	-	-	-	-	22	-	-	-	440	38	56	22
	99	9	12	-	-	1	-	-	-	-	22	-	-	-	440	37	54	22
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		85%			08%			00%			-40%							
'94		00%			00%			00%			-4%							
'99		52%			04%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	866	Dec:	-				
											'94	520		-				
											'99	500		-				
Eriogonum microthecum																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
	99	4	-	3	-	-	-	-	-	-	7	-	-	-	140		7	
M	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333	2	2	5
	94	35	-	-	-	-	-	-	-	-	35	-	-	-	700	3	4	35
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	3	2
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	3	4	-	-	-	-	7	140		7		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	60		3		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+58%							
'94		00%			00%			00%			-75%							
'99		00%			38%			44%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	533	Dec:	0%				
											'94	1280		0%				
											'99	320		44%				

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	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	200	Dec:	-				
											'94	0		-				
											'99	120		-				
Opuntia spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8	11	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			50%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	40		50%				
											'99	0		0%				
Pinus edulis																		
Y	88	5	-	-	-	-	-	1	-	-	6	-	-	-	400			6
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	2	-	-	-	-	-	5	-	-	-	100			5
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	7	-	-	1	-	-	-	-	-	7	-	1	-	160	23	26	8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	400	Dec:	-				
											'94	0		-				
											'99	260		-				

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																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	1	-	-	-	-	-	-	-	1	-	-	-	20	19	20	1	
	99	6	-	-	-	-	-	-	-	-	-	-	-	120	22	29	6	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	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%			-70%							
'94		00%			00%			00%			+88%							
'99		00%			25%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'94	20		0%			
												'99	160		13%			
Yucca harrimaniae																		
Y	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	6	-	-	-	-	-	-	-	6	-	-	-	120		6		
M	88	24	-	-	-	-	-	-	-	24	-	-	-	1600	17	15	24	
	94	84	-	-	-	-	-	-	-	82	-	2	-	1680	14	21	84	
	99	97	-	-	-	-	-	-	-	97	-	-	-	1940	14	18	97	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	2	-	-	-	-	-	-	-	1	-	-	1	40		2		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
	99	-	-	-	-	-	-	-	-	-	-	-	-	100		5		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-21%							
'94		00%			00%			02%			+20%							
'99		00%			00%			.95%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	2133	Dec:	0%			
												'94	1680		0%			
												'99	2100		2%			

Trend Study 16C-15-99

Study site name: Howard FS Chaining .

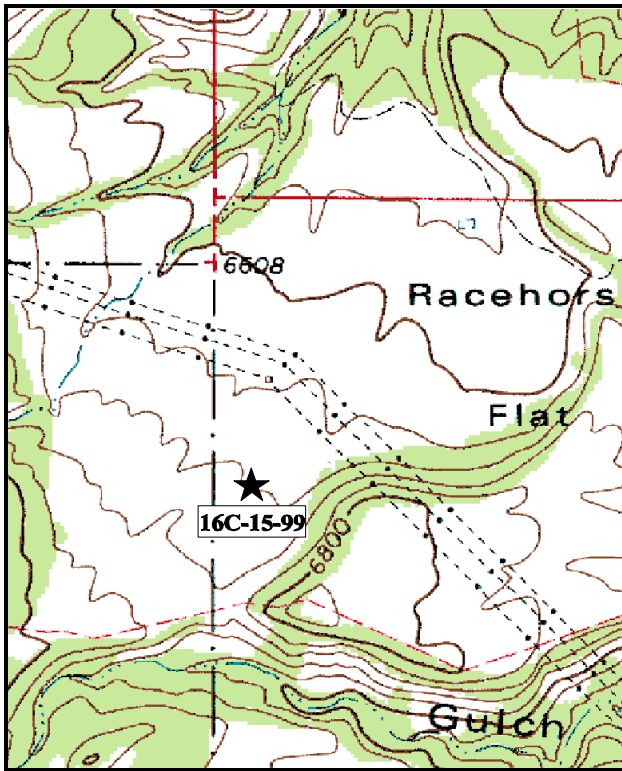
Range type: Chained, Seeded P-J .

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).

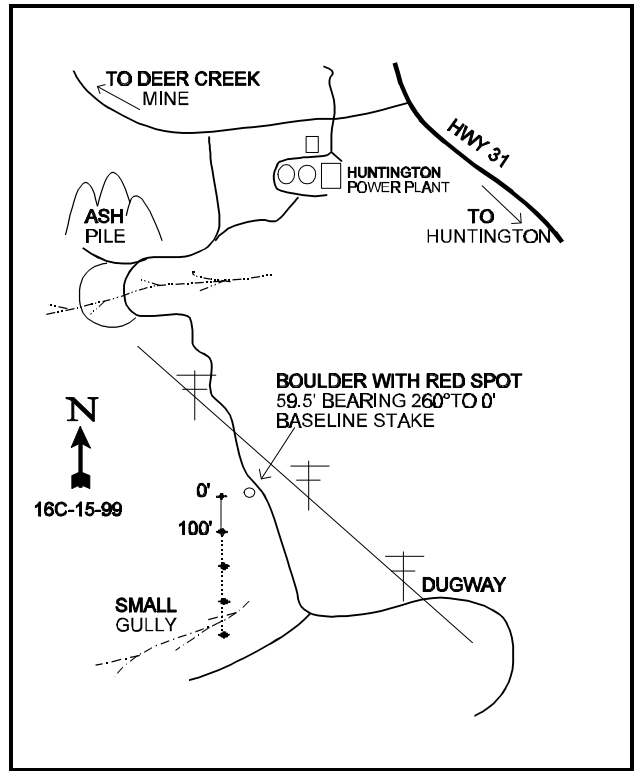
LOCATION DESCRIPTION

The shortest route to reach this study area is through the Huntington Power Plant. From the main building, go through the plant to the SE gate. Continue on the paved road 0.85 miles to a fork. The plant's ash pile is on the right. Bear left to a bridge or continue around the head of a small draw, following the road southeast towards the powerline. About 0.15 miles from the bridge there is an old fence. Go 0.1 miles to another fence. Continue up through the chaining, past the powerlines, for 0.25 miles to a large white rock with a red-painted spot, on the right side of the road. From the rock, walk 60 feet west to the first baseline stake. The fencepost is marked with browse tag #7881. The other study stakes run south at 100 foot intervals.



Map Name: Red Point

Township 17S, Range 8E, Section 7



Diagrammatic Sketch

UTM 4356668.380 N, 493455.281 E

DISCUSSION

Trend Study No. 16C-15 (31-13)

Located on the BLM side of the fence on Racehorse Flat, by an area known as the Howard-Forest Service Chaining, this study site samples a pinyon-juniper/black sagebrush range site that was chained and seeded in the early 1970's. A variety of browse were seeded, including a palatable ecotype of basin big sagebrush. Like the previous study, it is in the West Huntington Cattle Allotment where reductions have been made in spring cattle grazing. This chaining appears to receive light use by cattle with abundant sign of deer winter use. Pellet group data from 1999 estimate 42 deer, 1 elk and 15 cow days use/acre (104 ddu/ha, 3 edu/ha, 37 cdu/ha). There was also some old sheep sign. A small percentage of the cow pats were fresh but most appeared to be from last season.

The study site has a northwest aspect with a 3-5% slope and an elevation of 6,650 feet. The soil is relatively shallow and very rocky with a high percentage of boulders on the surface and below. Effective rooting depth is estimated at 13 inches. Soil texture is a sandy clay loam with a slightly alkaline pH (7.6). Phosphorus levels are marginal at 6.3 ppm. Values less than 10 ppm can limit normal plant growth and development. There are areas of pavement concentration and small gullies, but abundant chaining debris and fair grass cover provide protection from serious soil loss.

The key browse species on the flat consist of a mixture of basin big sagebrush, black sagebrush, and Wyoming big sagebrush. There is apparently some hybridizing occurring between the Wyoming big sagebrush and the lower growing black sagebrush. All sagebrush species individually show evidence of moderate and some heavy use. The mature basin big sagebrush were tall, with good vigor, although there were few young or seedlings. Black sagebrush population also contains few seedling or young plants. Wyoming big sagebrush is the most common shrub on the site. It was identified as basin big sagebrush in 1988. Overall sagebrush density has decreased since 1988, due to a major decline in the number of young plants. Drought conditions combined with increasing competition with pinyon and juniper trees probably caused this mortality.

Pinyon and juniper appear to be decreasing slightly on the site with point-center quarter data from 1994 estimating 445 trees/acre, with 23% pinyon and 77% juniper. Data from 1999 estimate 411 trees/acre. Density of juniper is estimated at 321 trees/acre with an average diameter of 2.1 inches. Pinyon number 90 trees/acre with an average diameter of 5 inches. Pinyon is around 10 feet in height while juniper averages around 6 feet. Neither species is producing many cones.

Other, less abundant preferred browse found on the site include, white rubber rabbitbrush, four-wing saltbush, and true mountain mahogany. True mountain mahogany is mostly unavailable, moderately to heavily used, and in poor vigor. White rubber rabbitbrush is fairly abundant but appears to be declining. It currently ('99) displays moderate to heavy use and declining recruitment, poor vigor, and increasing decadency.

The herbaceous understory is poor and produces less than 6% cover. The seeded crested wheatgrass is the only abundant herbaceous species on the site. It provided 96% of the grass cover and 82% of the herbaceous cover in 1994. By 1999, crested wheatgrass accounted for 92% of the grass cover and 84% of the total herbaceous cover. Intermediate wheatgrass, smooth brome, Indian ricegrass, bottlebrush squirreltail, and Russian wildrye were all encountered in 1988, however only Russian wildrye and few Indian ricegrass plants were found in 1999. Native forbs are rare, except for a *Cryptantha spp.* and a few annual mustards.

1994 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1988, with the exception of litter cover which has declined. This is primarily the result of diminishing chaining debris. Percent bare ground has remained fairly

stable, although increasing slightly. Soil trend is still considered stable. The browse trend is down slightly due to the lack of seedlings and the large decline in young plants. This trend will most likely be reversed when normal precipitation patterns return. Trend for herbaceous plants is slightly down due to a decline in the sum of nested frequencies for grasses and forbs.

TREND ASSESSMENT

soil - stable

browse - slightly down, very little recruitment

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is stable due to similar ground cover characteristics compared to those of 1994. Trend for browse is stable with respect to sagebrush. Density of all sagebrush species combined has remained similar to 1994 estimates. Seedlings and young plants are still limited, but at slightly higher levels compared to 1994. It appears that the basin big sagebrush are not doing as well as the black and Wyoming big sagebrush. Nearly 1/3 of the basin big sagebrush sampled display poor vigor and percent decadence has increased from 10% in 1994 to 32% currently. Rubber rabbitbrush is also showing signs of decline. It's population density has declined 36%, with 34% of the population displaying poor vigor, and percent decadence increase from 11% to 54%. No seedlings have been found on the site since 1988 and the proportion of young plants has steadily declined from 90% in 1988, to 22% in 1994, and only 9% by 1999. Released pinyon and juniper trees appear to be increasing in size. They provided 52% of the browse cover in 1994 and 61% in 1999. Taking all of these factors into consideration, trend for browse is considered stable since the key species, Wyoming big sagebrush, appears to have a stable population, the one that is best adapted to the drought conditions. Use is heavier than in 1994, but vigor has improved slightly, young recruitment has improved, and percent decadence has remained similar (23% vs 21%). This trend will change for the worse as the pinyon and juniper trees increase in size and density. Trend for the herbaceous understory is up slightly for perennial grasses but down for forbs. Overall the herbaceous understory is poor with grasses and forbs producing only about 6% cover in 1994 and 1999. Crested wheatgrass is the dominant species. It currently provides 92% of the grass cover and 84% of the herbaceous cover. It declined significantly in nested frequency between 1988 and 1994, but it has increased significantly since 1994. Forbs are rare and provide less than 1/2 of 1% cover. Trend is considered up slightly.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up slightly but poor

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 15

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	_b 246	_a 186	_b 233	85	77	83	5.15	4.95
G	Agropyron intermedium	6	2	-	3	1	-	.00	-
G	Bromus inermis	4	-	-	3	-	-	-	-
G	Elymus junceus	_b 35	_a 9	_a 11	16	3	6	.18	.42
G	Oryzopsis hymenoides	7	5	3	3	2	1	.04	.01
G	Poa fendleriana	-	1	-	-	1	-	.00	-
G	Sitanion hystrix	_b 28	_a -	_a -	12	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		326	203	247	122	84	90	5.39	5.39
Total for Grasses		326	203	247	122	84	90	5.39	5.39
F	Arabis spp.	15	4	1	6	2	1	.01	.00
F	Chenopodium album (a)	-	_b 7	_a -	-	3	-	.01	-
F	Cirsium spp.	1	-	-	1	-	-	-	-
F	Cryptantha spp.	_b 100	_{ab} 67	_a 36	45	31	19	.58	.32
F	Descurainia pinnata (a)	-	_b 21	_a -	-	10	-	.05	-
F	Draba spp. (a)	-	1	-	-	1	-	.00	-
F	Eriogonum umbellatum	16	18	8	9	8	3	.04	.04
F	Medicago sativa	3	-	-	2	-	-	-	-
F	Penstemon spp.	18	9	12	9	7	6	.03	.05
F	Ranunculus testiculatus (a)	-	-	1	-	-	1	-	.00
F	Salsola iberica (a)	-	_b 23	_a -	-	9	-	.09	-
F	Schoenrambe linifolia	_b 16	_{ab} 13	_a 5	11	6	3	.05	.01
F	Streptanthus cordatus	-	-	2	-	-	1	-	.00
F	Taraxacum officinale	2	-	-	1	-	-	-	-
F	Townsendia incana	2	-	-	2	-	-	-	-
F	Unknown forb-perennial	4	-	-	3	-	-	-	-
Total for Annual Forbs		0	52	1	0	23	1	0.16	0.00
Total for Perennial Forbs		177	111	64	89	54	33	0.72	0.44
Total for Forbs		177	163	65	89	77	34	0.89	0.44

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

BROWSE TRENDS --
Herd unit 16C, Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia nova	16	10	.45	.18
B	Artemisia tridentata tridentata	10	16	.85	.75
B	Artemisia tridentata wyomingensis	39	34	2.58	2.59
B	Atriplex canescens	1	0	-	-
B	Cercocarpus montanus	2	2	-	-
B	Chrysothamnus nauseosus	-	-	-	.74
B	Chrysothamnus nauseosus albicaulis	37	28	1.36	1.12
B	Juniperus osteosperma	0	24	2.03	3.29
B	Opuntia spp.	2	0	-	-
B	Pinus edulis	0	8	3.84	5.18
B	Pinus edulis chained	0	0	-	-
B	Purshia tridentata	0	0	-	-
Total for Browse		107	122	11.14	13.88

CANOPY COVER --
Herd unit 16C, Study no: 15

Species	Percent Cover '09
Juniperus osteosperma	2
Pinus edulis	5

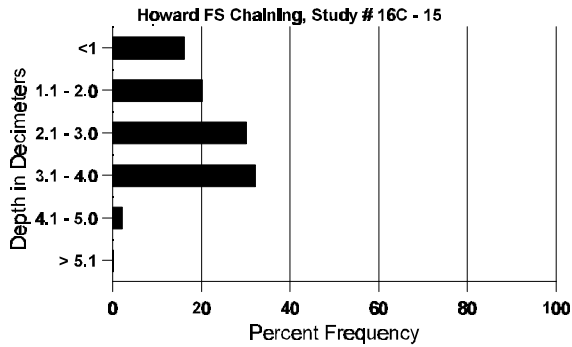
BASIC COVER --
Herd unit 16C, Study no: 15

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	253	254	3.25	17.63	18.36
Rock	256	184	12.25	10.96	8.97
Pavement	304	276	4.00	2.89	7.18
Litter	343	379	52.50	29.82	36.51
Cryptogams	10	41	0	.03	.81
Bare Ground	301	301	28.00	29.45	30.02

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 15, Study Name: Howard FS Chaining

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.0	55.6 (13.9)	7.6	54.7	23.4	21.8	5.1	6.3	80.0	0.8

Stoniness Index



PELLET GROUP DATA -- Herd unit 16C, Study no: 15

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) 09
	04	09	
Sheep	-	3	12 (30)
Rabbit	11	53	n/a
Elk	4	5	1 (2)
Deer	62	51	42 (104)
Cattle	1	5	15 (37)

BROWSE CHARACTERISTICS -- Herd unit 16C, 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			
Artemisia nova																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	-	-	-	-	40		2
M	88	1	-	-	-	-	-	-	-	-	-	-	-	66	6	14	1
	94	15	20	6	-	-	-	-	-	-	-	-	-	820	8	20	41
	99	1	13	5	-	-	2	-	-	-	-	-	-	420	6	16	21
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	4	4	2	-	-	-	-	-	-	-	-	-	200			10
	99	-	3	-	-	1	-	-	-	-	-	-	-	80			4
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>					
'88		00%			00%			00%				+94%					
'94		47%			16%			04%				-47%					
'99		63%			26%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%		
												'94	1020		20%		
												'99	540		15%		

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>Artemisia tridentata tridentata</i>																	
S	88	20	-	1	-	-	-	7	-	-	28	-	-	-	1866		28
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	88	44	12	-	3	-	-	8	-	-	67	-	-	-	4466		67
	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5
M	88	3	2	2	-	-	-	-	-	-	4	-	3	-	466	30 28	7
	94	5	2	-	-	-	-	-	-	-	7	-	-	-	140	41 46	7
	99	2	5	1	2	-	-	-	-	-	10	-	-	-	200	31 34	10
D	88	1	1	1	-	-	-	-	-	-	2	-	1	-	200		3
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	99	5	1	-	1	-	-	-	-	-	1	-	-	6	140		7
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		19%			04%			05%			-96%						
'94		20%			00%			00%			+55%						
'99		27%			05%			27%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	5132	Dec:	4%			
											'94	200		10%			
											'99	440		32%			
<i>Artemisia tridentata wyomingensis</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	99	7	2	-	-	-	-	-	-	-	9	-	-	-	180		9
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	94	34	14	-	1	-	-	-	-	-	47	-	-	2	980	21 25	49
	99	18	29	8	2	-	2	-	-	-	58	1	-	-	1180	17 24	59
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	10	2	2	1	-	-	-	-	-	3	-	-	12	300		15
	99	4	6	4	-	1	2	1	-	-	9	-	1	8	360		18
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	260		13
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		25%			03%			22%			+24%						
'99		44%			19%			10%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%			
											'94	1300		23%			
											'99	1720		21%			

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				
Atriplex canescens																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	30	29	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	25	18	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	20		-			
												'99	0		-			
Cercocarpus montanus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	19	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	1	1	-	-	-	1	-	-	1	40			2
	99	-	1	-	-	1	-	-	-	-	-	-	-	2	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		50%			50%			50%			+ 0%							
'99		100%			00%			100%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	40		100%			
												'99	40		100%			
Chrysothamnus nauseosus albicaulis																		
S	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	15	11	1	-	-	-	-	-	-	25	-	1	1	1800			27
	94	9	1	1	1	-	-	-	-	-	12	-	-	-	240			12
	99	2	-	-	-	-	1	-	-	-	2	-	-	1	60			3
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	29	21	1
	94	34	1	1	1	-	-	-	-	-	37	-	-	-	740	23	25	37
	99	1	3	3	-	4	2	-	-	-	11	1	1	-	260	37	36	13
D	88	1	-	1	-	-	-	-	-	-	2	-	-	-	133			2
	94	4	1	1	-	-	-	-	-	-	5	-	-	1	120			6
	99	1	7	2	1	-	6	2	-	-	9	-	-	10	380			19
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		37%			07%			07%			-45%							
'94		05%			05%			02%			-36%							
'99		40%			40%			34%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	1999	Dec:	7%			
												'94	1100		11%			
												'99	700		54%			

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	88	13	-	-	1	-	-	-	-	-	11	-	3	-	933		14
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	21	-	-	-	-	-	-	-	-	19	-	1	1	420		21
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	6	-	-	-	-	-	-	-	5	-	1	-	120	-	6	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			21%									
'94		00%			00%			00%									
'99		00%			00%			11%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	933	Dec:	-			
											'94	0		-			
											'99	540		-			
Opuntia spp.																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	4	-	-	-	-	-	-	-	4	-	-	-	80	3	12	4
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	80		-			
											'99	0		-			
Pinus edulis																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	3	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	7	-	-	-	-	-	-	-	7	-	-	-	140	-	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	200	Dec:	-			
											'94	0		-			
											'99	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				
Pinus edulis chained																		
D	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	100%			
												'94	0		0%			
												'99	0		0%			
Purshia tridentata																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	32	0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			

Trend Study 16C-17-99

Study site name: Middle Mountain .

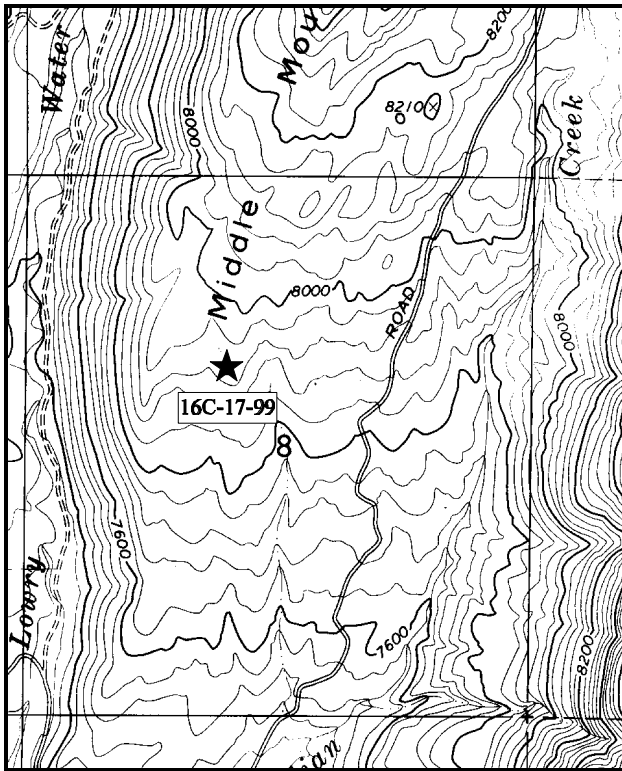
Range type: Chained, Seeded P-J .

Compass bearing: frequency baseline 345°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

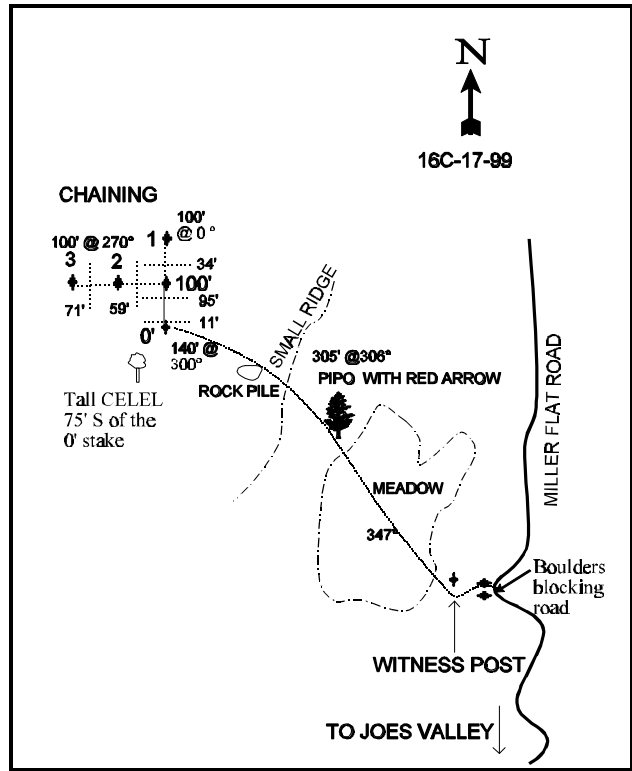
LOCATION DESCRIPTION

From the paved highway at the north end of Joes Valley Reservoir, proceed north on the Upper Joes Valley road (Millers Flat road) for 1.2 miles. Stay right at the fork and continue 1.2 miles to another fork. Stay right (on the Indian Creek side) and go 1.1 miles to a faint turnoff to the left. Park by the witness post which is about 75 yards off the main road. From the witness post, walk NNW to the upper end of the meadow to the lighting-scarred Ponderosa with a red arrow painted on it. From the pine tree walk NW 100 yards to a pile of rocks painted red. From the rock pile, walk NW (300/) for 140 feet to the 0-foot baseline stake. The 1st stake has a red browse tag #9018 attached.



Map Name: Joes Valley Reservoir

Township 17S, Range 6E, Section 8



Diagrammatic Sketch

UTM 4357009.311 N, 476952.638 E

DISCUSSION

Trend Study No. 16C-17 (31-15)

The Middle Mountain site is a diverse, productive area of high elevation range used by both deer and elk as winter-spring range. The study is located at the upper end of a small (approximately 200 acre) chaining on a slope where the pinyon and juniper trees were never very dense. It is more of a mixed mountain brush site. The gradual, southwest-facing slope allows for use during most winters. The slope is open, but nearby stands of Ponderosa pine, aspen, and mature curlleaf mountain mahogany on the ridge provide excellent cover and additional foraging opportunities. The elevation is 8,100 feet. The lower end of the chaining is dominated by grass, where there is less sign of big game use. Pellet group data from 1999 estimate 26 deer and 35 elk days use/acre (64 ddu/ha and 87 edu/ha). Sheep sign was also encountered and some animals could be heard in the area. One moose pellet group was also encountered on the site.

There are some sandstone rocks on the surface, but overall the soil is moderately deep and free of rocks. Effective rooting depth is estimated at just over 15 inches. Depth measurements were limited by a compacted soil horizon. The soil has a clay to sandy clay loam texture and a neutral pH (7.2). Phosphorus is very limited at just 2 ppm, the lowest reading of any site in 16C. Values less than 10 ppm can limit normal plant growth and development. There is little rock or pavement on the surface. There is some localized soil movement occurring on the site, including some small rills about 10 to 20 feet in length in places. There are no gullies however. A network of game trails that lack cover show signs of some active erosion.

The site supports a variety of desirable browse species including, mountain big sagebrush, black sagebrush, Utah serviceberry, and true mountain mahogany. Mountain big sagebrush and black sagebrush display moderate to heavy use, good vigor and low percent decadence. The population of black sagebrush has increased steadily since 1988 from 599 plants/acre to 2,480 in 1999. Mountain big sagebrush has declined slightly in density since 1988 (1,933 to 1,540 plants/acre). Other key preferred browse species are true mountain mahogany and Utah serviceberry. The true mountain mahogany population density has steadily increased since 1988. Mature plants average 2 to 2 ½ feet in height, show moderate to heavy use, and are in good vigor. Leader growth was excellent in 1999 at about 9 inches, but some of the new leaves were withered due to insect damage. Serviceberry is less abundant with an estimated density of 440 plants/acre in 1994 and 620 in 1999. The average mature plant has increased in height from about 1 foot in 1994 to nearly 3 feet by 1999. These shrubs have been heavily hedged in the past but currently ('99) show mostly light to moderate use and good vigor.

Some fair forage is provided by the numerous but small dwarf rabbitbrush whose population density was estimated at 5,240 plants/acre in 1994 and 4,760 in 1999. These shrubs provided 18% of the browse cover in 1994 and 19% in 1999. Additional forage is provided by small populations of curlleaf mahogany, antelope bitterbrush, and snowberry. Pinyon and juniper trees can be found scattered throughout the site in small numbers. Point quarter data from 1999 estimate 24 juniper and 20 pinyon trees/acre with average diameters of 3.1 and 1.6 inches respectively. A few white pine trees were also encountered.

The herbaceous understory is diverse and abundant. Salina wildrye is the dominant grasses. It provided 79% of the grass cover in 1994 and 77% in 1999. The only other common grass is prairie June grass. Forbs are also diverse and abundant. Common species include pussy toes, aster, bastard toadflax, Eaton fleabane, thistle, and desert phlox.

1994 TREND ASSESSMENT

Ground cover characteristics have changed considerable since 1988. Percent bare ground has more than tripled and litter cover has declined by 73%. Nested frequency of herbaceous vegetation has declined slightly, but it is still abundant. Trend for soil is down. The browse trend is currently stable. The key species

display stable population densities, reduced heavy utilization and good vigor. The herbaceous understory trend is stable. Sum of nested frequency for grasses have increased slightly, while those of forbs have declined slightly. This decline is due to drought conditions which have persisted over the past several years.

TREND ASSESSMENT

soil - down

browse - stable

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare ground from 44% to 39% and an increase in litter cover from 20% to 27%. Vegetative cover also increased from 30% to 39%. Trend for browse is up for serviceberry, black sagebrush, and true mountain mahogany. Densities of these key species have increased, vigor has improved, and percent decadence is lower. Heavy use is also lower on serviceberry and mahogany. Mountain big sagebrush is another key species which provides 23% of the shrub cover. Density has declined slightly since 1994, but vigor has improved and percent decadence has declined from 33% to 16%. Overall trend for browse is considered up slightly. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has increased slightly, but the frequency of the dominant species, Salina wildrye, is stable. The sum of nested frequency of perennial forbs has declined slightly, although cover of forbs has increased nearly three fold. However, 73% of the forb cover comes from pussy toes, thistle, and bastard toadflax.

TREND ASSESSMENT

soil - up slightly

browse - up slightly

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 17

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	44	50	33	18	18	16	1.40	.54
G	Carex spp.	_b 9	_a -	_a -	4	-	-	-	-
G	Elymus salina	244	258	264	83	88	90	11.48	11.38
G	Koeleria cristata	_a 52	_a 27	_b 110	21	12	43	.26	2.42
G	Poa fendleriana	_b 56	_c 76	_a 24	26	40	14	.86	.26
G	Poa secunda	_a -	_b 12	_b 22	-	5	8	.24	.14
G	Sitanion hystrix	-	-	2	-	-	1	-	.03
G	Stipa lettermani	_a -	_b 7	_a -	-	4	-	.21	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		405	430	455	152	167	172	14.47	14.80
Total for Grasses		405	430	455	152	167	172	14.47	14.80
F	Allium spp.	_b 54	_a -	_a -	25	-	-	-	-
F	Antennaria microphylla	_a 13	_a 14	_b 92	4	7	41	.25	1.83

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Androsace septentrionalis</i> (a)	-	a-	b13	-	-	6	-	.13
F	<i>Antennaria microphylla</i>	ab5	b14	a-	2	5	-	.10	-
F	<i>Arabis</i> spp.	-	3	-	-	1	-	.00	-
F	<i>Astragalus convallarius</i>	-	2	-	-	1	-	.00	-
F	<i>Aster</i> spp.	a54	b102	a38	19	38	16	.56	.28
F	<i>Astragalus</i> spp.	2	5	7	2	4	4	.02	.19
F	<i>Castilleja linariaefolia</i>	5	-	4	2	-	2	-	.01
F	<i>Calochortus nuttallii</i>	-	-	3	-	-	1	-	.00
F	<i>Cirsium</i> spp.	105	94	98	47	46	47	.68	4.07
F	<i>Comandra pallida</i>	b60	a35	c108	28	17	45	.13	2.89
F	<i>Crepis acuminata</i>	5	1	-	3	1	-	.00	-
F	<i>Cryptantha</i> spp.	2	4	-	1	2	-	.01	-
F	<i>Cymopterus</i> spp.	-	5	-	-	2	-	.01	-
F	<i>Erigeron eatonii</i>	b159	a79	a54	66	38	26	.42	.30
F	<i>Eriogonum umbellatum</i>	2	7	-	1	2	-	.03	-
F	<i>Hymenopappus filifolius</i>	a6	ab20	b24	4	11	11	.30	.52
F	<i>Lesquerella</i> spp.	-	-	2	-	-	1	-	.03
F	<i>Lomatium grayi</i>	b38	ab2	a-	17	1	-	.00	-
F	<i>Orthocarpus</i> spp. (a)	-	a-	b21	-	-	12	-	.18
F	<i>Penstemon caespitosus</i>	76	66	-	37	28	-	.66	-
F	<i>Penstemon lentus</i>	4	-	-	2	-	-	-	-
F	<i>Phlox austromontana</i>	a14	b34	ab28	7	18	16	.77	.82
F	<i>Polygonum douglasii</i> (a)	-	3	-	-	1	-	.00	-
F	<i>Senecio multilobatus</i>	3	-	-	1	-	-	-	-
F	<i>Sphaeralcea coccinea</i>	10	24	20	6	10	8	.10	.11
F	<i>Taraxacum officinale</i>	b8	a-	a-	6	-	-	-	.03
Total for Annual Forbs		0	3	34	0	1	18	0.00	0.31
Total for Perennial Forbs		625	511	478	280	232	218	4.08	11.12
Total for Forbs		625	514	512	280	233	236	4.09	11.43

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

BROWSE TRENDS --
Herd unit 16C, Study no: 17

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	20	14	.64	.86
B	Artemisia nova	41	61	2.90	4.92
B	Artemisia tridentata vaseyana	50	47	1.99	4.48
B	Cercocarpus ledifolius	2	1	-	-
B	Cercocarpus montanus	16	25	1.57	3.73
B	Chrysothamnus depressus	68	72	2.13	3.63
B	Chrysothamnus nauseosus	0	0	-	-
B	Chrysothamnus viscidiflorus	5	4	.18	.03
B	Gutierrezia sarothrae	53	26	1.48	.39
B	Opuntia spp.	3	5	.01	.00
B	Pinus edulis	0	3	-	.38
B	Purshia tridentata	2	2	-	.00
B	Quercus gambelii	0	0	-	-
B	Symphoricarpos oreophilus	13	10	.84	.82
B	Tetradymia canescens	0	0	-	-
Total for Browse		273	270	11.76	19.25

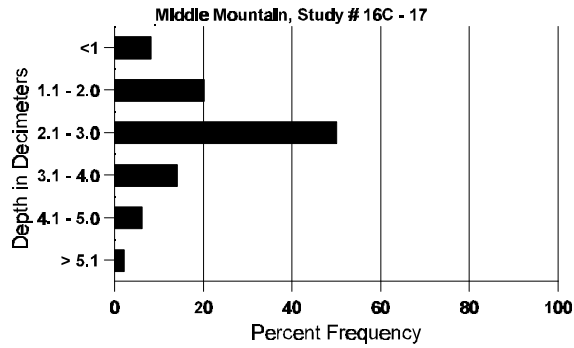
BASIC COVER --
Herd unit 16C, Study no: 17

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	340	346	5.75	29.73	39.15
Rock	45	35	6.50	2.62	2.79
Pavement	13	24	0	.03	.09
Litter	370	361	74.25	19.81	27.38
Cryptogams	23	23	0	.60	.55
Bare Ground	354	324	13.50	44.09	38.95

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 17, Study Name: Middle Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.2	53.2 (17.0)	7.2	44.4	13.8	41.8	1.4	2.0	76.8	0.6

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 17

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Sheep	-	2	11 (27)
Rabbit	9	30	n/a
Elk	43	21	35 (87)
Deer	18	9	26 (64)
Cattle	1	-	0

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 17

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	88	-	-	1	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	11	1	24	-	-	-	-	-	-	32	-	4	-	1200		36	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	15	4	1	1	1	-	1	-	-	23	-	-	-	460		23	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	3	4	5	2	1	1	2	-	-	18	-	-	-	360	11 15	18	
	99	4	3	1	-	-	-	-	-	-	8	-	-	-	160	35 30	8	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	1	1	-	-	-	-	-	-	1	-	-	1	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		03%			67%			11%			-63%							
'94		27%			32%			05%			+29%							
'99		26%			06%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	1200	Dec:	0%				
											'94	440		9%				
											'99	620		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 nova</i>																			
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	99	6	-	-	-	-	-	-	-	6	-	-	-	120		6			
Y	88	9	1	-	-	-	-	-	-	9	-	-	1	333		10			
	94	25	1	1	-	-	-	-	-	27	-	-	-	540		27			
	99	12	2	-	-	-	-	-	-	14	-	-	-	280		14			
M	88	3	1	-	-	-	-	-	-	4	-	-	-	133	7	8	4		
	94	47	3	-	3	-	-	-	-	53	-	-	-	1060	8	19	53		
	99	34	32	19	1	6	3	-	-	95	-	-	-	1900	11	20	95		
D	88	-	3	1	-	-	-	-	-	4	-	-	-	133		4			
	94	8	6	-	-	-	-	-	-	9	-	-	5	280		14			
	99	5	5	4	-	1	-	-	-	10	-	-	5	300		15			
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2			
	99	-	-	-	-	-	-	-	-	-	-	-	-	180		9			
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>											
'88		28%		06%		06%		+68%											
'94		11%		01%		05%		+24%											
'99		37%		21%		04%													
Total Plants/Acre (excluding Dead & Seedlings)										'88	599	Dec:	22%						
										'94	1880		15%						
										'99	2480		12%						
<i>Artemisia tridentata vaseyana</i>																			
S	88	6	5	8	-	-	-	-	-	16	-	1	2	633		19			
	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2			
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2			
Y	88	8	4	-	-	-	-	-	-	11	-	-	1	400		12			
	94	4	1	-	-	-	-	-	-	5	-	-	-	100		5			
	99	11	2	-	-	-	-	-	-	12	-	1	-	260		13			
M	88	4	6	14	-	-	-	-	-	23	1	-	-	800	17	23	24		
	94	52	12	2	2	-	-	-	-	68	-	-	-	1360	14	25	68		
	99	25	16	8	1	-	2	-	-	52	-	-	-	1040	19	30	52		
D	88	4	5	12	-	1	-	-	-	19	-	-	3	733		22			
	94	16	17	3	-	-	-	-	-	22	-	-	14	720		36			
	99	3	4	1	1	-	3	-	-	8	-	-	4	240		12			
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	94	-	-	-	-	-	-	-	-	-	-	-	-	460		23			
	99	-	-	-	-	-	-	-	-	-	-	-	-	300		15			
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>											
'88		28%		45%		07%		+11%											
'94		28%		05%		13%		-29%											
'99		29%		18%		06%													
Total Plants/Acre (excluding Dead & Seedlings)										'88	1933	Dec:	38%						
										'94	2180		33%						
										'99	1540		16%						

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 ledifolius																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	1	-	-	-	-	-	-	-	2	-	-	-	40	14	18	2
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	38	32	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-50%							
'94		50%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	40		-			
												'99	20		-			
Cercocarpus montanus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	1	1	7	-	-	-	-	-	-	9	-	-	-	300			9
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	3	3	-	-	-	-	-	-	-	6	-	-	-	120			6
M	88	-	-	2	-	-	-	-	-	-	2	-	-	-	66	28	37	2
	94	1	6	18	-	-	-	-	-	-	25	-	-	-	500	19	37	25
	99	6	16	10	-	-	-	-	-	-	32	-	-	-	640	28	36	32
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	1	-	-	-	-	-	-	-	-	-	3	60			3
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		09%			82%			00%			+37%							
'94		21%			66%			10%			+24%							
'99		50%			26%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	366	Dec:	0%			
												'94	580		10%			
												'99	760		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 depressus																
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	3	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	88	28	16	11	-	-	-	-	-	55	-	-	-	1833		55
	94	13	-	-	-	-	-	-	-	13	-	-	-	260		13
	99	24	3	-	-	-	-	-	-	27	-	-	-	540		27
M	88	25	8	4	1	-	1	-	-	37	1	1	-	1300	4 10	39
	94	214	4	-	13	-	-	-	-	231	-	-	-	4620	3 8	231
	99	154	34	15	1	-	-	-	-	204	-	-	-	4080	4 11	204
D	88	-	1	1	-	-	-	-	-	2	-	-	-	66		2
	94	15	3	-	-	-	-	-	-	10	-	5	3	360		18
	99	4	3	-	-	-	-	-	-	6	-	-	1	140		7
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2
	99	1	-	-	-	-	-	-	-	1	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		26%			18%			01%			+39%					
'94		03%			00%			03%			- 9%					
'99		17%			06%			.42%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	3199	Dec:	2%			
										'94	5240		7%			
										'99	4760		3%			
Chrysothamnus nauseosus																
M	88	1	-	-	-	-	-	-	-	-	-	1	-	33	20 19	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		00%			00%			100%								
'94		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	33	Dec:	-			
										'94	0		-			
										'99	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	88	3	1	-	-	-	-	-	-	4	-	-	-	133		4	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	5	-	-	-	-	-	-	-	5	-	-	-	166	9	12	5
	94	4	-	-	-	-	-	-	-	4	-	-	-	80	7	8	4
	99	6	-	-	-	-	-	-	-	6	-	-	-	120	11	17	6
D	88	-	1	1	-	-	-	-	-	2	-	-	-	66			2
	94	1	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		18%			09%			00%			-73%						
'94		00%			00%			20%			+17%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	365	Dec:	18%				
										'94	100		20%				
										'99	120		0%				
Gutierrezia sarothrae																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	6	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	88	6	-	-	-	-	-	-	-	6	-	-	-	200		6	
	94	10	-	-	-	-	-	-	-	10	-	-	-	200		10	
	99	14	-	-	-	-	-	-	-	13	1	-	-	280		14	
M	88	19	1	-	-	-	-	-	-	20	-	-	-	666	5	4	20
	94	151	-	-	-	-	-	-	-	151	-	-	-	3020	6	7	151
	99	61	-	-	-	-	-	-	-	61	-	-	-	1220	6	7	61
D	88	1	-	-	-	-	-	-	-	-	-	-	1	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		04%			00%			04%			+72%						
'94		00%			00%			00%			-53%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	899	Dec:	4%				
										'94	3220		0%				
										'99	1500		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.																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	12	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	8	
D	88	1	-	-	-	-	-	-	-	-	-	-	-	1	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			100%			+59%							
'94		00%			00%			00%			+20%							
'99		00%			00%			20%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	33	Dec:	100%			
												'94	80		0%			
												'99	100		20%			
Pinus edulis																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	33	Dec:	-			
												'94	0		-			
												'99	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				
Purshia tridentata																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	4	-	-	-	-	-	-	-	3	-	-	1	80	13	30	
	99	-	-	3	-	-	-	-	-	-	3	-	-	-	60	18	76	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	1	1	-	-	-	-	-	-	1	-	-	1	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		71%			14%			29%			-57%							
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	140		29%				
											'99	60		0%				
Quercus gambelii																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	33	Dec:	-				
											'94	0		-				
											'99	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						
Symphoricarpos oreophilus														
S	88	1	1	-	-	-	-	-	2	-	-	66		2
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	0		0
Y	88	4	4	7	-	-	-	-	15	-	-	500		15
	94	-	-	-	1	-	-	-	1	-	-	20		1
	99	2	-	-	-	-	-	-	1	1	-	40		2
M	88	-	1	3	-	-	-	-	4	-	-	133	11 19	4
	94	6	13	-	2	-	-	-	21	-	-	420	8 16	21
	99	8	2	-	-	-	-	-	10	-	-	200	12 25	10
D	88	-	-	2	-	-	-	-	2	-	-	66		2
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'88		24%		57%		00%		-37%						
'94		59%		00%		00%		-45%						
'99		17%		00%		00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	699	Dec:	9%	
										'94	440		0%	
										'99	240		0%	
Tetradymia canescens														
M	88	-	1	-	-	-	-	-	1	-	-	33	9 10	1
	94	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	-	-	-	-	-	-	-	-	-	0	- -	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'88		100%		00%		00%								
'94		00%		00%		00%								
'99		00%		00%		00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	33	Dec:	-	
										'94	0		-	
										'99	0		-	

Trend Study 16C-18-99

Study site name: East Mountain .

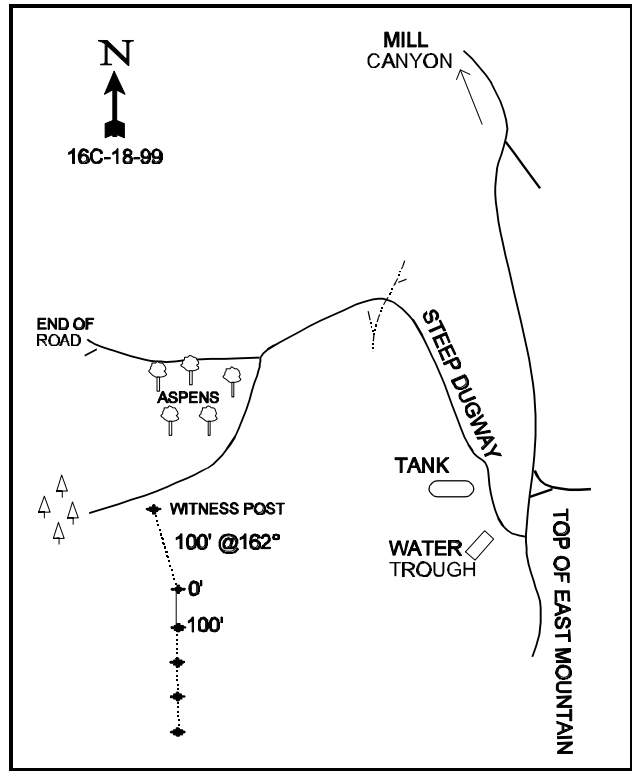
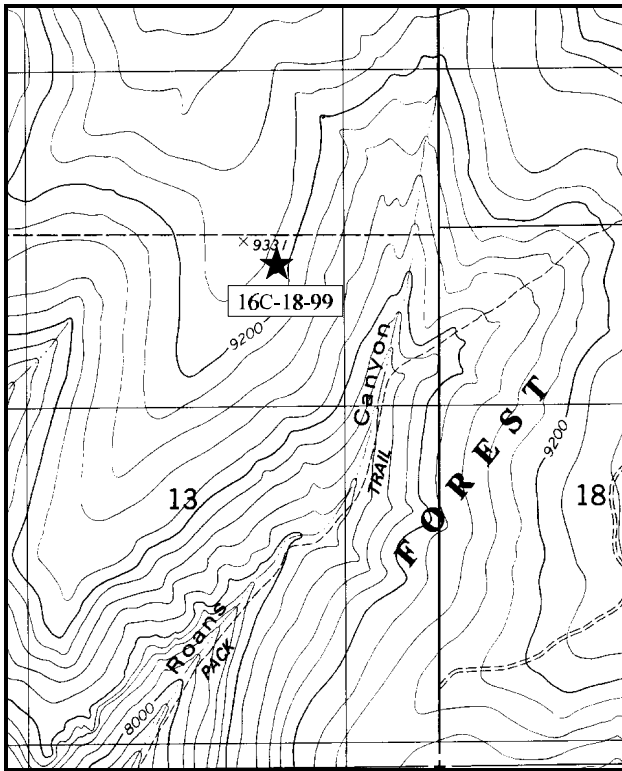
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 180°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 Orangeville, go up Straight Canyon to a major fork at Cottonwood Creek. Bear right up Cottonwood Creek approximately 7.5 miles to Mill Canyon. Turn right and go up Mill Canyon 2.7 miles to a fork at the top of East Mountain. Bear right on the main road 0.6 miles to a fork to Pine Springs - Snow Lake. Continue on the main road 0.55 miles. Turn right here down off the main road. Go 0.15 miles to a spring. Continue 0.15 miles to the creek at the bottom of the dugway. Go 0.2 miles to a fork by a patch of aspens, bear left on the faint road. Wind down through the trees and out onto the sage/grass ridge for 0.75 miles. There is a witness post on the left side of the road. From the witness post, walk 70 paces SSE to a 18" fencepost marked by a red browse tag, #7162. This is the 0-foot baseline stake.



Map Name: Mahogany Point

Diagrammatic Sketch

Township 17S, Range 6E, Section 13

UTM 4355370.962 N, 483670.761 E

DISCUSSION

Trend Study No. 16C-18 (31-16)

The East Mountain trend study is located on a low point on the west side of the plateau above Roans Canyon and Cottonwood Creek. It is on Forest Service land, on the East Mountain allotment which is grazed by 446 cows from June 21 to September 10. Much of the area was sprayed to kill sagebrush in the late 1960's. The site is on a slope where the majority of the mountain big sagebrush was not affected. The lower end of the study baseline was affected more by the treatment and showed a lower density of mountain big sagebrush than the beginning of the line. The study site is on a south-southwest slope of 6-8%. The elevation is 9,200 feet. Elk winter on the points and windswept south-facing slopes. Deer sign was only occasionally observed. Pellet group data from 1999 estimate 17 deer and 55 elk days use/acre (42 ddu/ha and 136 edu/ha).

The loose surface soil has a clay loam texture and neutral pH (7.3). It is relatively deep with an effective rooting depth of just over 17 inches. There are few rocks in the profile, except near the shallow ridge top. Phosphorus is limited on this site with a value of only 3.8 ppm. Values less than 10 ppm can limit normal plant growth and development. Scattered small gullies which begin on the upper portions of the slope converge and deepen on the steeper side hills. Bare spots on the study site show obvious soil movement in the past around pedestaled shrubs and bunch grasses. The bunchy nature of the Salina wildrye, which is common on the site, allows a rather large amount of bare soil to be exposed to erosion.

The dominant browse species is mountain big sagebrush. It currently ('99) makes up 83% of the browse cover. The rather small matured plants show good vigor with moderate use. The population has remained at a stable density of about 3,100 plants/acre since 1994. Percent decadence has steadily increased from 22% in 1988, to 23% in 1994, and 30% by 1999. This is still relatively low, but recruitment is marginal and the proportion of the population that are dead has increased from 8% in 1994 to 17% by 1999. Some additional forage is available from species like low rabbitbrush, snowberry, and gray horsebrush, which show light hedging.

The herbaceous understory is abundant and diverse. Large bunches of Salina wildrye dominant the grass component. It provided 84% of the grass cover in 1994 and 51% in 1999. Associated grass species are mutton and Sandberg bluegrass, slender wheatgrass, and Carex. Twenty-three forb species were identified in 1994 and 26 in 1999. Desert phlox, looseflower milkvetch, silvery lupine, narrowleaf Indian paintbrush, and a penstemon are the most common species. Some of these forbs showed light use in 1999.

1994 TREND ASSESSMENT

Ground cover characteristics changed only slightly since 1988. Bare ground is nearly the same with only a slight increase. Litter has decreased, while rock and pavement have increased. There appears to be ample litter and vegetative cover, with the soil trend appearing stable. Mountain big sagebrush is the key browse. It exhibits a stable mature population. The small stature of the mountain big sagebrush may indicate that the site is marginal for this plant. There is a decrease in the number of seedling and young plants compared to 1988, but this is likely due to a lack of precipitation rather a declining trend. The number of decadent plants has stayed relatively stable with more of the plants being moderately hedged. Trend for browse is stable. Herbaceous understory shows a decrease in sum of nested frequency for both grasses and forbs. Many of the grasses and forbs have significantly decreased in sum of nested frequency since 1988, which would indicate a slightly downward trend.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil continues to be stable. Percent cover of litter declined slightly since 1994, but percent bare ground also declined. Vegetation cover increased and herbaceous plants have a stable sum of nested frequency. Trend for the key browse species, mountain big sagebrush, is stable. Population density has remained similar, although use is heavier and percent decadence has increased from 23% to 30%. Recruitment is marginal and there is just enough young plants to replace decadent & dying plants. The proportion of dead plants in the population has increased from 8% to 17% since 1994. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has gone down slightly, while frequency of perennial forbs increased slightly. Nested frequency of Salina wildrye declined significantly since 1994, but frequency of the more preferred slender wheatgrass increased significantly. Cover of perennial grasses increased from 9% to 10%, with forb cover more than doubling (7.4% to 16.7%) since 1994. Currently forbs provide 62% of the herbaceous cover.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 18

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron trachycaulum	_b 69	_a 13	_b 44	31	5	22	.02	.55
G	Bromus anomalus	_b 12	_a -	_b 7	4	-	4	-	.09
G	Bromus japonicus (a)	-	-	-	-	-	-	-	.00
G	Carex spp.	24	18	37	11	8	16	.38	1.39
G	Elymus salina	_a 115	_b 167	_a 115	49	63	45	7.71	5.26
G	Oryzopsis hymenoides	-	-	2	-	-	1	-	.00
G	Poa fendleriana	68	80	63	30	32	26	.89	2.28
G	Poa secunda	_b 92	_a 24	_a 13	37	13	5	.06	.02
G	Stipa lettermani	15	7	14	8	3	6	.07	.69
Total for Annual Grasses		0	0	0	0	0	0	0	0.00
Total for Perennial Grasses		395	309	295	170	124	125	9.14	10.31
Total for Grasses		395	309	295	170	124	125	9.14	10.31
F	Androsace septentrionalis (a)	-	9	14	-	3	6	.30	.05
F	Arabis spp.	_b 7	_a -	_{ab} 3	5	-	2	-	.01
F	Astragalus convallarius	-	3	5	-	1	3	.00	.01
F	Astragalus megacarpus	9	1	4	6	1	2	.00	.03

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Astragalus tenellus</i>	a26	a13	b48	12	8	24	.72	3.22
F	<i>Aster</i> spp.	-	-	2	-	-	1	-	.00
F	<i>Caulanthus crassicaulis</i>	b5	a-	a-	3	-	-	-	-
F	<i>Castilleja linariaefolia</i>	88	59	79	42	31	38	.45	3.53
F	<i>Chaenactis douglasii</i>	17	4	13	9	3	7	.01	.08
F	<i>Comandra pallida</i>	a3	a2	b14	1	1	5	.01	.12
F	<i>Crepis acuminata</i>	1	-	-	1	-	-	-	-
F	<i>Eriogonum alatum</i>	a-	b11	b10	-	5	5	.08	.24
F	<i>Erigeron</i> spp.	12	6	-	6	3	-	.01	-
F	<i>Eriogonum</i> spp.	-	-	1	-	-	1	-	.00
F	<i>Erigeron pumilus</i>	-	-	3	-	-	1	-	.00
F	<i>Eriogonum racemosum</i>	-	-	2	-	-	1	-	.03
F	<i>Eriogonum umbellatum</i>	14	17	16	7	5	8	.07	.40
F	<i>Hymenoxys acaulis</i>	-	-	2	-	-	1	-	.03
F	<i>Hymenoxys richardsonii</i>	a39	b94	a34	19	41	17	1.32	.58
F	<i>Ipomopsis aggregata</i>	b9	a-	ab1	5	-	1	-	.00
F	<i>Lesquerella alpina</i>	a11	ab20	b35	6	11	14	.10	.22
F	<i>Linum lewisii</i>	5	10	12	3	4	6	.02	.08
F	<i>Lupinus sericeus</i>	b71	a32	a42	35	14	21	1.83	3.08
F	<i>Machaeranthera canescens</i>	-	5	5	-	2	2	.01	.06
F	<i>Machaeranthera grindelioides</i>	11	4	3	6	2	2	.04	.03
F	<i>Penstemon</i> spp.	a23	a10	b38	11	5	22	.06	1.39
F	<i>Penstemon watsonii</i>	b13	b14	a-	9	8	-	.16	-
F	<i>Phlox austromontana</i>	b160	a108	a108	67	45	49	2.11	3.28
F	<i>Phlox longifolia</i>	c42	b10	a-	17	5	-	.02	-
F	<i>Senecio multilobatus</i>	11	1	8	6	1	5	.00	.02
F	<i>Taraxacum officinale</i>	8	2	7	4	1	4	.00	.07
F	<i>Tragopogon dubius</i>	1	2	-	1	1	-	.00	-
Total for Annual Forbs		0	9	14	0	3	6	0.30	0.05
Total for Perennial Forbs		586	428	495	281	198	242	7.10	16.60
Total for Forbs		586	437	509	281	201	248	7.41	16.65

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

BROWSE TRENDS --
Herd unit 16C, Study no: 18

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia frigida	19	16	.08	.43
B	Artemisia tridentata vaseyana	68	71	13.11	15.06
B	Chrysothamnus viscidiflorus	53	38	.65	.34
B	Gutierrezia sarothrae	28	23	.37	.43
B	Rosa woodsii	0	1	-	-
B	Symphoricarpos oreophilus	21	22	1.24	.52
B	Tetradymia canescens	25	30	1.64	1.42
Total for Browse		214	201	17.10	18.23

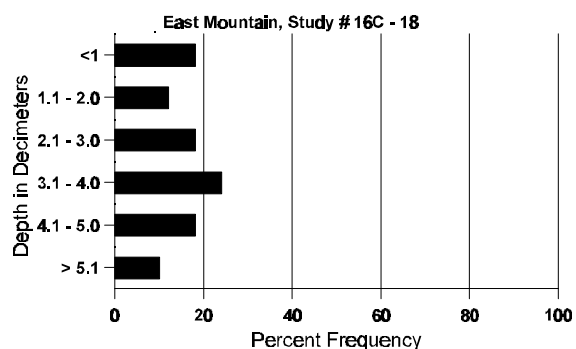
BASIC COVER --
Herd unit 16C, Study no: 18

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	299	304	10.75	31.36	37.50
Rock	150	82	2.50	5.98	8.07
Pavement	144	128	0	1.34	1.92
Litter	387	343	45.25	34.56	29.52
Cryptogams	21	9	0	.43	.09
Bare Ground	334	304	41.50	43.59	35.87

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 18, Study Name: East Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.4	48.8 (17.3)	7.3	40.0	27.4	32.6	2.8	3.8	99.2	0.6

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 18

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	20	10	n/a
Elk	36	24	55 (136)
Deer	2	4	17 (42)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 18

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches)		Total								
		1	2	3	4		Ht. Cr.										
<i>Artemisia frigida</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	3	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	7	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	88	2	1	-	-	-	-	-	-	3	-	-	-	200	4	2	3
	94	23	-	-	2	-	-	-	-	25	-	-	-	500	5	4	25
	99	21	-	-	5	-	-	-	-	26	-	-	-	520	5	7	26
D	88	-	-	1	-	-	-	-	-	-	-	1	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		25%		25%		25%		+53%									
'94		00%		00%		00%		+15%									
'99		00%		00%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	266	Dec:	25%				
										'94	560		0%				
										'99	660		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											
<i>Artemisia tridentata vaseyana</i>																
S	88	1	-	-	1	-	-	-	-	2	-	-	-	133		2
	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2
	99	7	-	-	-	-	-	-	-	7	-	-	-	140		7
Y	88	12	7	-	-	-	-	-	-	14	5	-	-	1266		19
	94	6	1	-	1	-	-	-	-	8	-	-	-	160		8
	99	11	-	-	-	-	-	-	-	11	-	-	-	220		11
M	88	19	11	1	-	-	-	-	-	30	1	-	-	2066	13 31	31
	94	71	34	2	3	-	-	-	-	110	-	-	-	2200	15 32	110
	99	21	65	10	-	3	-	-	-	92	-	7	-	1980	16 33	99
D	88	6	6	2	-	-	-	-	-	8	5	1	-	933		14
	94	7	28	-	-	-	-	-	-	24	-	-	11	700		35
	99	15	24	5	-	3	-	-	-	38	-	-	9	940		47
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	260		13
	99	-	-	-	-	-	-	-	-	-	-	-	-	680		34
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		38%			05%			02%			-28%					
'94		41%			01%			07%			+ 3%					
'99		61%			10%			10%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	4265	Dec:	22%			
										'94	3060		23%			
										'99	3140		30%			
<i>Chrysothamnus viscidiflorus</i>																
S	88	3	-	1	1	-	-	-	-	5	-	-	-	333		5
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	88	10	3	-	1	-	-	-	-	12	2	-	-	933		14
	94	2	-	-	1	-	-	-	-	3	-	-	-	60		3
	99	13	-	-	1	-	-	-	-	14	-	-	-	280		14
M	88	11	2	2	-	-	-	-	-	15	-	-	-	1000	5 5	15
	94	110	-	-	8	-	-	-	-	118	-	-	-	2360	7 9	118
	99	53	-	-	1	-	1	-	-	55	-	-	-	1100	7 11	55
D	88	2	3	3	-	-	-	-	-	8	-	-	-	533		8
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	3	-	-	-	-	-	-	-	3	-	-	1	80		4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		22%			14%			00%			- 2%					
'94		00%			00%			00%			-40%					
'99		00%			01%			01%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	2466	Dec:	22%			
										'94	2420		0%			
										'99	1460		5%			

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	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	-	-	-	-	-	-	-	-	-	40			2
	99	6	-	-	-	-	-	-	-	-	-	-	-	120			6
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	66	-	-	-	-	-	-	-	-	-	-	-	1320	6	6	66
	99	55	-	-	1	-	-	-	-	-	-	-	-	1120	7	8	56
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	6	-	-	-	-	-	-	-	-	-	-	-	120			6
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%			-16%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%		
												'94	1480		8%		
												'99	1240		0%		
<i>Rosa woodsii</i>																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	10	18	0
	99	3	-	-	-	-	-	-	-	-	-	-	-	60	9	12	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	0		-		
												'99	60		-		
<i>Symphoricarpos oreophilus</i>																	
S	88	2	-	-	-	-	-	1	-	-	-	-	3	-	-	-	3
	94	1	-	-	-	-	-	2	-	-	-	-	3	-	-	-	3
	99	6	-	-	-	-	-	-	-	-	-	-	6	-	-	-	6
Y	88	8	1	-	-	-	-	-	-	-	-	-	9	-	-	-	9
	94	19	-	-	7	-	-	-	-	-	-	-	26	-	-	-	26
	99	12	2	-	1	-	-	-	-	-	-	-	15	-	-	-	15
M	88	2	1	-	-	-	-	-	-	-	-	-	3	-	-	-	3
	94	22	8	-	5	-	-	-	-	-	-	-	35	-	-	-	35
	99	16	15	-	-	-	-	-	-	-	-	-	31	-	-	-	31
D	88	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	1
	94	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	1
	99	6	1	-	-	-	-	-	-	-	-	-	7	-	-	-	7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		23%			00%			00%			+30%						
'94		15%			00%			00%			-15%						
'99		34%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	866	Dec:	8%		
												'94	1240		2%		
												'99	1060		13%		

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																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	8	-	-	1	-	-	-	-	-	9	-	-	-	180		9	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	65	-	-	1	-	-	-	-	-	66	-	-	-	1320	7	66	
	99	35	10	-	-	-	-	-	-	-	45	-	-	-	900	8	45	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	3	-	-	-	-	-	-	-	-	2	-	-	1	60		3	
	99	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			01%			-22%							
'99		18%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	1440		4%			
												'99	1120		4%			

Trend Study 16C-19-99

Study site name: Trail Mountain Enclosure .

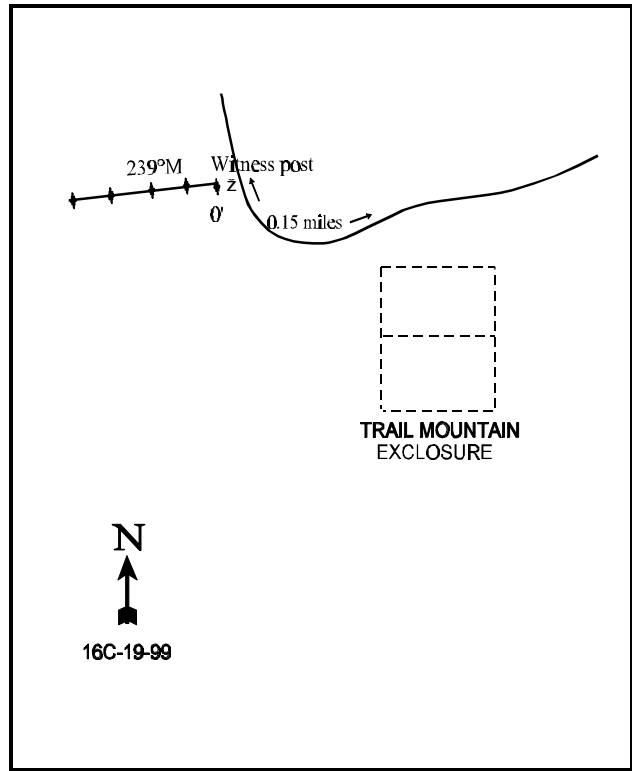
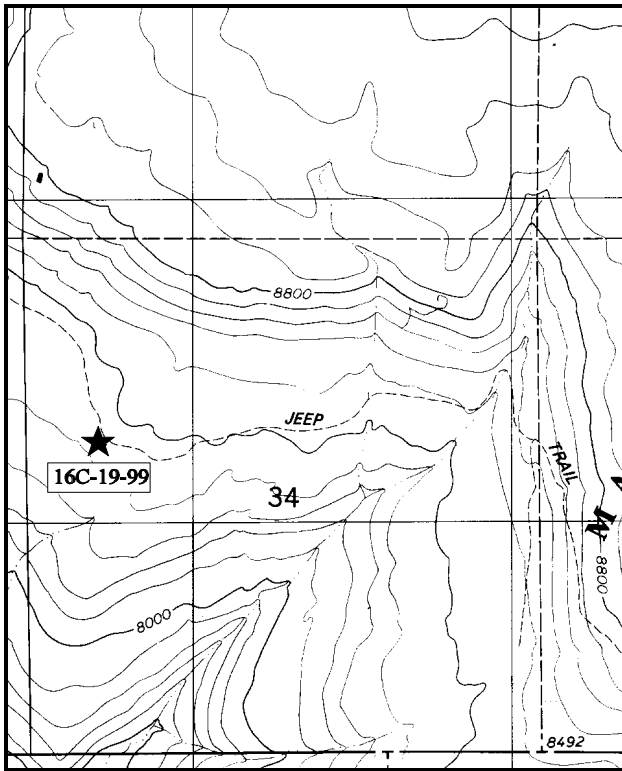
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 239°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 pass between Upper Joes Valley and the head of Cottonwood Creek (T16S, R6E, sec 27), take the road south onto Trail Mountain. Go 7.0 miles on this road to a fork. Take the left fork, towards Miles Point. Go 4.25 miles to a fork. Bear right down the side of the mountain for 1.35 miles. Bear right at another fork and continue 1.0 miles to the enclosure. Continue past the enclosure for 0.15 miles to just past where the road crosses a gully at a sharp bend in the terraces to a witness post. The 0 ft stake is located 13 paces away at 225°M, and is marked with a browse tag. There is rebar next to the 0 ft stake.



Map Name: Mahogany Point

Diagrammatic Sketch

Township 17S, Range 6E, Section 34

UTM 4350364.583 N, 479671.097 E

DISCUSSION

Trend Study No. 16C-19 (31-17)

The Trail Mountain Big Game Enclosure was constructed on the southwest end of Trail Mountain in the 1960's. Considerable watershed work, contour trenching and seeding, was done on this Forest Service land at that time. The area has since been closed to livestock grazing, although there is occasionally trespass by cattle. This side of the mountain is occupied by a mixed mountain brush range type. The trend study is on the same location as the 1980 line-intercept study #35-3. It starts near a sharp bend in a large contour furrow above an old gully. The bench has a gentle slope, but drops off steeply to the west and south. The aspect is south-southwest and the elevation is 8,350 feet. Sign of deer and elk winter use is scattered. Pellet group data from the site in 1999 estimated 15 deer, 44 elk, and 8 cow days use/acre (37 ddu/ha, 109 edu/ha, and 20 cdu/ha). Most of the deer and elk pellet groups were from winter use. Most of the cow pats encountered were old, however some fresh pats were observed on the site.

The soil is a moderately deep, clay loam with a slightly alkaline pH (7.6). Like all of the other sites in the unit, the soil here is deficient in phosphorus at just 2.9 ppm. Values less than 10 ppm can inhibit normal plant growth and development. Effective rooting depth was estimated at almost 14 inches. Soil penetrometer readings were limited by a heavy compacted soil horizon. This is not apparently a continuous rooting barrier due to the abundance of deeper rooted shrubs on the site. A large gully by the site is vegetated and stable. Litter and vegetation is abundant and the contour trenches remain effective in slowing erosion.

The mixed brush type on this site is composed largely of mountain big sagebrush with a significant population of serviceberry and true mountain mahogany. Other common species include dwarf rabbitbrush, snowberry, curleaf mountain mahogany, and a few antelope bitterbrush. Mountain big sagebrush provided 51% of the browse cover in 1994 and 38% in 1999. It has displayed light to moderate use since 1988 with a few individuals heavily browsed. Vigor is generally good and percent decadence has declined from a high of 50% in 1988, to 16% in 1999. Recruitment currently good with a biotic potential of 11% and young plants comprising 27% of the population. There is also a small population of moderately utilized black sagebrush on the site.

The palatable Utah serviceberry currently ('99) show moderate to heavy use on available plants. In 1999, some of the large serviceberry plants in the vicinity appear to have been knocked down in what appeared to be a mechanical treatment to promote more available growth. Several shrubs; curleaf mountain mahogany, and true mountain mahogany, were sampled for the first time on the site in 1994, due to the greatly increased sample size. True mountain mahogany shows heavy use, while curleaf mahogany displays moderate use. Population densities for these species are low yet they are important forage species. Many of the curleaf mountain mahogany are large highlined trees. Density of true mountain mahogany is higher in 1999 due to a realignment of the study site baseline. This is a marginal site for mountain mahogany since it is at its upper elevational range.

Native species such as mutton bluegrass, Salina wildrye, Letterman needlegrass, and bluebunch wheatgrass comprise the bulk of the herbaceous understory, except for the terraces where smooth brome and other introduced species are found. A wide variety of forbs were encountered which produced as much cover as the grasses in 1999. However, most species provide little forage due to their low growing growth form.

1994 TREND ASSESSMENT

Litter cover on the site has decreased by 35% since 1988 although bare ground has stayed nearly the same. Trend for soil is stable. Mountain big sagebrush offers the most browse forage and has a stable mature population with a large decrease in percent decadency. Utah serviceberry shows good recruitment with a decline in percent decadency as well. Trend for browse is currently stable. The herbaceous understory trend

is slightly down. Summed nested frequency for grasses and forbs have declined with many species significantly declining.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1994. Trend for browse is considered stable. Key species, serviceberry, mountain big sagebrush, and true mountain mahogany appear to be relatively stable. Some of the changes in density of mahogany is due to a realignment of the study site baseline in 1999. Utilization of these shrubs is heavier compared to 1994, but vigor is generally good and percent decadence low. Trend for the herbaceous understory is up slightly. Sum of nested frequency of perennial grasses and forbs increased slightly. Cover also increased slightly for grasses and significantly for forbs (up 60%). The nearby 3 way enclosure visually has a lot more Indian paintbrush in the total and livestock enclosure compared to outside. Grass abundance appears to be higher in the total enclosure than in the livestock enclosure or outside.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 19

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	-	-	2	-	-	1	-	.15
G	Agropyron intermedium	7	1	4	4	1	2	.00	.01
G	Agropyron spicatum	61	60	84	26	20	37	1.59	1.99
G	Agropyron trachycaulum	-	1	-	-	1	-	.03	-
G	Bromus inermis	32	26	38	11	10	12	.46	.91
G	Carex spp.	-	1	2	-	1	2	.00	.03
G	Elymus salina	^a 79	^a 78	127	32	33	45	1.92	3.73
G	Oryzopsis hymenoides	^a -	^b 13	^{ab} 2	-	5	1	.59	.38
G	Poa fendleriana	^c 173	^b 134	^a 77	72	52	30	4.10	2.00
G	Sitanion hystrix	-	5	7	-	3	2	.01	.06
G	Stipa comata	-	-	4	-	-	1	-	.03
G	Stipa lettermani	60	63	53	24	27	23	.89	.92
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		412	382	400	169	153	156	9.63	10.23
Total for Grasses		412	382	400	169	153	156	9.63	10.23

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
F	<i>Antennaria parvifolia</i>	25	12	10	11	9	5	.29	.36
F	<i>Androsace septentrionalis</i> (a)	-	-	3	-	-	1	-	.00
F	<i>Arabis</i> spp.	_b 12	_a -	_a -	6	-	-	-	-
F	<i>Astragalus calycosus</i>	_a -	_{ab} 1	_b 6	-	1	4	.00	.22
F	<i>Aster chilensis</i>	-	3	-	-	2	-	.01	-
F	<i>Astragalus convallarius</i>	_a -	_b 6	_a -	-	3	-	.01	-
F	<i>Astragalus tenellus</i>	_c 25	_b 12	_a -	13	5	-	.22	-
F	<i>Aster</i> spp.	_b 43	_a 20	_{ab} 26	19	7	9	.08	.31
F	<i>Castilleja linariaefolia</i>	11	7	17	4	4	10	.16	.35
F	<i>Calochortus nuttallii</i>	_b 7	_a -	_a -	3	-	-	-	-
F	<i>Cirsium</i> spp.	6	3	2	4	2	1	.03	.15
F	<i>Comandra pallida</i>	34	28	41	16	12	19	.13	.44
F	<i>Crepis acuminata</i>	_b 4	_a -	_a -	3	-	-	-	-
F	<i>Eriogonum alatum</i>	-	1	2	-	1	1	.01	.03
F	<i>Erigeron eatonii</i>	_b 52	_a 2	_a 8	25	1	3	.00	.01
F	<i>Eriogonum umbellatum</i>	_a 17	_b 41	_b 43	7	19	19	.77	1.75
F	<i>Hedysarum boreale</i>	_{ab} 3	_a -	_b 6	1	-	3	-	.09
F	<i>Hymenoxys acaulis</i>	10	5	4	4	3	2	.06	.06
F	<i>Ipomopsis aggregata</i>	_a -	_a -	_b 6	-	-	3	-	.04
F	<i>Lesquerella</i> spp.	7	2	4	3	2	2	.01	.03
F	<i>Lupinus</i> spp.	_b 50	_a -	_a -	21	-	-	-	-
F	<i>Machaeranthera canescens</i>	_a 10	_a 7	_b 40	5	3	19	.06	.83
F	<i>Machaeranthera grindelioides</i>	_a -	_b 4	_a -	-	3	-	.06	-
F	<i>Orthocarpus</i> spp. (a)	-	-	2	-	-	1	-	.15
F	<i>Penstemon caespitosus</i>	131	143	126	56	60	48	3.50	4.37
F	<i>Pedicularis centranthera</i>	_a -	_a -	_b 12	-	-	5	-	.15
F	<i>Penstemon</i> spp.	_b 41	_{ab} 6	_a -	17	2	-	.06	-
F	<i>Penstemon pachyphyllus</i>	4	-	7	2	-	2	-	.03
F	<i>Phlox austromontana</i>	_b 116	_a 80	_a 63	56	37	32	1.06	.97
F	<i>Potentilla gracilis</i>	-	16	26	-	7	12	.06	.16
F	<i>Senecio multilobatus</i>	_b 15	_a 1	_{ab} 6	8	1	4	.00	.07
F	<i>Taraxacum officinale</i>	4	-	-	2	-	-	-	-
F	Unknown forb-perennial	_b 7	_a -	_a -	6	-	-	-	-
F	<i>Zigadenus paniculatus</i>	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	0	5	0	0	2	0	0.15
Total for Perennial Forbs		635	400	455	293	184	203	6.63	10.46
Total for Forbs		635	400	460	293	184	205	6.63	10.61

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

BROWSE TRENDS --
Herd unit 16C, Study no: 19

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	27	22	3.47	2.79
B	Artemisia nova	12	8	.51	.94
B	Artemisia tridentata vaseyana	76	65	10.94	9.55
B	Ceratoides lanata	0	0	-	-
B	Cercocarpus ledifolius	7	8	1.38	.03
B	Cercocarpus montanus	14	16	1.13	3.36
B	Chrysothamnus depressus	26	27	1.24	.66
B	Chrysothamnus nauseosus	14	1	.13	-
B	Chrysothamnus viscidiflorus	10	16	.69	.55
B	Eriogonum microthecum	-	-	-	.03
B	Gutierrezia sarothrae	6	22	.06	1.13
B	Juniperus osteosperma	0	0	-	-
B	Leptodactylon pungens	0	0	-	-
B	Opuntia spp.	-	-	.03	-
B	Pinus edulis	0	1	.03	.15
B	Purshia tridentata	1	3	.15	.30
B	Sambucus cerulea	0	0	-	.00
B	Symphoricarpos oreophilus	20	30	1.39	5.60
B	Tetradymia canescens	15	10	.09	.01
Total for Browse		228	229	21.28	25.14

CANOPY COVER --
Herd unit 16C, Study no: 19

Species	Percent Cover '09
Cercocarpus ledifolius	2

BASIC COVER --
Herd unit 16C, Study no: 19

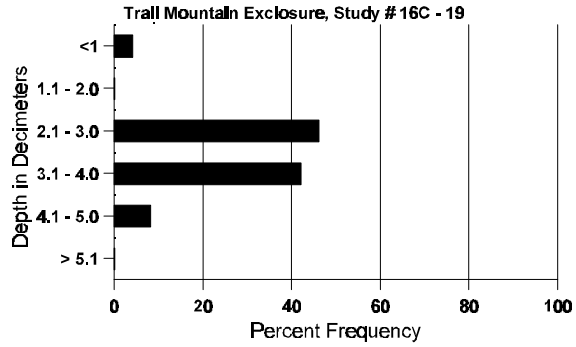
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	306	327	9.00	34.87	40.61
Rock	165	106	0	3.90	6.11
Pavement	78	188	2.25	1.14	3.62
Litter	350	353	59.00	38.39	37.47
Cryptogams	14	21	1.00	.27	.31
Bare Ground	272	259	28.75	28.70	23.38

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 19, Study Name: Trial Mountain Enclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.9	52.8 (15.0)	7.6	38.7	27.4	33.8	3.0	2.9	131.2	0.5

Stoniness Index



PELLET GROUP DATA --

Herd unit 16C, Study no: 19

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Rabbit	16	10	n/a
Elk	12	20	44 (109)
Deer	17	7	15 (37)
Cattle	1	1	8 (20)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 19

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	88	-	-	-	1	-	-	1	-	-	2	-	-	-	133			2
	94	1	-	-	-	-	-	-	-	1	-	-	-	20			1	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20			1	
Y	88	2	3	-	-	-	-	-	-	4	-	-	1	333			5	
	94	20	-	-	2	-	-	1	-	23	-	-	-	460			23	
	99	8	1	-	-	-	-	-	-	9	-	-	-	180			9	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	11	4	2	-	1	-	5	-	21	-	2	-	460	27	29	23	
	99	5	13	4	-	2	1	-	-	25	-	-	-	500	38	44	25	
D	88	-	-	-	-	1	-	-	-	1	-	-	-	66			1	
	94	1	-	-	1	-	-	-	-	2	-	-	-	40			2	
	99	-	-	2	-	-	1	1	-	-	-	-	4	80			4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	40			2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		67%			00%			17%			+58%							
'94		10%			04%			04%			-21%							
'99		42%			21%			11%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	399	Dec:	17%				
											'94	960		4%				
											'99	760		11%				
Artemisia nova																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	2	-	-	-	-	-	-	2	-	-	-	40			2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	10	1	-	1	-	-	-	-	12	-	-	-	240	11	20	12	
	99	7	10	-	-	-	-	-	-	17	-	-	-	340	9	19	17	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	10	4	1	-	-	-	-	-	9	-	-	6	300			15	
	99	1	-	-	-	-	-	1	-	-	-	2	40			2		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	220			11	
	99	-	-	-	-	-	-	-	-	1	-	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		19%			04%			22%			-22%							
'99		57%			00%			10%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	540		56%				
											'99	420		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>Artemisia tridentata vaseyana</i>																
S	88	6	-	-	-	-	5	-	-	11	-	-	-	733		11
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	21	-	-	-	-	-	1	-	-	22	-	-	440		22
Y	88	5	-	-	1	-	-	1	-	-	7	-	-	466		7
	94	21	-	-	1	-	-	-	-	22	-	-	-	440		22
	99	40	1	-	-	-	-	-	-	41	-	-	-	820		41
M	88	15	10	2	-	-	-	-	-	27	-	-	-	1800	22 28	27
	94	98	1	-	4	-	-	-	-	103	-	-	-	2060	19 26	103
	99	46	27	12	1	1	-	-	-	86	1	-	-	1740	22 27	87
D	88	14	19	1	-	-	-	-	-	34	-	-	-	2266		34
	94	35	4	2	3	-	-	-	-	32	-	-	12	880		44
	99	15	8	1	-	-	-	-	-	14	-	-	10	480		24
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	600		30
	99	-	-	-	-	-	-	-	-	-	-	-	-	580		29
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		43%			04%			00%			-25%					
'94		03%			01%			07%			-10%					
'99		24%			09%			07%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	4532	Dec:	50%			
										'94	3380		26%			
										'99	3040		16%			
<i>Ceratoides lanata</i>																
Y	88	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	88	1	-	-	-	-	-	-	-	1	-	-	-	66	3 3	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
D	88	2	-	-	-	-	-	-	-	2	-	-	-	133		2
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		00%			00%			00%								
'94		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	265	Dec:	50%			
										'94	0		0%			
										'99	0		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				
Cercocarpus ledifolius																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
	99	4	2	-	-	1	-	-	-	-	7	-	-	-	140		7	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	1	3	-	1	-	-	-	-	-	5	-	-	-	100	20	21	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40	26	27	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		43%			00%			00%			+22%							
'99		56%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	140		-			
												'99	180		-			
Cercocarpus montanus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	2	-	-	3	-	-	-	-	-	5	-	-	-	100		5	
	99	-	4	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	1	4	6	2	-	-	-	-	-	13	-	-	-	260	24	29	
	99	-	-	12	-	10	8	-	-	-	27	3	-	-	600	22	32	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	1	-	-	-	-	-	-	-	-	-	1	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		21%			37%			05%			+44%							
'99		41%			59%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	380		5%			
												'99	680		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				
Chrysothamnus depressus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	30	15	1	-	-	-	-	-	-	46	-	-	-	3066	4	9	46
	94	74	26	-	2	-	-	-	-	-	102	-	-	-	2040	3	7	102
	99	9	12	41	-	-	5	-	-	-	65	2	-	-	1340	2	7	67
D	88	4	1	-	-	-	-	-	-	-	5	-	-	-	333		5	
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	99	-	1	-	-	-	-	-	-	-	-	-	-	1	20		1	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		30%			02%			00%			-41%							
'94		25%			00%			.94%			-36%							
'99		19%			68%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	3599	Dec:	9%			
												'94	2120		1%			
												'99	1360		1%			
Chrysothamnus nauseosus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	18	1	-	1	-	-	-	-	-	20	-	-	-	400	6	9	20
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	15	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	2	-	-	-	-	-	-	-	-	2	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		04%			00%			09%			-91%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	460		9%			
												'99	40		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					
<i>Chrysothamnus viscidiflorus</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	88	8	-	-	-	-	-	-	-	8	-	-	-	533	6	7	8
	94	9	-	-	4	-	-	-	-	13	-	-	-	260	5	9	13
	99	42	1	-	-	-	-	-	-	43	-	-	-	860	6	7	43
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	2	-	-	-	-	-	-	-	-	2	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-44%						
'94		00%			13%			13%			+68%						
'99		02%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	533	Dec:	0%				
										'94	300		13%				
										'99	940		0%				
<i>Gutierrezia sarothrae</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	7	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	7	-	-	1	-	-	-	-	8	-	-	-	160	5	6	8
	99	55	-	-	-	-	-	-	-	55	-	-	-	1100	6	8	55
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%			+87%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	160		-				
										'99	1240		-				

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 osteosperma</i>																		
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	69	72	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-				
											'94	0		-				
											'99	0		-				
<i>Leptodactylon pungens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	4	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	0		-				
<i>Pinus edulis</i>																		
S	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	-	2	-	1	-	60			3
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	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				
Purshia tridentata																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	1	-	-	-	20	9	32	1
	99	-	-	1	-	-	2	-	-	3	-	-	-	60	7	15	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%			+75%						
'99		00%			75%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	20		-		
												'99	80		-		
Sambucus cerulea																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	24	33	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	32	31	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	0		-		
												'99	0		-		
Symphoricarpos oreophilus																	
S	88	-	-	-	1	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	10	-	-	3	-	-	-	-	13	-	-	-	260			13
	99	15	-	-	-	-	-	-	-	15	-	-	-	300			15
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	19	1	-	5	-	-	-	-	25	-	-	-	500	13	25	25
	99	40	4	-	-	-	-	-	-	44	-	-	-	880	14	28	44
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	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%									
'94		03%			00%			00%			+38%						
'99		07%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%		
												'94	760		0%		
												'99	1220		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				
Tetradymia canescens																		
Y	'88	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	'94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'88	-	1	-	1	-	-	-	-	-	2	-	-	-	133	12	7	2
	'94	11	3	-	-	1	-	-	-	-	15	-	-	-	300	5	8	15
	'99	7	6	-	-	-	-	-	-	-	13	-	-	-	260	6	9	13
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	1	3	-	-	-	-	-	-	4	-	-	-	80		4	
	'99	1	1	-	-	3	-	-	-	-	3	-	-	2	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		33%			00%			00%			+55%							
'94		23%			14%			00%			-18%							
'99		56%			00%			11%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	0%			
												'94	440		18%			
												'99	360		28%			

Trend Study 16C-20-99

Study site name: Miles Point .

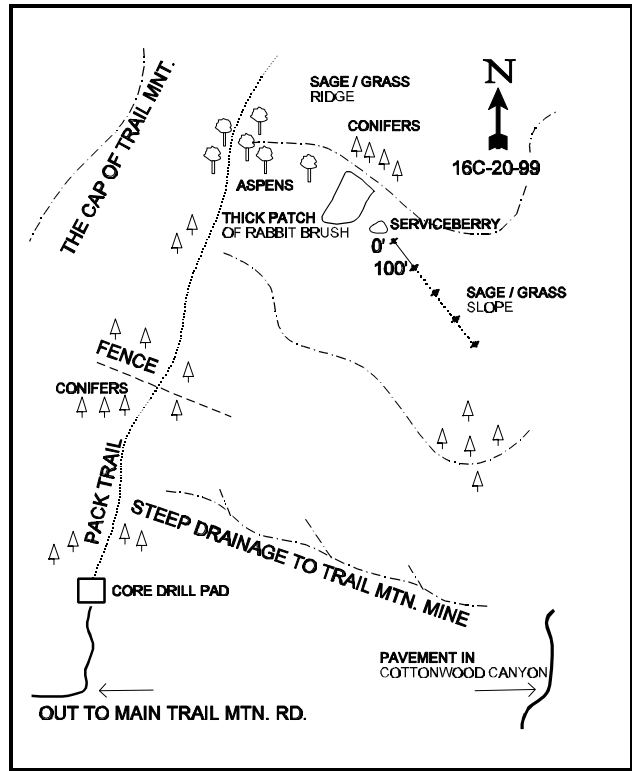
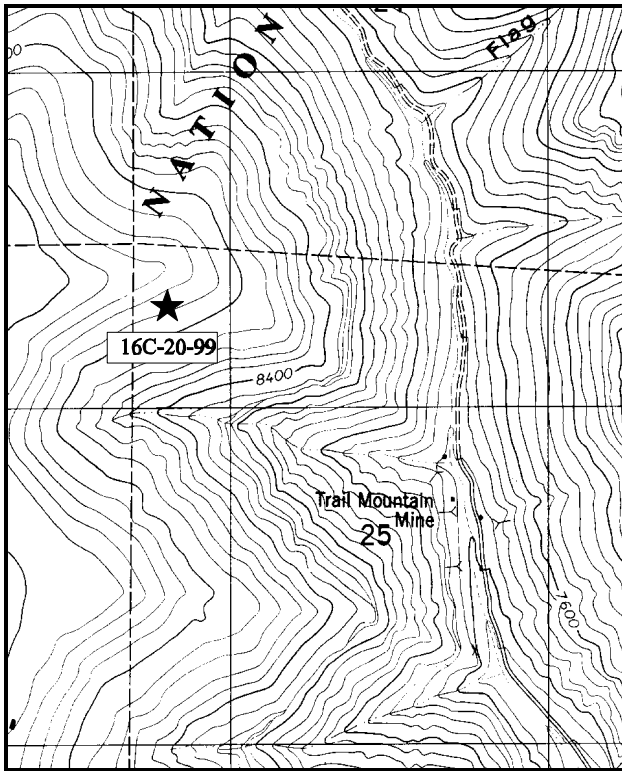
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 112°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 pass at the top of the Cottonwood Canyon Road (10.15 miles from Straight Canyon), take the Trail Mountain road southeast for approximately 9.5 miles to the south end of the Cap of Trail Mountain. The study site is to the NE, on the other side of this high cap. A new road takes off to the east from the main road just past the southern point of the cap. Follow this road for 0.65 miles and stop before you enter the thick timber. From here, a pack trail takes off to the north along the edge of Trail Mountain. Follow this trail for about 1/2 miles to an open ridge. Turn east and hike down this ridge to the SE for 1/4 mile. The study is located on a sage-grass slope on the SE side of the ridge. The 0-foot baseline stake, marked by browse tag #9030, is adjacent to a large clump of serviceberry. The area has a view of lower Cottonwood Canyon and the fields in Straight Canyon.



Map Name: Mahogany Point

Diagrammatic Sketch

Township 17S, Range 6E, Section 25

DISCUSSION

Trend Study No. 16C-20 (31-18)

This study is not actually situated on Miles Point, but on a similar sagebrush/grass point above the Trail Mountain mine in Cottonwood Canyon. It samples a typical high elevation elk winter range, which mule deer use in the summer. The study is on a moderately steep slope (35%) with a southeast aspect. The elevation is 8,800 feet. There is moderate elk sign on the open, south-facing ridge. Nearby aspen, curlleaf mountain mahogany, and conifer stands also show evidence of elk winter use. The study site is in the Trail Mountain summer cattle allotment, but actually receives little use by cattle. Pellet group data from 1999 estimate 3 deer, 70 elk, and 2 cow days use/acre (7 ddu/ha, 173 edu/ha, and 5 cdu/ha). Nearly all of the elk pellet groups were from the previous winter, although a few were more recent. Cattle pats were old.

Soil on the site is moderately deep with an effective rooting depth estimated at almost 17 inches. Soil texture is a clay loam with a slightly alkaline pH (7.5). Phosphorus levels are marginal at 6 ppm because values less than 10 ppm can limit normal plant growth and development. Soil parent material is limestone with rocks common within the profile. Vegetative and litter cover is adequate to protect the soil on the slope from excessive movement, but some soil pedestaling and terracing is evident. On the downhill side of terraces there are some plant roots exposed. The abundant grasses provide over half of vegetative cover. Litter is also abundant. Rocks and pavement occur in the interspaces leaving little exposed bare soil.

The key browse on the sagebrush/grass slope is the vigorous mountain big sagebrush. Sagebrush cover along the baseline is higher near the zero foot stake and decreases as you reach the 400 foot stake. Sagebrush provided 66% of the browse cover in 1994 and 80% in 1999. The mountain big sagebrush population has shifted from predominantly young plants in 1988 to a more mature stand in 1994 and 1999. Browsing on the sagebrush is light to moderate, vigor is normal and percent decadence relatively low.

Other common shrubs include dwarf rabbitbrush, low rabbitbrush, and snowberry. Dwarf rabbitbrush (*Chrysothamnus depressus*) displays consistent moderate to heavy use since 1988. Vigor is good and percent decadence low. The large decline in density of dwarf rabbitbrush between 1988 and 1994 is mostly due to the much larger sample used in 1994. The scattered Utah serviceberry show light use and good vigor. Snowberry also shows light use with a stable population density, although shifting towards a more mature stand.

Bluebunch wheatgrass and Salina wildrye provide most the herbaceous understory cover due to their large bunchgrass stature. Bluebunch wheatgrass has increased significantly with each reading. Other grass species are uncommon. Grasses showed light utilization overall, but some were moderately utilized in 1999. Forbs are rare with timber poison vetch the only common species.

1994 TREND ASSESSMENT

Bare ground has decreased slightly although there was a decrease in litter cover. Herbaceous vegetative cover is abundant and provides a majority of the ground cover. Trend for soil is stable. The key browse is mountain big sagebrush. It has a low number of seedling and young plants this year, but most of the young sampled in 1988 appear to have survived and are now mature. Utilization is light, although percent decadency has increased. The trend for browse is stable. Summed nested frequency for grasses has increased since 1988. Summed nested frequency for forbs has decreased greatly and is mostly due to one plant, timber poisonvetch. Trend for herbaceous understory is stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil continues to be stable due to similar ground cover characteristics compared to 1994. There is some localized soil movement occurring yet the abundance of herbaceous vegetation cover has stabilized the slope. Trend for the key browse, mountain big sagebrush, is stable. Sagebrush density has increased slightly, vigor is normal, and percent decadence has declined slightly. However, utilization is heavier and reproduction is marginally low. In addition, 42% (220 plants/acre) of the decadent plants appear to be dying. Currently, there are enough young plants within the population to replace the decadent & dying sagebrush. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has remained stable while frequency of forbs has increased slightly. Nested frequency of Salina wildrye declined significantly with the more preferred, bluebunch wheatgrass increased significantly. There may have been some confusion in the identification between these two species in 1994.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 20

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	_a 212	_b 234	313	79	80	94	14.05	19.32
G	Elymus salina	_a 64	_b 123	_a 59	28	44	28	8.85	3.98
G	Poa fendleriana	7	12	6	4	6	3	.03	.09
G	Stipa lettermani	_b 21	_{ab} 15	_a 6	9	6	2	.13	.18
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		304	384	384	120	136	127	23.06	23.57
Total for Grasses		304	384	384	120	136	127	23.06	23.57
F	Androsace septentrionalis (a)	-	-	3	-	-	1	-	.00
F	Astragalus convallarius	_b 147	_a 14	_a 29	61	8	13	.04	.77
F	Aster spp.	2	2	-	1	1	-	.00	-
F	Astragalus spp.	-	-	3	-	-	1	-	.03
F	Castilleja linariaefolia	_b 13	_a -	_a -	7	-	-	-	-
F	Calochortus nuttallii	1	2	1	1	1	1	.00	.01
F	Chaenactis douglasii	-	-	5	-	-	2	-	.03
F	Cirsium neomexicanum	2	-	-	1	-	-	-	-
F	Cirsium spp.	2	-	2	1	-	1	-	.03
F	Crepis acuminata	7	-	-	3	-	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Hedysarum boreale	-	-	2	-	-	1	-	.15
F	Hymenoxys richardsonii	-	-	-	-	-	-	.00	.00
F	Machaeranthera canescens	_b 9	_a 2	_{ab} 4	7	1	2	.00	.06
F	Penstemon caespitosus	-	-	5	-	-	2	-	.06
F	Phlox longifolia	3	-	1	1	-	1	-	.00
F	Tragopogon dubius	4	-	-	1	-	-	-	-
F	Unknown forb-perennial	4	3	-	2	1	-	.00	-
Total for Annual Forbs		0	0	3	0	0	1	0	0.00
Total for Perennial Forbs		194	23	52	86	12	24	0.06	1.15
Total for Forbs		194	23	55	86	12	25	0.06	1.15

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

BROWSE TRENDS --

Herd unit 16C, Study no: 20

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	2	0	-	-
B	Artemisia tridentata vaseyana	86	85	12.65	15.80
B	Chrysothamnus depressus	12	20	.84	.79
B	Chrysothamnus vaseyi	0	2	-	-
B	Chrysothamnus viscidiflorus	70	66	2.86	1.28
B	Sambucus cerulea	0	1	.15	.15
B	Symphoricarpos oreophilus	39	39	2.54	1.69
B	Tetradymia canescens	7	8	-	-
Total for Browse		216	221	19.06	19.73

BASIC COVER --

Herd unit 16C, Study no: 20

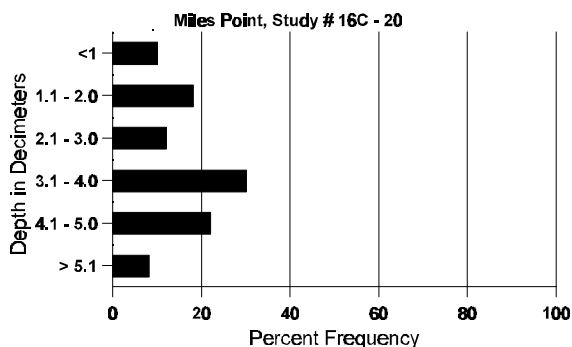
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	321	338	13.50	44.13	44.77
Rock	263	157	3.75	7.74	6.75
Pavement	193	212	3.50	1.18	6.38
Litter	385	371	58.75	42.52	43.77
Cryptogams	4	4	0	.03	.18
Bare Ground	259	245	20.50	18.95	16.36

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 20, Study Name: Miles Point

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.9	51.0 (17.0)	7.5	24.7	29.4	45.8	3.1	6.0	128.0	0.5

Stoniness Index



PELLET GROUP DATA --

Herd unit 16C, Study no: 20

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	11	10	n/a
Elk	31	24	70 (173)
Deer	9	2	3 (7)
Cattle	-	2	2 (5)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 20

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				
Amelanchier utahensis																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	2	-	-	-	-	-	-	-	-	-	-	-	40	33	40	2	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	0	36	20	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	40		-			
												'99	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	88	1	-	-	-	-	-	-	1	-	66		1
	94	-	-	-	-	-	-	-	-	-	0		0
	99	4	-	-	1	-	-	-	-	4	-	100	5
Y	88	19	8	1	-	-	-	-	28	-	1866		28
	94	10	-	-	-	-	1	-	11	-	220		11
	99	14	2	-	2	-	-	-	18	-	360		18
M	88	6	5	-	-	-	-	-	10	1	733	22 32	11
	94	103	27	-	-	2	-	-	132	-	2640	21 33	132
	99	92	52	2	-	2	-	-	144	-	2960	22 32	148
D	88	-	1	2	-	-	-	-	3	-	200		3
	94	30	6	1	-	-	-	-	24	-	740		37
	99	20	5	-	1	-	-	-	15	-	520		26
X	88	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	600		30
	99	-	-	-	-	-	-	-	-	-	800		40
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		33%		07%		00%		+22%					
'94		19%		.55%		07%		+ 6%					
'99		32%		01%		08%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	2799	Dec:	7%
										'94	3600		21%
										'99	3840		14%
<i>Chrysothamnus depressus</i>													
S	88	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	1	-	20		1
	99	-	-	-	-	-	-	-	-	-	0		0
Y	88	2	2	-	-	-	-	-	4	-	266		4
	94	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	2	-	40		2
M	88	18	27	11	-	-	1	-	56	-	3800	3 7	57
	94	23	9	10	-	-	-	-	42	-	840	4 8	42
	99	24	11	24	8	-	-	-	67	-	1340	4 7	67
D	88	8	1	1	-	-	-	-	9	-	666		10
	94	4	-	-	-	-	-	-	4	-	80		4
	99	2	-	-	-	2	1	-	2	-	100		5
X	88	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		42%		17%		03%		-81%					
'94		20%		22%		00%		+38%					
'99		18%		34%		04%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	4732	Dec:	14%
										'94	920		9%
										'99	1480		7%

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				
Chrysothamnus vaseyi																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	29	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	19	25	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	40		-			
Chrysothamnus viscidiflorus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	88	22	-	-	-	-	-	-	-	-	22	-	-	-	1466			22
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	99	16	2	-	-	-	-	-	-	-	18	-	-	-	360			18
M	88	63	-	-	-	-	-	-	-	-	63	-	-	-	4200	10	12	63
	94	201	2	-	26	-	-	2	-	-	229	-	2	-	4620	8	13	231
	99	136	29	-	4	-	-	-	-	-	169	-	-	-	3380	9	11	169
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	99	15	-	-	1	-	-	-	-	-	12	-	-	4	320			16
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-16%							
'94		.83%			00%			.83%			-15%							
'99		15%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	5666	Dec:	0%			
												'94	4780		2%			
												'99	4060		8%			
Sambucus cerulea																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	30	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	22	24	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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						
Symphoricarpos oreophilus														
S	88	3	-	-	-	-	-	-	3	-	-	200		3
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	1	-	-	20		1
Y	88	6	4	6	-	-	-	2	-	-	-	1200		18
	94	3	-	-	-	-	-	-	3	-	-	60		3
	99	13	-	-	1	-	-	-	14	-	-	280		14
M	88	-	7	2	-	-	-	-	9	-	-	600	13 33	9
	94	44	-	6	13	-	-	11	74	-	-	1480	11 32	74
	99	42	22	-	4	-	-	-	68	-	-	1360	11 23	68
D	88	-	-	-	-	-	-	-	-	-	-	0		0
	94	3	-	-	-	-	-	-	2	-	-	60		3
	99	1	-	-	3	-	-	-	2	-	-	80		4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'88		41%		30%		04%		-11%						
'94		00%		08%		01%		+ 7%						
'99		26%		00%		02%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	1800	Dec:	0%	
										'94	1600		4%	
										'99	1720		5%	
Tetradymia canescens														
Y	88	1	-	-	-	-	-	-	1	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	1	-	-	20		1
M	88	1	2	1	-	-	-	-	4	-	-	266	7 10	4
	94	8	-	-	-	-	-	-	8	-	-	160	9 9	8
	99	10	5	-	-	-	-	-	15	-	-	300	8 9	15
D	88	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	1	-	-	20		1
	99	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'88		40%		20%		00%		-46%						
'94		00%		00%		00%		+44%						
'99		31%		00%		00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	332	Dec:	0%	
										'94	180		11%	
										'99	320		0%	

Trend Study 16C-21-99

Study site name: North Horn Cap .

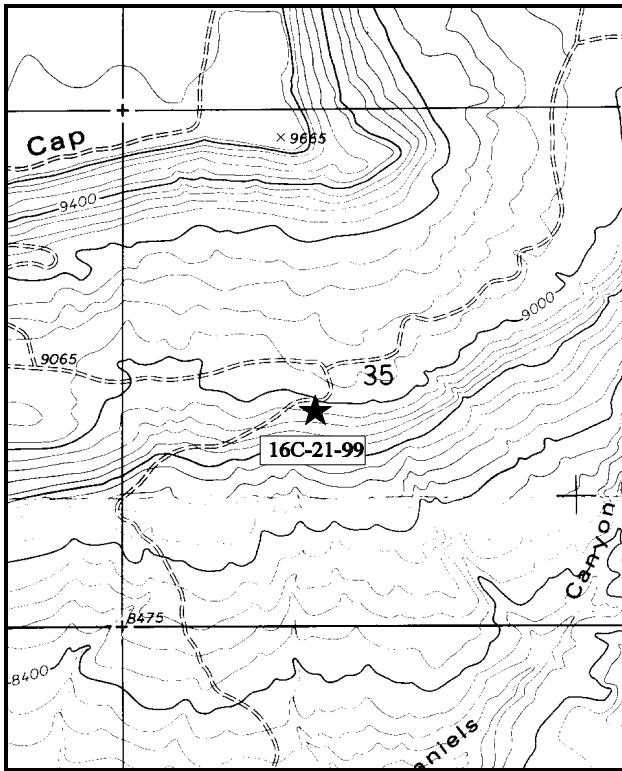
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 180°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

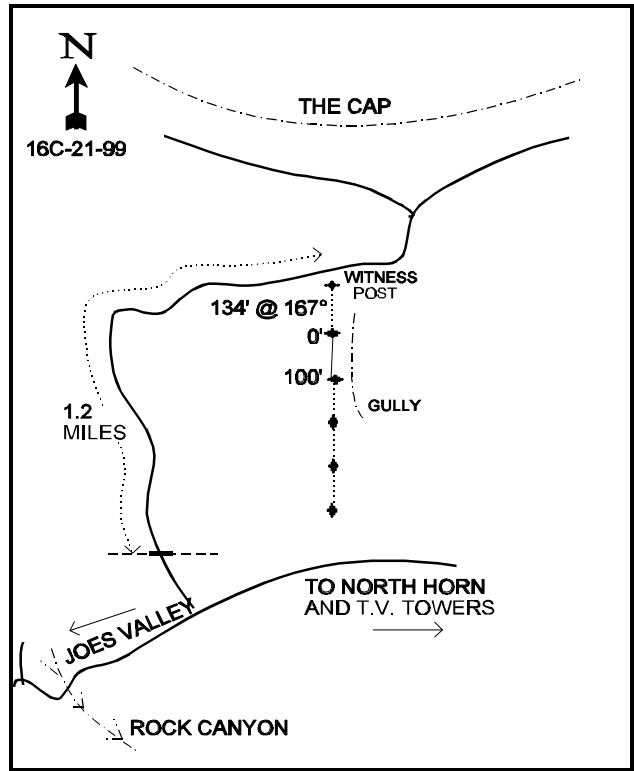
LOCATION DESCRIPTION

Starting on the southwest side of Joes Valley Reservoir, follow the main road up North Dragon Creek to a three-way fork at the upper end. Bear left and follow the main road about four miles to an intersection. From the intersection of the North Horn and South Horn roads, continue on the North Horn road towards the Emery County TV towers for 1.3 miles to a fork. Turn left towards The Cap and go 0.2 miles to a cattleguard. Continue up the dugway 1.2 miles to a witness post on the south side of the road. From the witness post, walk down the steep slope 134 feet (167°) to the start of the baseline. The 0-foot stake, a 2' metal fencepost, is marked by browse tag #9017.



Map Name: The Cap ,

Township 18S , Range 6E , Section 35



Diagrammatic Sketch

UTM 4339979.552 N, 481141.809 E

DISCUSSION

Trend Study No. 16C-21 (31-19)

The North Horn Cap trend study is situated on a moderately steep, southern slope of The Cap of North Horn Mountain. Slope varies from almost 30% to 55%, the overall average would be about 40%. The site overlooks the gentle, chained slopes and sagebrush/grass valley below. Large contoured terraces traverse the entire length of The Cap. A contour trenching and seeding treatment was done by the Forest Service in the 1960's to curb serious soil erosion. The study site runs down slope crossing several terraces. It is classified as a mixed mountain brush range type. The site is on a slope that faces directly south. At 9,000 feet in elevation, the site is generally too high for normal deer winter range but is used by elk and some moose. Cattle graze the area as part of the Horn Mountain Allotment. Cattle use the slope only occasionally, as herbaceous forage for cattle is limited. The very steep character of the slope, which varies from 27% along the 1st 100 feet to 55% along the last 200 feet, has definite effects upon the vegetation and animal use of the site. Pellet group data from 1999 estimate 7 deer, 34 elk and 2 cow days use/acre (17 ddu/ha, 84 edu/ha, and 5 cdu/ha). Most of the pellet groups were found along the first 200 feet of the baseline where the slope is not as steep.

The steep slope has obvious and unavoidable negative affects on soil stability. There is continuous soil loss from the loose, bare spots with deep-cut gullies nearby. Accumulation of sediment is apparent in the generally well-vegetated and effective terraces. Seeded grasses are restricted to the terraces, and the native grass, Salina wildrye, has only limited value in holding the soil on the steeper areas between terraces. The soil has a clay texture with a slightly alkaline pH (7.7). Soil depth varies from fairly deep to moderately shallow, but effective rooting depth averages more than 20 inches. Both phosphorus and potassium are limited at 3.9 and 35.2 ppm. Values less than 10 ppm for phosphorus and 70 ppm for potassium are known to inhibit normal plant growth and development.

The key species for wintering big game on this site are Utah serviceberry and true mountain mahogany. These two shrubs accounted for 72% of the shrub cover in 1994 and 75% in 1999. Due to the greatly increased sample size more serviceberry was encountered in 1994 and 1999 than in 1988. These plants average 4 to 5 feet in height, are moderately to heavily hedged, and in good vigor. Many plants have grown tall enough to be partly unavailable to browsing. The true mountain mahogany population appears stable and average 2-3 feet tall. The population is becoming increasingly mature. They show continued heavy use since 1988. Vigor is good however, with percent decadence very low. Other species include, mountain big sagebrush, stickyleaf low rabbitbrush, broom snakeweed, Woods rose, and snowberry.

The herbaceous understory is abundant along the first 200 feet of the baseline, but as the slope steepens further down the baseline, herbaceous plants become more rare and bare ground abundant. The dominant understory species is Salina wildrye which provided 97% of the grass cover and 88% of the total herbaceous cover in 1994. Currently ('99) it accounts for 76% of the grass cover and 67% of the total herbaceous cover. This coarse, unpalatable bunchgrass did not appear to be utilized in 1994 or 1999. Forbs are uncommon and produce less than 2% total cover.

1994 TREND ASSESSMENT

Although litter cover has decreased by 60% (mostly because the baseline was lengthened), bare ground has remained similar to 1998 estimates. A majority of the vegetative cover is from browse with very little offered by forbs. Soil trend appears to be stable with little erosion apparent. Browse trend is stable. The large increase in the Utah serviceberry is due to increased sample size. True mountain mahogany has a stable population with good biotic potential although a slight increase in decadency. Herbaceous understory trend is down slightly. The dominant species, Salina wildrye, significantly decreased in its summed nested frequency. Summed nested frequency for grasses decreased while those of forbs increased slightly. All the forbs together make up only 4% of the total herbaceous cover.

TREND ASSESSMENT

soil - down slightly and in poor condition

browse - stable

herbaceous understory - stable, mostly Salina wildrye with very few forbs

1999 TEND ASSESSMENT

Trend for soil is slightly up, but still in poor condition with accelerated erosion occurring between contoured terraces. Percent bare ground has declined while litter cover has increased. In addition, sum of nested frequency for grasses and forbs has increased. Trend for the key browse species, serviceberry and true mountain mahogany, appear to be down slightly. Use is heavier, population densities have declined, and young recruitment is down on both species. Serviceberry is starting to grow tall enough to be partly unavailable to browsing. The proportion of plants displaying poor vigor has increased and percent decadence has gone up from 7% to 22%. Trend for the herbaceous understory is up slightly. Sum of nested frequency of perennial grasses has gone up slightly. However, sum of nested frequency for Salina wildrye, the dominant species, has remained similar to 1994. Forbs are still very limited, but sum of nested frequency has also increased slightly.

TREND ASSESSMENT

soil - slightly up, but still in poor condition

browse - down slightly

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 21

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	a-	a-	b23	-	-	9	-	2.04
G	Agropyron intermedium	a-	a3	b24	-	1	9	.38	.14
G	Agropyron spicatum	-	3	15	-	2	6	.01	1.24
G	Carex spp.	3	-	7	1	-	3	-	.06
G	Elymus salina	b244	a183	a176	89	62	60	13.91	10.89
G	Poa fendleriana	-	-	2	-	-	1	-	.03
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		247	189	247	90	65	88	14.30	14.42
Total for Grasses		247	189	247	90	65	88	14.30	14.42
F	Arenaria spp.	-	-	1	-	-	1	-	.00
F	Aster chilensis	a-	ab2	b16	-	1	5	.00	.45
F	Astragalus convallarius	-	3	-	-	1	-	.03	-
F	Astragalus megacarpus	-	2	3	-	2	2	.30	.04
F	Cymopterus spp.	a-	a-	b5	-	-	3	-	.01
F	Eriogonum umbellatum	-	1	4	-	1	2	.03	.01
F	Hedysarum boreale	-	-	-	-	-	-	-	.03
F	Helianthella uniflora	a-	b11	a-	-	5	-	.98	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Hymenoxys richardsonii</i>	a-	a-	b ⁴	-	-	3	-	.18
F	<i>Lesquerella</i> spp.	-	-	1	-	-	1	-	.03
F	<i>Lomatium nuttallii</i>	6	-	-	2	-	-	-	-
F	<i>Machaeranthera grindelioides</i>	-	-	2	-	-	2	.00	.06
F	<i>Penstemon caespitosus</i>	1	1	-	1	1	-	.00	-
F	<i>Penstemon</i> spp.	1	2	-	1	1	-	.03	-
F	<i>Petradoria pumila</i>	a-	a-	b ¹³	-	-	7	-	.54
F	<i>Phlox austromontana</i>	2	5	5	1	2	4	.03	.21
F	<i>Physaria chambersii</i>	8	7	7	3	4	5	.04	.19
F	<i>Schoenrambe linifolia</i>	b ⁷	a-	ab ¹	4	-	1	-	.00
F	<i>Senecio multilobatus</i>	-	-	4	-	-	1	-	.00
F	Unknown forb-perennial	2	-	3	1	-	1	-	.00
F	<i>Zigadenus paniculatus</i>	-	-	2	-	-	1	-	.00
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		27	34	71	13	18	39	1.46	1.79
Total for Forbs		27	34	71	13	18	39	1.46	1.79

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

BROWSE TRENDS --

Herd unit 16C, Study no: 21

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	<i>Amelanchier utahensis</i>	35	37	11.01	16.03
B	<i>Artemisia frigida</i>	0	0	-	-
B	<i>Artemisia tridentata vaseyana</i>	21	22	2.79	3.75
B	<i>Cercocarpus montanus</i>	45	36	7.94	7.24
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	19	13	.54	.63
B	<i>Eriogonum corymbosum</i>	0	0	-	-
B	<i>Gutierrezia sarothrae</i>	4	10	.33	.09
B	<i>Mahonia repens</i>	0	2	-	.00
B	<i>Pinus edulis</i>	0	2	.15	-
B	<i>Pinus flexilis</i>	0	1	-	.63
B	<i>Rosa woodsii</i>	10	11	.52	.60
B	<i>Sambucus cerulea</i>	0	1	-	.74
B	<i>Symphoricarpos oreophilus</i>	27	32	2.96	1.05
B	<i>Tetradymia canescens</i>	0	3	-	.33
Total for Browse		161	170	26.26	31.12

CANOPY COVER --

Herd unit 16C, Study no: 21

Species	Percent Cover 09
Amelanchier utahensis	11
Pinus flexilis	2

BASIC COVER --

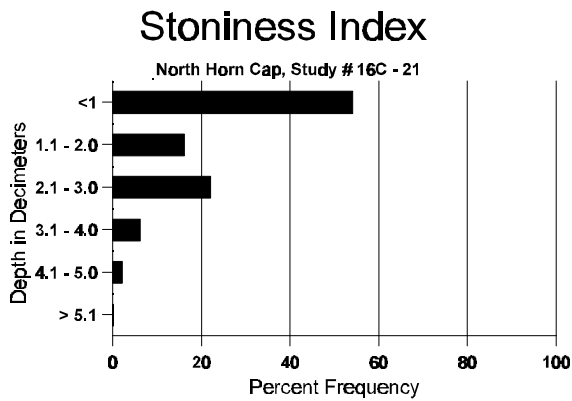
Herd unit 16C, Study no: 21

Cover Type	Nested Frequency		Average Cover %		
	04	09	'88	'94	'99
Vegetation	249	264	6.50	37.77	43.00
Rock	252	212	12.75	14.61	14.06
Pavement	184	215	1.50	1.68	7.17
Litter	341	343	47.75	19.15	37.26
Cryptogams	3	-	0	.00	0
Bare Ground	330	291	31.50	31.32	25.20

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 21, Study Name: North Horn Cap

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
20.6	51.2 (17.6)	7.7	29.1	25.1	45.8	1.9	3.9	35.2	0.4



PELLET GROUP DATA --
Herd unit 16C, Study no: 21

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'84	'89	
Rabbit	16	30	n/a
Moose	5	-	0
Elk	12	11	34 (84)
Deer	3	7	7 (17)
Cattle	-	-	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 21

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.		
Amelanchier utahensis																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33	-	-	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	12	-	-	2	-	-	-	-	-	14	-	-	-	280	-	-	14
Y	88	-	1	-	-	-	-	-	-	-	1	-	-	-	33	-	-	1
	94	24	7	1	6	-	-	-	-	-	38	-	-	-	760	-	-	38
	99	7	2	6	-	1	-	-	-	-	16	-	-	-	320	-	-	16
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	20	53	15	-	-	3	-	-	-	90	-	-	1	1820	47	43	91
	99	-	2	10	-	1	10	15	-	-	38	-	-	-	760	57	65	38
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	33	-	-	1
	94	6	1	3	-	-	-	-	-	-	3	-	-	7	200	-	-	10
	99	-	1	5	-	-	6	3	-	-	7	-	-	8	300	-	-	15
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	180	-	-	9
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		50%			50%			00%			+98%							
'94		44%			16%			06%			-50%							
'99		10%			54%			12%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	50%			
												'94	2780		7%			
												'99	1380		22%			
Artemisia frigida																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	9	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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											
<i>Artemisia tridentata vaseyana</i>																
S	88	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	20		1
Y	88	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	7	1	-	-	-	-	-	-	-	8	-	-	160		8
M	88	-	2	1	1	-	-	-	-	-	4	-	-	133	8 18	4
	94	24	13	1	-	-	-	-	-	-	38	-	-	760	20 26	38
	99	9	-	5	2	-	-	-	-	-	16	-	-	320	12 25	16
D	88	2	-	-	-	-	1	-	-	-	3	-	-	100		3
	94	6	-	-	2	-	-	-	-	-	2	-	-	160		8
	99	2	-	5	-	-	-	-	-	-	3	-	-	140		7
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	320		16
	99	-	-	-	-	-	-	-	-	-	-	-	-	180		9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		29%			29%			00%			+75%					
'94		28%			02%			13%			-33%					
'99		03%			32%			13%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	233	Dec:	43%			
										'94	920		17%			
										'99	620		23%			
<i>Cercocarpus montanus</i>																
S	88	2	-	-	-	-	-	-	-	-	2	-	-	66		2
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	1	-	-	-	-	-	1	-	-	20		1
Y	88	4	2	18	-	-	-	-	-	-	24	-	-	800		24
	94	26	-	-	-	-	-	-	-	-	26	-	-	520		26
	99	3	4	-	-	-	-	-	-	-	7	-	-	140		7
M	88	3	1	16	-	-	-	-	-	-	20	-	-	666	39 45	20
	94	14	25	14	-	-	2	-	-	-	55	-	-	1100	29 36	55
	99	-	2	27	-	-	7	2	-	-	32	6	-	760	33 38	38
D	88	-	1	1	-	-	-	-	-	-	2	-	-	66		2
	94	1	-	9	-	-	-	-	-	-	3	-	-	200		10
	99	-	-	-	-	-	2	1	-	-	2	1	-	60		3
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		09%			76%			00%			+16%					
'94		27%			27%			08%			-47%					
'99		13%			75%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	1532	Dec:	4%			
										'94	1820		11%			
										'99	960		6%			

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				
Chrysothamnus depressus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	8	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	88	2	-	1	-	-	-	-	-	-	3	-	-	-	100			3
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	10	1	-	-	-	-	-	-	-	11	-	-	-	366	7	9	11
	94	38	-	-	1	-	-	-	-	-	39	-	-	-	780	6	9	39
	99	17	-	-	1	-	-	-	-	-	18	-	-	-	380	10	11	19
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	320			16
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		07%			07%			00%			+43%							
'94		00%			00%			00%			-44%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	466	Dec:	0%			
												'94	820		0%			
												'99	460		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		1	2					
<i>Eriogonum corymbosum</i>													
S	88	1	-	-	-	-	-	-	1	-	33		1
	94	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	0		0
Y	88	1	-	-	-	-	-	-	1	-	33		1
	94	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	0		0
M	88	1	2	-	-	-	-	-	3	-	100	9 13	3
	94	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	-	-	-	-	-	-	-	-	0	- -	0
D	88	-	2	10	-	-	-	-	12	-	400		12
	94	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'88		25%			63%			00%					
'94		00%			00%			00%					
'99		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'88	533	Dec:	75%
										'94	0		0%
										'99	0		0%
<i>Gutierrezia sarothrae</i>													
Y	88	5	-	-	-	-	-	-	5	-	166		5
	94	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	0		0
M	88	11	-	-	-	-	-	-	11	-	366	5 6	11
	94	28	-	-	-	-	-	-	28	-	560	7 9	28
	99	22	-	-	-	-	-	-	22	-	440	7 9	22
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'88		00%			00%			00%		+ 5%			
'94		00%			00%			00%		-21%			
'99		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'88	532	Dec:	-
										'94	560		-
										'99	440		-

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				
Mahonia repens																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	4	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	220		-				
Pinus edulis																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	40		-				
Pinus flexilis																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	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				
Rosa woodsii																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	24	-	-	3	-	-	-	-	-	27	-	-	-	540			27
	99	70	-	-	-	-	-	-	-	-	70	-	-	-	1400			70
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	58	-	-	1	-	-	-	-	-	59	-	-	-	1180	9	8	59
	99	38	-	-	-	-	-	-	-	-	38	-	-	-	760	7	6	38
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%			+20%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	1720		-			
												'99	2160		-			
Sambucus cerulea																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	60	65	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	20		-			
Symphoricarpos oreophilus																		
Y	88	3	2	-	1	-	-	4	-	-	10	-	-	-	333			10
	94	23	-	-	3	-	-	-	-	-	26	-	-	-	520			26
	99	10	-	-	1	-	-	-	-	-	11	-	-	-	220			11
M	88	-	3	-	-	-	-	1	-	-	4	-	-	-	133	12	10	4
	94	52	7	-	5	-	-	-	-	-	64	-	-	-	1280	14	22	64
	99	31	2	-	5	-	-	5	-	-	43	-	-	-	860	16	26	43
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	3	-	-	-	-	-	-	-	-	2	-	-	1	60			3
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		36%			00%			00%			+75%							
'94		08%			00%			01%			-40%							
'99		04%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	466	Dec:	0%			
												'94	1860		3%			
												'99	1120		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									
Tetradymia canescens																	
Y	88	5	-	1	-	-	-	-	-	6	-	-	-	200			6
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		
M	88	5	-	-	-	-	-	-	-	5	-	-	-	166	6	7	5
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	6	9	0
	99	8	-	-	-	-	-	-	-	8	-	-	-	160	8	12	8
D	88	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	1	-	-	-	-	-	1	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			08%			00%									
'94		00%			00%			00%									
'99		00%			09%			09%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	399	Dec:	8%				
										'94	0		0%				
										'99	220		9%				

Trend Study 16C-22-99

Study site name: North Horn-Rock Canyon .

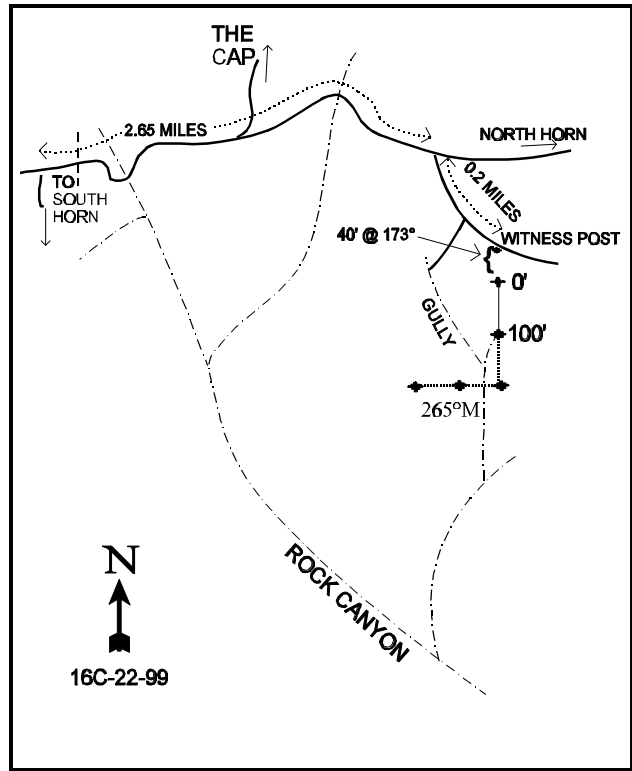
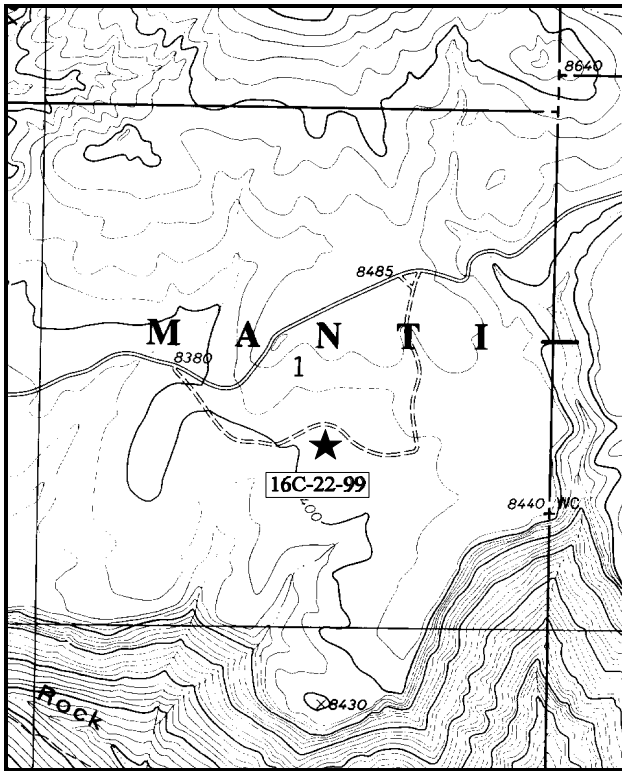
Range type Big Sagebrush-Grass .

Compass bearing: frequency baseline 173°M-lines 1 & 2; 265°M-lines 3 & 4.

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 North Horn and South Horn roads, continue on the graded North Horn road. Go 0.8 miles and cross the upper end of Rock Canyon. Continue on main road 1.85 miles to a small fork. Bear right onto the dirt road (#130), and proceed 0.2 miles to a witness post on the right hand side of the road. The frequency baseline starts 40 feet south of the tall witness post. The 0-foot baseline stake is marked by a red browse tag #9008.



Map Name: The Cap ,

Diagrammatic Sketch

Township 19S, Range 6E, Section 1

UTM 4338259.909 N, 482827.112 E

DISCUSSION

Trend Study No. 16C-22 (31-20)

The North Horn-Rock Canyon study is located in a small basin at the head of Rock Canyon. The Rock Canyon drainage is a migration route from the high elevation range on North Horn and South Horn mountains down to pinyon-juniper and desert shrub winter range. The range type at the study site is sagebrush/grass, containing a mixture of mountain big sagebrush and black sagebrush with scattered mountain brush on the hillsides. Ponderosa pine, pinyon, and juniper trees are found in the drainages and along the canyon edge. The site has a southwest aspect on a slope that varies from 3-5% with an elevation of 8,400 feet. The small basin has never been terraced or seeded. The study site shows evidence of moderate use from both deer and elk. Cattle sign is relatively infrequent, possibly because grasses are more limited here than on surrounding terraced and seeded areas. Pellet group data from 1999 estimate 29 deer, 13 elk, and 15 cow days use/acre (72 ddu/ha, 32 edu/ha, and 37 cdu/ha). Most of the cattle pats were from the previous season but some were from earlier this summer.

Sandstone bedrock is exposed near the canyon edge. However, up the slope where sagebrush dominates, the soil appears to be relatively shallow. There are some more shallow spots of underlying bedrock favoring the more shallow rooted black sagebrush. Effective rooting depth is estimated at a little over 12 inches over the site. The sandy clay loam soil has a fairly high concentration of pavement and rock fragments in upper horizons and on the surface. Phosphorus is low at 5.5 ppm, where values less than 10 ppm are known to limit normal plant growth and development. Bare ground is fairly abundant in the shrub interspaces but there is little erosion occurring on the site.

A mixture of mountain big sagebrush and black sagebrush provides most of the forage on this site. Some individuals were difficult to identify and are most likely hybrids. Black sagebrush is more numerous and provided 50% of the shrub cover in 1994 and 44% in 1999. It numbered 11,266 mostly mature and decadent plants/acre in 1988. During the 1994 reading there were an estimated 5,160 plants/acre and in 1999, 5,580 plants/acre. The increased sample size used in 1994 and 1999 are largely responsible for the change in density due to the lack of large numbers of dead plants. Black sagebrush has been lightly to moderately hedged and display good vigor. Most plants are mature with few young or seedlings sampled in 1994 or 1999. Percent decadence was moderately low at 24% in 1994 and 22% in 1999, but an increasing proportion of these decadent shrubs have been classified as dying, going from 18% to 28%.

Mountain big sagebrush provided 25% of the shrub cover in 1994 with a lower population density of 2,940 plants/acre. Density remained similar in 1999 with 2,520 plants/acre estimated. The majority of the population consist of mature and decadent plants with very few seedlings or young. Hedging has been light to moderate on most plants with some displaying heavy browsing. Vigor is normal on most plants, yet percent decadence is high and it has increased from 32% (1988) to 46% (1994), and 48% by 1999. Currently ('99) 40% of the decadent shrubs appear to be dying. This is an increase from 29% in 1994.

The site supports two species of rabbitbrush, dwarf (*Chrysothamnus depressus*) and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*). All of the rabbitbrush was called dwarf rabbitbrush in 1988 and 1994, but most of the rabbitbrush is actually stickyleaf low rabbitbrush. Dwarf rabbitbrush currently ('99) has a population density of 1,320 plants/acre. These shrubs are very low growing, averaging only 3 inches in height. Use was moderate to heavy and vigor good with percent decadence low. Stickyleaf low rabbitbrush is much more numerous at an estimated 7,700 plants/acre. These plants are mostly mature and unutilized. Other palatable browse species include Utah serviceberry and antelope bitterbrush. However, these species occur infrequently.

Grasses on average compose a majority of the herbaceous understory (90%). Western wheatgrass, muttongrass, and blue grama are the dominant grass species on this site. Bottlebrush squirreltail and needle-

and-thread grass were common in 1988 but have nearly disappeared from the site. Salina wildrye was picked up in the 1999 sample. A variety of low-growing forbs were sampled, but they do not provide much forage due to their low numbers.

1994 TREND ASSESSMENT

Bare ground has increased 14% with a decrease in litter and rock and pavement cover. Over half of the vegetative cover is from browse with the rest coming from grasses. Soil trend is slightly down. Key browse are mountain big sagebrush and black sagebrush. This appears to be a marginal site for mountain big sagebrush evidenced by mountain big sagebrush having nearly the same stature as black sagebrush. The mature mountain big sagebrush population declined by 41%, while the black sagebrush population declined by 54%. Most of these declines would be due to the much larger sample size utilized in 1994 which now gives much more accurate browse densities. Due to the dry conditions, very few seedling or young were encountered in 1994 for either species. Browse trend is slightly down. Summed nested frequency for grasses and forbs decreased since 1988 leading to a slightly down herbaceous trend.

TREND ASSESSMENT

soil - slightly down

browse - slightly down

herbaceous understory - slightly down especially for forbs

1999 TREND ASSESSMENT

Trend for soil appears to be stable. Percent cover of bare ground has declined with pavement cover increasing and litter cover declining slightly. Trend for browse is also stable for the time being. The black sagebrush population has increased slightly and percent decadence has declined from 24% to 22%. Reproduction is still poor however, with few seedlings and young plants encountered. Another negative aspect of the black sagebrush population is an increase in the proportion of decadent plants which appear to be dying (18% to 28%). There is currently not enough young plants to maintain the population. If recruitment does not improve in the future, the population will decline. Density of mountain big sagebrush declined slightly since 1994. Utilization is similar to 1994 levels, but the proportion of shrubs displaying poor vigor have increased. Percent decadence is high at 48%, a slight increase from 1994. In addition, the proportion of decadent plants classified as dying has increased from 29% to 40%. Recruitment for mountain big sagebrush is also inadequate to maintain the current population. Dwarf rabbitbrush is abundant and provides some additional forage. During the 1999 reading, most of what was called dwarf rabbitbrush (*Chrysothamnus depressus*) was actually stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*). The dwarf rabbitbrush displays moderate to heavy use while the stickyleaf low rabbitbrush is unutilized. Trend for the herbaceous understory is up slightly due to an increase in the sum of nested frequency of perennial grasses and forbs. Nested frequency of western wheatgrass declined significantly whereas frequency for mutton bluegrass increased significantly. Forbs are diverse but produce less than 2% cover.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up slightly

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 22

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Agropyron smithii</i>	ab206	b217	a173	69	81	69	4.14	3.12
G	<i>Bouteloua gracilis</i>	66	93	90	28	38	36	1.56	2.65
G	<i>Elymus salina</i>	a-	a-	b74	-	-	30	-	1.41
G	<i>Oryzopsis hymenoides</i>	a-	b5	b5	-	3	3	.07	.16
G	<i>Poa fendleriana</i>	a89	ab109	b131	42	39	51	1.37	3.34
G	<i>Poa secunda</i>	-	4	3	-	2	1	.03	.00
G	<i>Sitanion hystrix</i>	b85	a3	a27	35	1	13	.00	.67
G	<i>Stipa comata</i>	b47	a1	a-	19	1	-	.00	.00
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		493	432	503	193	165	203	7.19	11.38
Total for Grasses		493	432	503	193	165	203	7.19	11.38
F	<i>Allium</i> spp.	3	-	-	1	-	-	-	-
F	<i>Androsace septentrionalis</i> (a)	-	-	4	-	-	2	-	.03
F	<i>Antennaria microphylla</i>	-	1	-	-	1	-	.03	-
F	<i>Arabis</i> spp.	1	1	-	1	1	-	.00	-
F	<i>Astragalus convallarius</i>	-	2	-	-	1	-	.00	-
F	<i>Astragalus</i> spp.	-	3	2	-	1	1	.00	.03
F	<i>Castilleja linariaefolia</i>	b36	a4	a3	21	2	1	.03	.00
F	<i>Chaenactis douglasii</i>	b19	a-	b18	9	-	11	-	.16
F	<i>Crepis acuminata</i>	c22	a-	b6	13	-	5	-	.10
F	<i>Cryptantha</i> spp.	-	2	-	-	1	-	.00	-
F	<i>Eriogonum alatum</i>	-	-	1	-	-	1	-	.00
F	<i>Erigeron eatonii</i>	a7	ab24	b26	4	11	13	.13	.16
F	<i>Erigeron pumilus</i>	7	4	3	2	2	2	.01	.01
F	<i>Eriogonum racemosum</i>	14	13	23	6	8	13	.04	.29
F	<i>Eriogonum umbellatum</i>	-	-	2	-	-	1	-	.03
F	<i>Haplopappus acaulis</i>	a4	b12	a-	2	8	-	.18	-
F	<i>Ipomopsis aggregata</i>	a-	a-	b12	-	-	6	-	.03
F	<i>Lupinus argenteus</i>	a-	a-	b7	-	-	3	-	.06
F	<i>Machaeranthera canescens</i>	31	11	16	12	5	9	.02	.09
F	<i>Penstemon</i> spp.	-	1	-	-	1	-	.01	-
F	<i>Pediocactus simpsonii</i>	-	-	2	-	-	1	-	.03
F	<i>Penstemon watsonii</i>	2	7	6	1	4	4	.02	.05
F	<i>Phlox austromontana</i>	b18	a3	ab11	11	2	6	.01	.39
F	<i>Senecio multilobatus</i>	b29	a6	b49	15	3	24	.01	.24
F	<i>Sphaeralcea coccinea</i>	1	-	-	1	-	-	-	-
F	<i>Trifolium</i> spp.	-	-	1	-	-	1	-	.00
F	Unknown forb-perennial	1	-	2	1	-	1	-	.00

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
	Total for Annual Forbs	0	0	4	0	0	2	0	0.03
	Total for Perennial Forbs	195	94	190	100	51	103	0.52	1.72
	Total for Forbs	195	94	194	100	51	105	0.52	1.75

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

BROWSE TRENDS --

Herd unit 16C, Study no: 22

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	0	2	-	.03
B	Artemisia nova	74	76	7.72	8.48
B	Artemisia tridentata vaseyana	71	58	3.87	4.39
B	Chrysothamnus depressus	85	41	3.50	.64
B	Chrysothamnus viscidiflorus viscidiflorus	0	81	-	5.10
B	Gutierrezia sarothrae	22	34	.16	.52
B	Pediocactus simpsonii	1	3	.03	-
B	Pinus edulis	0	2	-	-
B	Purshia tridentata	0	5	-	.30
B	Symphoricarpos oreophilus	0	1	-	-
	Total for Browse	253	303	15.29	19.47

BASIC COVER --

Herd unit 16C, Study no: 22

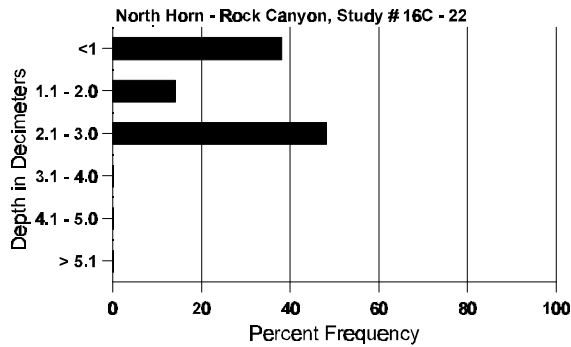
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	304	308	6.25	23.82	32.56
Rock	258	99	.25	5.92	2.12
Pavement	250	297	12.25	2.67	11.30
Litter	378	339	45.00	20.31	16.80
Cryptogams	186	179	1.50	2.53	4.10
Bare Ground	373	348	34.75	40.54	35.50

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 22, Study Name: North Horn - Rock Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.3	51.6 (13.5)	7.2	60.4	17.8	21.8	1.7	5.5	73.6	0.6

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 22

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	28	18	n/a
Elk	23	12	13 (32)
Deer	16	12	29 (72)
Cattle	-	3	15 (37)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 22

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																		
Y	'88	2	1	-	-	-	-	-	-	-	3	-	-	-	200			3
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'88	-	3	2	-	-	-	-	-	-	5	-	-	-	333	19	12	5
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	14	0
	'99	-	-	1	-	-	-	-	-	-	1	-	-	-	20	24	40	1
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	1	-	-	-	-	-	-	-	-	1	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		50%			25%			00%										
'94		00%			00%			00%										
'99		00%			100%			50%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	533	Dec:	0%			
												'94	0		0%			
												'99	40		50%			

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 nova</i>														
S	88	6	-	-	-	-	-	5	-	1	-	400		6
	94	2	-	-	-	-	-	2	-	-	-	40		2
	99	1	-	-	-	-	-	1	-	-	-	20		1
Y	88	13	1	-	-	-	-	14	-	-	-	933		14
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	5	1	-	-	-	-	6	-	-	-	120		6
M	88	85	7	1	-	-	-	90	-	3	-	6200	7 11	93
	94	167	28	2	-	-	-	195	2	-	-	3940	9 19	197
	99	126	62	25	-	-	-	213	-	-	-	4260	7 17	213
D	88	60	2	-	-	-	-	43	1	15	3	4133		62
	94	43	14	4	-	-	-	50	-	-	11	1220		61
	99	44	8	7	1	-	-	43	-	-	17	1200		60
X	88	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	180		9
	99	-	-	-	-	-	-	-	-	-	-	180		9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'88		06%			.59%			12%			-54%			
'94		16%			02%			04%			+ 8%			
'99		25%			11%			06%						
Total Plants/Acre (excluding Dead & Seedlings)										'88	11266	Dec:	37%	
										'94	5160		24%	
										'99	5580		22%	
<i>Artemisia tridentata vaseyana</i>														
S	88	7	-	-	-	-	-	7	-	-	-	466		7
	94	1	-	-	-	-	-	1	-	-	-	20		1
	99	1	-	-	-	-	-	1	-	-	-	20		1
Y	88	13	-	-	-	-	-	13	-	-	-	866		13
	94	2	-	-	-	-	-	2	-	-	-	40		2
	99	4	-	1	-	-	-	5	-	-	-	100		5
M	88	21	12	6	-	-	-	38	-	1	-	2600	10 15	39
	94	60	17	-	-	-	-	76	-	-	1	1540	9 20	77
	99	24	22	15	-	-	-	61	-	-	-	1220	11 24	61
D	88	18	4	3	-	-	-	20	-	4	1	1666		25
	94	37	28	3	-	-	-	48	-	-	20	1360		68
	99	22	22	11	5	-	-	36	-	-	24	1200		60
X	88	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	140		7
	99	-	-	-	-	-	-	-	-	-	-	240		12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'88		21%			12%			08%			-43%			
'94		31%			02%			14%			-14%			
'99		35%			21%			19%						
Total Plants/Acre (excluding Dead & Seedlings)										'88	5132	Dec:	32%	
										'94	2940		46%	
										'99	2520		48%	

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	88	6	-	-	-	-	-	3	-	-	9	-	-	-	600		9	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	12	1	-	-	-	-	-	-	-	13	-	-	-	866		13	
	94	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
	99	-	4	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	88	55	16	2	-	-	-	-	-	-	72	-	1	-	4866	3	6	73
	94	277	40	12	1	-	-	-	-	-	330	-	-	-	6600	3	8	330
	99	22	14	19	-	2	1	-	-	-	58	-	-	-	1160	3	7	58
D	88	7	-	1	1	-	-	-	-	-	6	-	3	-	600		9	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	2	-	2	-	-	-	-	3	-	-	1	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		18%			03%			04%			+ 8%							
'94		12%			03%			00%			-81%							
'99		33%			33%			02%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	6332	Dec:	9%				
											'94	6900		0%				
											'99	1320		6%				
Chrysothamnus viscidiflorus viscidiflorus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	20	-	-	-	-	-	-	-	-	20	-	-	-	400		20	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	341	-	-	-	-	-	-	-	-	341	-	-	-	6820	5	11	341
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	24	-	-	-	-	-	-	-	-	24	-	-	-	480		24	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	0		0%				
											'99	7700		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		1	2				
<i>Gutierrezia sarothrae</i>												
Y	88	2	-	-	-	-	-	-	2	-	2	
	94	5	-	-	-	-	-	-	5	-	5	
	99	3	-	-	-	-	-	-	3	-	3	
M	88	4	-	-	-	-	-	-	4	6	7	4
	94	43	-	-	-	-	-	-	43	4	23	43
	99	98	-	-	-	-	-	-	98	6	8	98
X	88	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	20	-	-	1
	99	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>		
'88		00%			00%			00%		+58%		
'94		00%			00%			00%		+52%		
'99		00%			00%			00%				
Total Plants/Acre (excluding Dead & Seedlings)									'88	399	Dec:	-
									'94	960		-
									'99	2020		-
<i>Pediocactus simpsonii</i>												
M	88	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	20	2	2	1
	99	4	-	-	-	-	-	-	80	3	4	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>		
'88		00%			00%			00%				
'94		00%			00%			00%		+75%		
'99		00%			00%			00%				
Total Plants/Acre (excluding Dead & Seedlings)									'88	0	Dec:	-
									'94	20		-
									'99	80		-
<i>Pinus edulis</i>												
S	88	1	-	-	-	-	-	-	66	-	-	1
	94	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	0	-	-	0
Y	88	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	40	-	-	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>		
'88		00%			00%			00%				
'94		00%			00%			00%				
'99		00%			00%			00%				
Total Plants/Acre (excluding Dead & Seedlings)									'88	0	Dec:	-
									'94	0		-
									'99	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				
Purshia tridentata																		
S	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	53	
	'99	-	2	8	-	-	-	-	-	-	10	-	-	-	200	10	52	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		20%			80%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	200		-				
Symphoricarpos oreophilus																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	20		-				

Trend Study 16C-23-99

Study site name: Black Dragon .

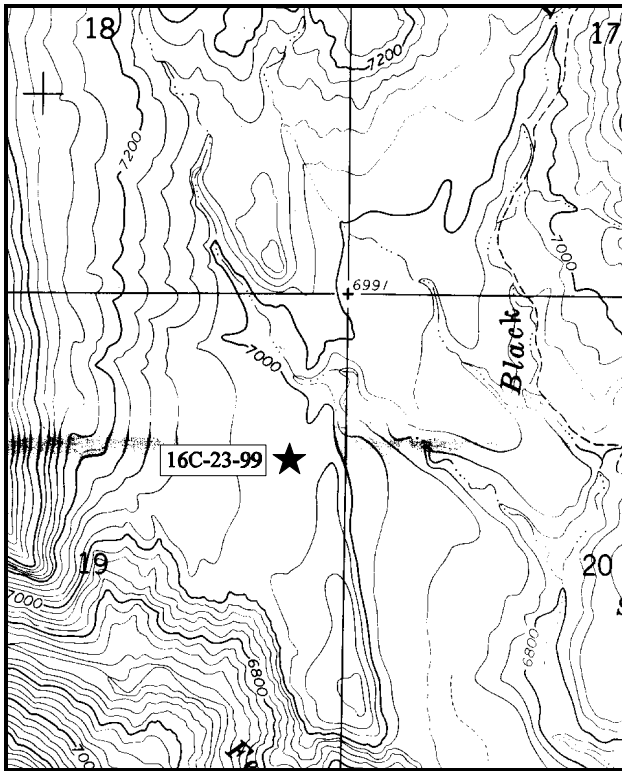
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 239°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

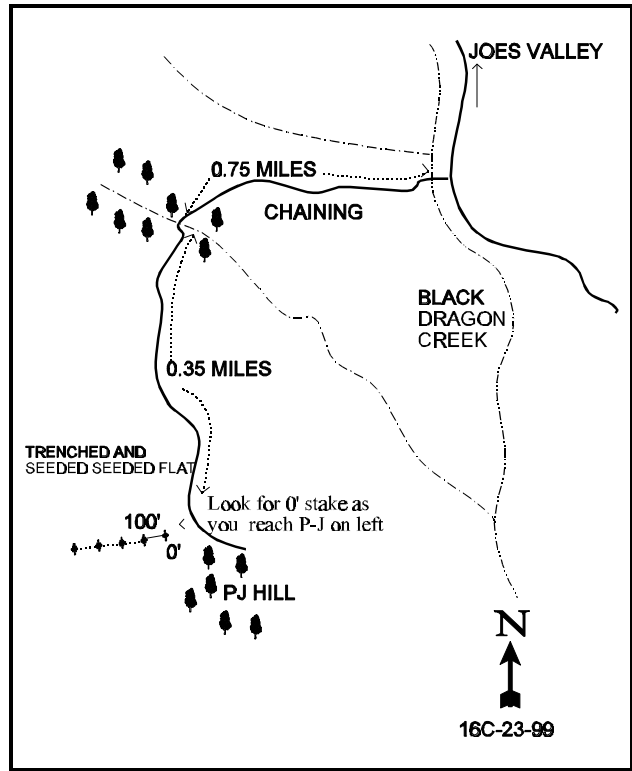
LOCATION DESCRIPTION

From the junction near the fence at the top of North Dragon Creek above Joes Valley, take the middle road (F.S. #170). Go down the Black Dragon trail 0.5 miles to a gate. Continue driving down the canyon 2.75 miles to a fork. Bear right across the creek. Proceed 0.75 miles through a chaining and down into a dry creek bottom. Cross and continue across a seeded sage flat for 0.35 miles to where the road turns to the left towards a P-J hill. There is a green fencepost on the right side of the road as a witness post. From the post, the 0-foot baseline stake is 117 feet bearing 221°, and is marked by tag #484.



Map Name: Ferron Canyon ,

Township 19S, Range 6E, Section 19



Diagrammatic Sketch

UTM 4333918.550 N, 475542.986 E

DISCUSSION

Trend Study No. 16C-23 (31-21)

The Black Dragon study site is located between Joe's Valley and Ferron Canyon. The Black Dragon area is important winter range for deer and increasingly important for elk. The pinyon-juniper type in the valley was chained and seeded. There are naturally open sagebrush flats, one of which was sampled by this trend study. The area was contour-trenched and seeded in 1965. It is now occupied by sagebrush and seeded grasses. The study site has an elevation of 7,000 feet. Drainage is generally south down Black Dragon Creek into Ferron Creek. On the study site, drainage is to the north and the aspect is more to the northeast. Like the two preceding studies, it is part of the Horn Mountain Allotment. Since it is a small unit, it is grazed by only a portion of the livestock in early spring. Use by cattle at the site is minimal due to lack of water in the area. Deer and elk appear to use the area moderately. Pellet group data from 1999 estimate 40 deer, 53 elk and 10 cow days use/acre (99 ddu/ha, 13 edu/ha, 25 cdu/ha). All of the cattle pats were from last season. Most of the elk and deer pellet groups were from winter, although a few of the elk pellet groups were from this spring ('99).

The soil appears to a moderate depth but strongly compacted, with a hardpan about 10-12 inches below the surface. The hard pan appears to be a calcium carbonate layer of cemented gravel. The soil is a fine-textured sandy clay loam with small gravel on the surface and within the profile. Parent material is a combination of limestone, sandstone, and quartz. The amount of phosphorus is marginal at 6.9 ppm and potassium is low at 60.8 ppm. Values less than 10 ppm for phosphorus and 70 ppm for potassium can limit normal plant growth and development. At intervals of 30 to 40 feet, there are contour-furrows which have effectively eliminated most problems from erosion. There is some bare soil exposed, especially on the top edges of the furrows, but generally there is adequate ground and vegetative cover. Between the evenly distributed shrubs and bunch grasses there are large patches of bare soil with a diffused covering of rocks and pavement. There is some localized erosion occurring, yet it is not serious due to the contour-furrows treatment.

A small statured mountain big sagebrush is the key browse species. It provided 40% of the browse cover in 1994 and 43% in 1999. Density was extremely high in 1988 with an estimated 49,799 plants/acre. However, 90% of these were very young plants. In 1994 there were 9,040 plants/acre estimated and in 1999, 10,180. Young plants accounted for 28% of the population in 1994, increasing to 54% by 1999. Utilization of the sagebrush has become increasingly heavy with 74% of the sagebrush sampled displaying heavy use in 1999. Nevertheless, vigor is good and percent decadence is low at only 15% in 1999.

Another palatable browse species on the site consists of low growing winterfat. It currently ('99) shows moderate to heavy use and due to its small size, probably has been heavily utilized for many years. The population is almost entirely mature with a few young. Rabbitbrush is the most abundant shrub on the site with an estimated density of 18,780 plants/acre in 1994 and 19,680 in 1999. This population has shifted from mostly young plants in 1988 to mostly mature plants by 1994 and 1999 (88% and 93% respectively). These small shrubs average only 6 inches in height but provide 56% of the browse cover.

Herbaceous plants are moderately abundant. Crested wheatgrass provides most of the grass cover. It is especially dense within the contour furrows. Native needle-and-thread, bluebunch wheatgrass, bottlebrush squirreltail, and Indian ricegrass are also fairly numerous. Forbs are rare, producing less than 1% total cover and producing little useful forage. The most common species include prickly phlox and scarlet globemallow.

1994 TREND ASSESSMENT

Percent bare ground has decreased, although due to drought litter has decreased as well. Most of the ground cover is provided by grasses and browse. Soil trend is stable at this time. Mountain big sagebrush shows an expanding population with 28% of the population consisting of young plants. Most of the sagebrush is lightly

to moderately hedged. Percent decadency is low at 16%. Rabbitbrush also shows an expanding population with many of the young sampled in 1988 surviving to maturity by 1994. Browse trend is stable, although it could be considered slightly up if not for the abundance of the less desirable low rabbitbrush. Trend for herbaceous understory is slightly down with a decrease in sum of nested frequency for grasses and forbs combined. Sum of nested frequency of grasses has actually gone up slightly, with summed frequency of forbs dropping dramatically.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly down especially for forbs

1999 TREND ASSESSMENT

Trend for soil is stable with similar “relative percent” cover estimates for bare ground and litter. There is some localized erosion occurring between the contour furrows, but the treatment keeps erosion to a minimum. Trend for browse is also stable. Density of mountain big sagebrush has increased slightly and the proportion of young plants has increased. Percent decadence has remained stable although utilization is currently very heavy with 74% of the sagebrush sampled displaying heavy use. The population of the less desirable stickyleaf low rabbitbrush has increased slightly. It currently provides 56% of the shrub cover. The population is mostly mature (93%). Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has declined slightly, while nested frequency of the dominant crested wheatgrass has increased slightly. Both Indian ricegrass and needle-and-thread declined significantly in nested frequency. Forbs are rare and unimportant on this site. Nested frequency and cover for forbs has remained similar to 1994 levels.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 23

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	256	234	245	90	76	86	7.96	6.82
G	Agropyron intermedium	_b 63	_a 4	_a 8	24	2	5	.03	.07
G	Agropyron spicatum	6	6	16	3	3	7	.16	.45
G	Bouteloua gracilis	_a -	_b 31	_b 27	-	10	10	.90	.93
G	Oryzopsis hymenoides	_b 51	_c 77	_a 20	23	34	8	1.24	.33
G	Sitanion hystrix	_a 17	_a 29	_b 49	10	11	22	.30	.55
G	Sporobolus cryptandrus	-	1	4	-	1	2	.03	.01
G	Stipa comata	_{ab} 50	_b 78	_a 48	24	30	20	2.33	.71
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		443	460	417	174	167	160	12.97	9.90
Total for Grasses		443	460	417	174	167	160	12.97	9.90

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Astragalus calycosus</i>	_b 19	_a 2	_{ab} 7	10	2	6	.01	.03
F	<i>Calochortus nuttallii</i>	3	-	1	2	-	1	-	.00
F	<i>Chenopodium</i> spp. (a)	-	_b 6	_a -	-	3	-	.01	-
F	<i>Erigeron pumilus</i>	_b 21	_a -	_b 8	9	-	4	-	.07
F	<i>Machaeranthera canescens</i>	_b 37	_a 4	_a 3	23	2	2	.01	.06
F	<i>Microsteris gracilis</i> (a)	-	-	3	-	-	1	-	.00
F	<i>Phlox longifolia</i>	_c 164	_b 50	_a 17	64	25	8	.15	.06
F	<i>Senecio multilobatus</i>	1	-	-	1	-	-	-	-
F	<i>Sphaeralcea coccinea</i>	66	44	45	30	26	21	.24	.22
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	6	3	0	3	1	0.01	0.00
Total for Perennial Forbs		312	100	81	140	55	42	0.41	0.45
Total for Forbs		312	106	84	140	58	43	0.42	0.46

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

BROWSE TRENDS --

Herd unit 16C, Study no: 23

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	<i>Artemisia nova</i>	0	0	-	-
B	<i>Artemisia tridentata vaseyana</i>	95	96	5.84	7.78
B	<i>Ceratoides lanata</i>	17	16	.09	.12
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	95	92	7.64	10.25
B	<i>Opuntia</i> spp.	7	13	.04	.01
Total for Browse		214	217	13.62	18.17

BASIC COVER --

Herd unit 16C, Study no: 23

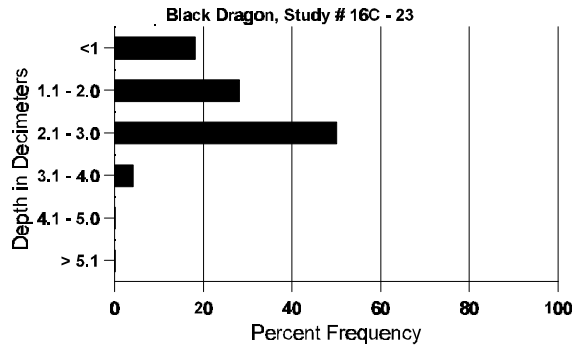
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	341	324	6.75	24.96	27.18
Rock	318	65	.75	4.69	.76
Pavement	185	275	10.00	.74	7.55
Litter	381	336	37.25	19.30	17.26
Cryptogams	28	23	1.00	.08	.11
Bare Ground	369	345	44.25	37.02	40.47

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 23, Study Name: Black Dragon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.4	65.6 (13.0)	7.1	57.4	16.7	25.8	1.7	6.9	60.8	0.7

Stoniness Index



PELLET GROUP DATA --

Herd unit 16C, Study no: 23

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Rabbit	36	14	n/a
Elk	29	44	53 (131)
Deer	38	22	40 (99)
Cattle	4	2	10 (25)

BROWSE CHARACTERISTICS --

Herd unit 16C, 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	5	6	7	8				9	
Artemisia nova														
Y	88	1	-	-	-	-	-	-	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	0		0
M	88	2	-	-	-	-	-	-	-	-	2	133	6 15	2
	94	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	-	-	-	-	0	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'88		00%			00%			33%						
'94		00%			00%			00%						
'99		00%			00%			00%						
Total Plants/Acre (excluding Dead & Seedlings)										'88	199	Dec:	-	
										'94	0		-	
										'99	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>Artemisia tridentata vaseyana</i>																	
S	88	62	2	-	1	-	-	-	-	-	65	-	-	-	4333		65
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	4	8	4	-	-	-	-	-	-	16	-	-	-	320		16
Y	88	656	5	8	-	-	-	-	-	-	667	-	2	-	44600		669
	94	124	3	-	-	-	-	-	-	-	127	-	-	-	2540		127
	99	41	47	172	-	-	13	-	-	-	273	-	-	-	5460		273
M	88	7	8	19	-	-	-	-	-	-	34	-	-	-	2266	8 12	34
	94	186	63	3	-	-	-	-	-	-	252	-	-	-	5040	9 18	252
	99	-	23	112	-	5	18	-	-	-	156	-	2	-	3160	11 22	158
D	88	16	12	16	-	-	-	-	-	-	37	-	2	5	2933		44
	94	52	19	-	2	-	-	-	-	-	41	-	-	32	1460		73
	99	-	9	57	-	7	5	-	-	-	58	-	3	17	1560		78
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	640		32
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		03%			06%			01%			-82%						
'94		19%			.66%			07%			+11%						
'99		18%			74%			04%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	49799	Dec:	6%			
											'94	9040		16%			
											'99	10180		15%			
<i>Ceratoides lanata</i>																	
Y	88	-	2	1	-	-	-	-	-	-	3	-	-	-	200		3
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	88	-	6	12	1	-	-	-	-	-	19	-	-	-	1266	4 3	19
	94	19	5	-	-	-	-	-	-	-	24	-	-	-	480	3 4	24
	99	3	20	2	-	3	2	-	-	-	29	1	-	-	600	7 7	30
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		36%			59%			00%			-65%						
'94		19%			00%			00%			+16%						
'99		74%			13%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	1466	Dec:	-			
											'94	520		-			
											'99	620		-			

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 viscidiflorus																		
S	88	29	-	-	-	-	-	-	-	-	29	-	-	-	1933		29	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	88	174	2	-	-	-	-	-	-	-	176	-	-	-	11733		176	
	94	112	-	-	-	-	-	-	-	-	112	-	-	-	2240		112	
	99	53	9	2	-	-	-	-	-	-	64	-	-	-	1280		64	
M	88	32	1	-	-	-	-	-	-	-	33	-	-	-	2200	5 8	33	
	94	825	-	-	-	-	-	-	-	-	825	-	-	-	16500	4 9	825	
	99	857	60	-	3	-	-	-	-	-	920	-	-	-	18400	6 12	920	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	2	-	-	-	-	-	-	-	-	2	-	-	40		2		
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		01%			00%			00%			+26%							
'94		00%			00%			00%			+ 5%							
'99		07%			.20%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	13933	Dec:	0%			
												'94	18780		0%			
												'99	19680		0%			
Opuntia spp.																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	2	-	-	-	-	-	-	-	-	2	-	-	40		2		
M	88	6	-	-	-	-	-	-	-	-	3	-	3	-	400	3 7	6	
	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140	3 6	7	
	99	12	-	-	-	-	-	-	-	-	12	-	-	-	240	3 14	12	
D	88	1	-	-	-	-	-	-	-	-	-	-	-	1	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	1	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			27%			-86%							
'94		00%			00%			00%			+53%							
'99		00%			00%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	999	Dec:	7%			
												'94	140		0%			
												'99	300		7%			

Trend Study 16C-24-99

Study site name: South Horn Exclosure .

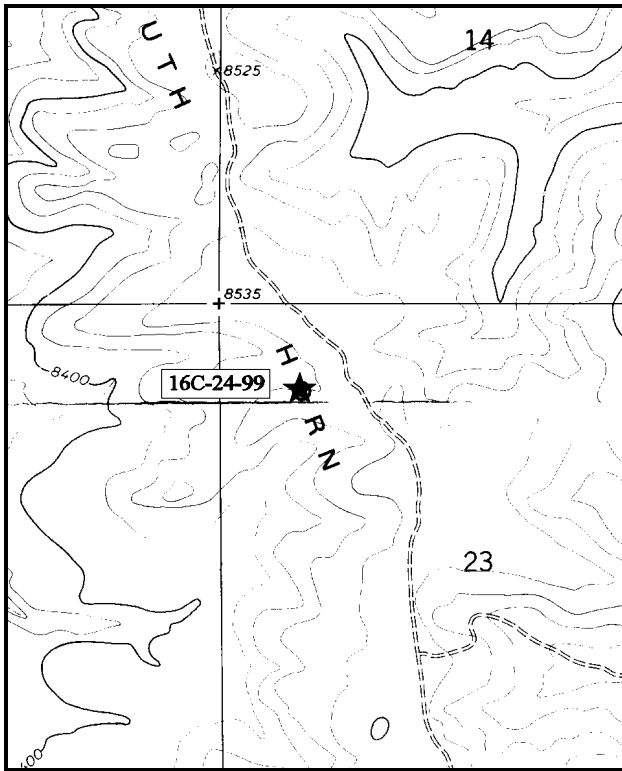
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 206°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

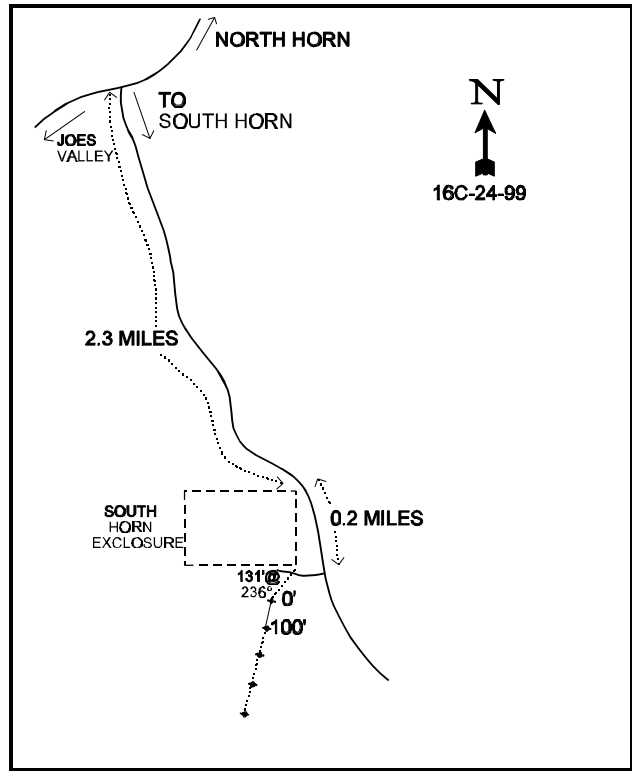
LOCATION DESCRIPTION

From the intersection of the North Horn and South Horn roads, turn right (south) onto the South Horn roadv(#21). Proceed 2.3 miles to the NE corner of an exclosure. Continue 0.2 miles past the exclosure to a faint road. Turn right onto this faint road and go 0.15 miles to the SE corner of the exclosure. The 0-foot baseline stake is approximately 130 feet southwest (236°) of the SE corner.



Map Name: The Cap

Township 19S, Range 6E, Section 23



Diagrammatic Sketch

UTM 4334202.893 N, 480762.528 E

DISCUSSION

Trend Study No. 16C-24 (31-22)

The South Horn Exclosure study samples a mixed mountain brush community dominated by true mountain mahogany and scattered, very old pinyon pine. The study is located on the south side of the South Horn Mountain Exclosure. It has a gradual 5% slope and a northwest aspect with an elevation of 8,500 feet. The site is representative of north slopes in the area which support a higher density of true mountain mahogany. The area is primarily used by elk in the winter, although sign of mule deer is also frequent. Rabbit sign is abundant. Grazed in the summer by cattle on the Horn Mountain allotment, this particular area receives less cattle use than the seeded sagebrush flats. Pellet group data from 1999 estimate 32 deer, 33 elk and only 3 cow days use/acre (79 ddu/ha, 82 edu/ha, and 7 cdu/ha). All cow pats were from last season. All of the deer and elk pellet groups appeared to be from the last winter.

Soil on the site is relatively shallow (effective rooting depth of just over 9 inches) and very rocky throughout the profile. The upper 6 inches is a visibly darker soil, beyond this, it is a light colored fine sand. Overall soil texture is a sandy loam with a neutral pH (6.8). Phosphorus and potassium are limited at just 4.2 ppm and 32 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium can limit normal plant growth and development. The majority of the soil surface is protected by vegetation and associated litter. The bare shrub interspaces do experience some soil loss and runoff, but the problem is not widespread or severe.

The site supports a variety of browse species. The key species include true mountain mahogany, serviceberry, and mountain big sagebrush. Mountain mahogany is represented by a small population of mostly mature plants which average a little over four feet in height, making some plants partly unavailable. They numbered an estimated 1,800 plants/acre in 1988 and only 200 plants/acre by 1994. The change in density is a reflection of the larger sample taken in 1994, which gives a more representative sample of aggregated shrub with discontinuous distributions. Density increased slightly to 320 plants/acre by 1999. The true mountain mahogany are vigorous, in good vigor, and display moderate to heavy hedging.

Mountain big sagebrush is the most common shrub on the site and some of the more open areas are completely dominated by it. It provided 36% of the shrub cover in 1994 and 47% in 1999. The sagebrush population currently ('99) numbers 2,540 plants/acre with good vigor and light to moderate hedging. Snowberry and Utah serviceberry are present at low densities. Mature serviceberry are very large averaging nearly seven feet in height making many plants partly unavailable. There are also some large tree-like curlleaf mountain mahogany. Both serviceberry and curlleaf mountain mahogany display moderate to heavy use on forage that is available. Large and very old pinyon and juniper trees are scattered throughout the site. Point quarter data from 1999 estimate 30 pinyon and 13 Rocky mountain juniper trees/acre. Average diameter of pinyon is estimated at 15 inches while juniper averages over 20 inches. Overhead canopy cover is variable, but averages 15% for pinyon and 3% for juniper.

The herbaceous understory is diverse but not very abundant. Eleven species of grasses encountered in 1999 produced only 5% cover and 21 species of forbs provided only an additional 3% cover. The most abundant grasses include, Salina wildrye, Indian ricegrass, mutton bluegrass, and Carex. Common forbs include, rockcress, bastard toadflax, and Eaton fleabane.

1994 TREND ASSESSMENT

Litter cover has decreased but is still extensive at 61%. Bare ground increased slightly with browse offering most of the vegetative cover. Soil trend is still considered stable. Mountain big sagebrush has a stable mature population, however 38% of the population is decadent and recruitment is down. Therefore, trend for browse is slightly down. Grasses and forbs have significantly decreased in nested frequency values indicating a slightly downward herbaceous understory trend.

TREND ASSESSMENT

soil - stable

browse - slightly down

herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare ground from 23% to 17% and a slight increase in litter. Vegetation cover has gone up, but most of the improvement comes from shrubs and trees, which increased in cover from 14% in 1994 to 24% in 1999. Herbaceous plants, which are more effective at holding soil in place, increased in cover from 6% to 9%. Localized erosion is occurring, although it is not a problem. Trend for browse is up slightly. Density of mountain big sagebrush has increased, recruitment is improved, and percent decadence has declined from 38% to 6%. True mountain mahogany is more heavily hedged but density has increased slightly, vigor is normal, and reproduction has improved. Serviceberry has also increased in density. Most of the plants are very large however and partially unavailable to browsing. Available portions of these shrubs display moderate to heavy use. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has remained similar to 1994 estimates, although nested frequency of perennial forbs increased slightly. Composition is diverse and very similar to 1994 with herbaceous plants only producing about 9% cover.

TREND ASSESSMENT

soil - up slightly

browse - up slightly

herbaceous understory - stable

1999 exclosure observations:

The nearby exclosure has more of a western aspect than the trend study site. The total exclosure contains a lot of curleaf mountain mahogany which are about 4 to 6 foot in height. They do not appear to be producing seed and they contain many yellow leaves. There are a few decadent tree-like curleaf. Visually, there appears to be little difference between outside and inside of the total exclosure with regard to sagebrush and grass cover and health. The livestock exclosure also appears to have similar health and vigor for sagebrush compared to outside. Grass composition and abundance also look similar. There are no curleaf mountain mahogany in the livestock exclosure. A few large highlined serviceberry plants occur in the livestock exclosure.

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 24

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron intermedium	b ₁₄₄	a ₇	3	55	3	1	.01	.00
G	Agropyron trachycaulum	a ₋	a ₂	b ₈₄	-	1	31	.03	.50
G	Carex spp.	b ₄₆	a ₁₄	ab ₂₃	20	8	12	.11	.82
G	Elymus salina	a ₋	c ₇₀	b ₄₃	-	30	19	.71	1.59
G	Festuca ovina	a ₋	b ₃₃	a ₃	-	14	2	.36	.03
G	Koeleria cristata	a ₋	c ₃₇	b ₆	-	13	3	.33	.06
G	Oryzopsis hymenoides	a ₋	b ₁₇	b ₂₁	-	8	11	.57	.79
G	Poa fendleriana	a ₋	b ₃₈	c ₅₈	-	16	25	.29	.81
G	Poa secunda	b ₆₀	a ₃₀	a ₁₃	31	12	5	.52	.22
G	Sitanion hystrix	a ₋	b ₆	a ₋	-	3	-	.01	-
G	Stipa comata	b ₅₆	a ₂₆	a ₅	23	12	3	.50	.04
G	Stipa lettermani	b ₁₁	a ₋	b ₉	6	-	5	-	.12
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		317	280	268	135	120	117	3.48	5.02
Total for Grasses		317	280	268	135	120	117	3.48	5.02
F	Androsace septentrionalis (a)	-	a ₋	b ₄₉	-	-	22	-	.18
F	Arabis spp.	61	64	57	27	28	21	.29	.35
F	Chenopodium album (a)	-	5	-	-	2	-	.01	-
F	Comandra pallida	b ₂₉	ab ₂₄	a ₂₀	13	8	8	.52	.60
F	Collinsia parviflora (a)	-	15	10	-	6	4	.05	.02
F	Crepis acuminata	b ₅₇	a ₆	a ₁₆	27	3	7	.04	.10
F	Cryptantha spp.	b ₃₈	a ₁₁	a ₁₆	20	8	6	.16	.27
F	Delphinium nuttallianum	b ₁₃	a ₋	a ₋	7	-	-	-	-
F	Eriogonum alatum	23	20	15	14	9	8	.34	.31
F	Eriogonum cernuum (a)	-	5	2	-	2	1	.01	.03
F	Erigeron eatonii	b ₇₅	a ₄₈	a ₄₂	35	20	18	.37	.24
F	Erigeron spp.	-	5	-	-	2	-	.01	-
F	Eriogonum umbellatum	b ₁₃	a ₁	a ₁	6	1	1	.00	.03
F	Gayophytum ramosissimum (a)	-	b ₉	a ₋	-	3	-	.06	-
F	Heterotheca villosa	a ₋	a ₋	b ₅	-	-	3	-	.21
F	Lappula occidentalis (a)	-	-	5	-	-	2	-	.01
F	Lupinus spp.	4	-	-	2	-	-	-	-
F	Machaeranthera canescens	b ₁₈	a ₂	a ₋	8	2	-	.03	.03
F	Penstemon humilis	b ₂₅	a ₂	a ₅	12	2	2	.01	.03
F	Penstemon spp.	-	-	5	-	-	2	-	.12
F	Phlox austromontana	b ₄₉	a ₉	a ₄	24	5	2	.21	.03
F	Phlox spp.	-	-	7	-	-	2	-	.18
F	Polygonum douglasii (a)	a ₋	c ₈₅	b ₂₁	-	29	9	.14	.04

Type	Species	Nestled Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Potentilla spp.	-	3	-	-	1	-	.00	-
F	Schoenrambe linifolia	_a -	_b 13	_c 46	-	5	20	.05	.40
F	Senecio multilobatus	_b 24	_a 4	_b 31	12	2	14	.01	.19
F	Sphaeralcea coccinea	_a -	_{ab} 4	_b 9	-	1	4	.00	.02
F	Townsendia spp.	_b 24	_a 2	_a -	9	1	-	.03	-
Total for Annual Forbs		0	119	87	0	42	38	0.28	0.29
Total for Perennial Forbs		453	218	279	216	98	118	2.11	3.14
Total for Forbs		453	337	366	216	140	156	2.40	3.43

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

BROWSE TRENDS --

Herd unit 16C, Study no: 24

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	2	6	2.32	1.83
B	Artemisia tridentata vaseyana	54	59	5.16	11.05
B	Cercocarpus ledifolius	3	4	-	.48
B	Cercocarpus montanus	10	15	4.22	4.55
B	Chrysothamnus viscidiflorus	18	16	.28	.24
B	Gutierrezia sarothrae	7	5	.04	.21
B	Juniperus osteosperma	-	-	.15	-
B	Leptodactylon pungens	11	11	.10	.54
B	Mahonia repens	0	0	-	-
B	Opuntia spp.	7	12	.07	.29
B	Pinus edulis	0	1	1.46	2.76
B	Purshia tridentata	2	2	-	-
B	Sambucus racemosa	0	0	-	-
B	Sclerocactus whipplei	0	0	-	-
B	Symphoricarpos oreophilus	13	16	.58	1.76
B	Tetradymia canescens	1	0	-	-
Total for Browse		128	147	14.41	23.74

CANOPY COVER --
Herd unit 16C, Study no: 24

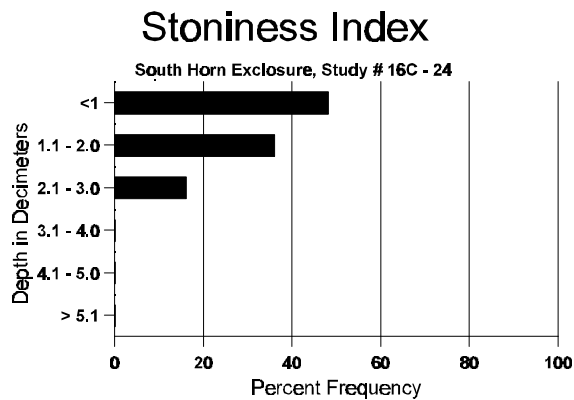
Species	Percent Cover '99
Amelanchier utahensis	2
Cercocarpus ledifolius	2
Cercocarpus montanus	2
Juniperus scopulorum	3
Pinus edulis	15

BASIC COVER --
Herd unit 16C, Study no: 24

Cover Type	Nested Frequency		Average Cover %		
	'94	'99	'88	'94	'99
Vegetation	269	289	2.50	20.51	31.71
Rock	58	32	.75	.44	.89
Pavement	34	63	.75	.05	.66
Litter	392	377	75.00	61.38	62.79
Cryptogams	37	60	1.00	.54	.46
Bare Ground	215	181	20.00	22.79	17.32

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 24, Study Name: South Horn Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.3	55.2 (9.7)	6.8	76.7	11.4	11.8	0.8	4.2	32.0	0.5



PELLET GROUP DATA --
Herd unit 16C, Study no: 24

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	52	55	n/a
Elk	30	13	33 (82)
Deer	23	26	32 (79)
Cattle	1	-	3 (7)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 24

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.		
Amelanchier utahensis																		
S	'88	-	-	-	-	-	-	3	-	-	3	-	-	-	200		3	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	24	-	-	-	-	-	-	-	-	24	-	-	-	480		24	
Y	'88	1	-	-	1	-	-	1	-	-	3	-	-	-	200		3	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	'88	-	2	-	-	-	-	-	-	-	2	-	-	-	133	42	31	2
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	82	103	1
	'99	-	-	1	-	2	-	-	1	-	4	-	-	-	80	93	90	4
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	'99	-	1	-	-	-	-	-	-	-	-	-	1	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		40%			00%			00%			-88%							
'94		00%			00%			00%			+67%							
'99		50%			17%			17%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	0%			
												'94	40		50%			
												'99	120		17%			

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	88	5	-	-	-	-	-	3	-	-	8	-	-	-	533		8	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	18	-	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	88	15	3	1	-	-	-	-	-	-	19	-	-	-	1266	16	22	19
	94	53	1	-	-	-	-	-	-	-	53	1	-	-	1080	28	35	54
	99	60	41	-	-	-	-	-	-	-	98	-	3	-	2020	23	33	101
D	88	5	1	-	-	-	-	-	-	-	5	-	-	1	400		6	
	94	33	2	-	-	-	-	-	-	-	26	-	-	9	700		35	
	99	7	1	-	-	-	-	-	-	-	5	-	2	1	160		8	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	760		38	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	880		44	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		14%			04%			04%			- 2%							
'94		03%			00%			10%			+28%							
'99		33%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	1866	Dec:	21%				
											'94	1820		38%				
											'99	2540		6%				
<i>Cercocarpus ledifolius</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	2	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	76	53	0
	99	-	1	-	-	-	1	-	1	-	3	-	-	-	60	15	20	3
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		50%			25%			00%			+20%							
'99		20%			20%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	80		25%				
											'99	100		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								
Cercocarpus montanus																
S	88	15	-	-	-	-	5	-	-	20	-	-	-	1333		20
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	2	-	-	2	-	-	-	40		2
Y	88	8	3	-	-	-	1	-	-	12	-	-	-	800		12
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	88	3	6	2	-	4	-	-	-	15	-	-	-	1000	51 58	15
	94	6	4	-	-	-	-	-	-	10	-	-	-	200	55 60	10
	99	-	6	-	-	2	4	-	-	12	-	-	-	240	50 54	12
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	1	-	-	-	-	-	-	1	-	-	-	20		1
	99	-	-	1	-	-	3	-	-	3	-	-	1	80		4
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	20		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		48%			07%			00%			-88%					
'94		45%			00%			00%			+31%					
'99		50%			50%			06%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	1800	Dec:	0%			
										'94	220		9%			
										'99	320		25%			
Chrysothamnus viscidiflorus																
S	88	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	88	10	-	-	-	-	1	-	-	11	-	-	-	733		11
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	4	-	-	-	-	-	-	-	4	-	-	-	80		4
M	88	8	1	-	-	-	1	-	-	10	-	-	-	666	8 11	10
	94	25	2	1	-	-	2	-	-	27	-	3	-	600	20 28	30
	99	25	-	-	-	-	-	-	-	25	-	-	-	500	11 14	25
D	88	2	1	-	-	-	-	-	-	2	-	-	1	200		3
	94	2	-	-	-	-	-	-	-	-	-	2	-	40		2
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'88		08%			00%			04%			-60%					
'94		06%			03%			16%			- 9%					
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'88	1599	Dec:	13%			
										'94	640		6%			
										'99	580		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>Gutierrezia sarothrae</i>												
S	88	6	-	-	-	6	-	-	400		6	
	94	3	-	-	-	3	-	-	60		3	
	99	-	-	-	-	-	-	-	0		0	
Y	88	10	1	-	-	9	-	2	733		11	
	94	6	-	-	-	6	-	-	120		6	
	99	-	-	-	-	-	-	-	0		0	
M	88	12	-	-	-	11	-	1	800	3	4	12
	94	11	-	-	-	11	-	-	220	5	5	11
	99	19	-	-	-	19	-	-	380	7	9	19
D	88	3	-	-	-	2	-	-	200		3	
	94	3	-	-	-	3	-	-	60		3	
	99	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		04%		00%		15%		-77%				
'94		00%		00%		00%		- 5%				
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'88	1733	Dec:	12%			
						'94	400		15%			
						'99	380		0%			
<i>Leptodactylon pungens</i>												
Y	88	-	-	-	-	-	-	-	0		0	
	94	4	-	-	-	4	-	-	80		4	
	99	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	0	-	-	0
	94	27	-	-	-	27	-	-	540	5	8	27
	99	32	-	-	-	32	-	-	640	4	5	32
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		00%		00%		00%						
'94		00%		00%		00%		+ 3%				
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'88	0	Dec:	-			
						'94	620		-			
						'99	640		-			
<i>Mahonia repens</i>												
M	88	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	0	3	5	0
	99	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		00%		00%		00%						
'94		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'88	0	Dec:	-			
						'94	0		-			
						'99	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	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	26	-	-	-	-	-	1	-	-	15	-	12	-	1800		27	
	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2		
	99	4	-	-	-	-	-	-	-	4	-	-	-	80		4		
M	88	77	-	-	-	-	-	-	-	51	-	26	-	5133	2	4	77	
	94	7	-	-	-	-	-	-	-	7	-	-	-	140	2	5	7	
	99	20	-	-	-	-	-	-	-	20	-	-	-	400	2	5	20	
D	88	8	-	-	-	-	-	1	-	3	-	2	4	600		9		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			39%			-98%							
'94		00%			00%			00%			+63%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	7533	Dec:	8%				
											'94	180		0%				
											'99	480		0%				
Pinus edulis																		
S	88	-	1	-	-	-	-	-	-	1	-	-	-	66		1		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	-	-	-	-	-	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	20		-				
Purshia tridentata																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	1	-	-	-	-	-	1	-	-	-	20		1		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	1	3	-	-	-	-	-	-	4	-	-	-	80	9	16	4	
	99	-	-	3	-	-	-	-	-	3	-	-	-	60	17	25	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		75%			00%			00%			+ 0%							
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	80		-				
											'99	80		-				

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				
Sambucus racemosa												
M	88	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	0	21	49	0
	99	-	-	-	-	-	-	-	0	33	52	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
	'88	00%		00%		00%						
	'94	00%		00%		00%						
	'99	00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'88	0	Dec:	-			
						'94	0		-			
						'99	0		-			
Sclerocactus whipplei												
M	88	1	-	-	-	-	-	-	66	1	3	1
	94	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
	'88	00%		00%		00%						
	'94	00%		00%		00%						
	'99	00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'88	66	Dec:	-			
						'94	0		-			
						'99	0		-			
Symphoricarpos oreophilus												
S	88	1	-	-	-	-	3	-	266			4
	94	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	60			3
Y	88	8	3	-	-	-	10	-	1400			21
	94	1	-	-	-	-	-	-	20			1
	99	30	-	-	-	-	-	-	600			30
M	88	2	-	2	-	-	-	-	266	15	9	4
	94	21	3	-	-	-	-	-	480	9	19	24
	99	10	-	-	3	-	-	-	260	14	22	13
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
	'88	12%		08%		00%		-70%				
	'94	12%		00%		00%		+42%				
	'99	00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'88	1666	Dec:	-			
						'94	500		-			
						'99	860		-			

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	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	1	-	-	-	-	-	-	-	-	-	-	-	20	10	11	1	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	0	7	24	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	20		-			
												'99	0		-			

Trend Study 16C-25-99

Study site name: South Horn 1/4 Corner .

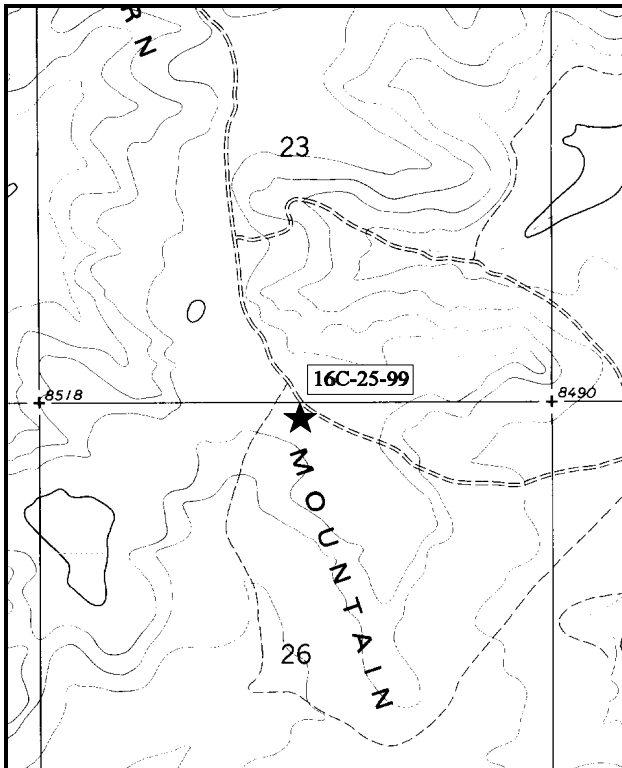
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 180°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

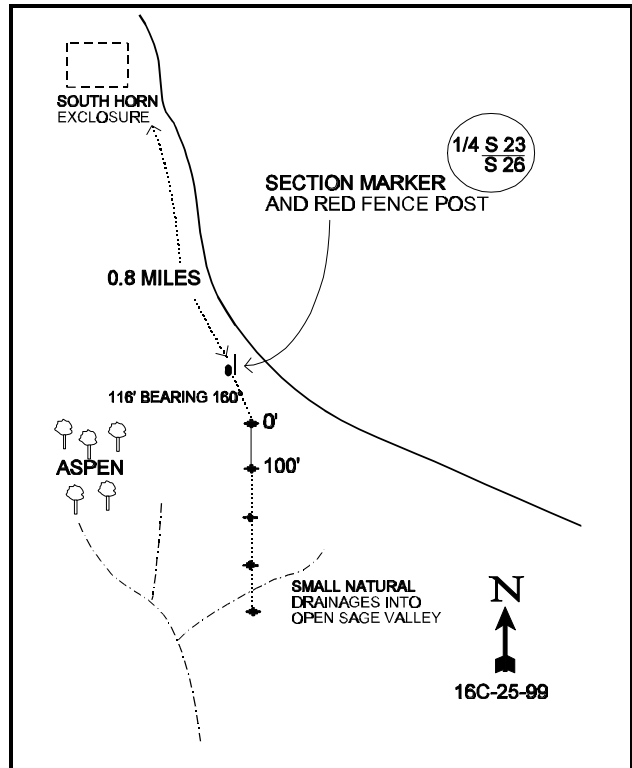
LOCATION DESCRIPTION

From the South Horn enclosure (by study #16C-24), continue south on the main USGS road to a USGS landline marker by a tall red fencepost on the right side of the road. This is the witness post for the transect. From the witness post walk SE (145°M) for 116 feet to the 0-foot end of the baseline. The 18" green fencepost is marked by browse tag #9011.



Map Name: The Cap

Township 19S, Range 6E, Section 26



Diagrammatic Sketch

UTM 4332840.865 N, 481397.347 E

DISCUSSION

Trend Study No. 16C-25 (31-23)

The South Horn 1/4 Corner trend study samples an area of mountain big sagebrush/grass which is representative of a large expanse of open sagebrush slopes and flats on South Horn Mountain. On top of this large open plateau, the country is flat or gently rolling. The study is located on a southwest-facing slope (5%) with an elevation of 8,550 feet. The rocky ridges and barren rock outcrops support black sagebrush due to the shallow soils. Down the slope, mountain big sagebrush is dominant on the deeper soils. Elk utilize this area in winter and into early spring. Scattered clumps of pinyon-juniper and Utah serviceberry offer cover and forage, with a stand of aspen 300 yards to the west. The Forest Service permits for summer cattle grazing as part of the Horn Mountain allotment. On this particular site, there is little sign of cattle because there is little water available in the summer. Pellet group data from 1999 estimate 9 deer, 71 elk, and 3 cow days use/acre (22 ddu/ha, 175 edu/ha, 7 cdu/ha). All of the cow pats were old. Deer and elk pellet groups appeared to be from the previous winter.

The soil is relatively shallow with an estimated effective rooting depth of just over 12 inches. At that depth there is a clay/sand hardpan layer that could restrict root development. Soil texture is a sandy loam with a neutral pH (6.8). Parent material is sandstone. Phosphorus is limited at just 2.5 ppm. Values less than 10 ppm can limit normal plant growth and development. There is some localized soil movement evident, although there are no active gullies and herbaceous vegetation cover is abundant. There was a high intensity thunderstorm during the 1999 reading which deposited an estimated quarter inch or more of water in about 30 minutes. Puddled rain water drained into the soil within 5 minutes after the rain stopped.

The dominant browse species is mountain big sagebrush, although this may be a marginal site for it. There is also a few black sagebrush mixed in. There were an estimated 10,132 mountain big sagebrush plants/acre reported in 1988. In 1994, the baseline was lengthened to provide a much larger sample. The density of mountain big sagebrush was estimated at 4,140 plants/acre. This larger sample is largely responsible for the differences in population densities between 1988 and 1994. Density increased to 4,840 plants/acre by 1999, partly due to the large increase in young age class. The mountain big sagebrush is heavily hedged, especially near the top of the slope. However, this is where site potential would also be at its lowest. Vigor was poor and percent decadence high in 1994 at 58%. Conditions have improved since then and in 1999, vigor is normal, recruitment improved, percent decadence has declined to 13%, and young age class has increased to 21%.

Dwarf rabbitbrush is an abundant, predominately mature population that shows light use. Smaller shrubs and half-shrubs like prickly phlox and low rabbitbrush are fairly common but seldom utilized as forage. A few Utah serviceberry, were sampled and displayed only light hedging and good vigor. Other species on the site include Pediocactus, snowberry, fringed sagebrush, broom snakeweed, and gray horsebrush. All are present in low densities and do not provide much cover or forage.

The herbaceous understory is moderately abundant and diverse. Mutton and Sandberg bluegrass are the most common species. Some of the changes in frequency between these two species appears to be due to problems with identification between 1994 and 1999. The next dominant grass is needle-and-thread grass followed by prairie junegrass, both of which significantly decreased in nested frequency since 1994. The forb population is exceptionally diverse. Twenty five species were identified in 1994 and 27 in 1999. The most common species include tapertip hawksbeard, Eaton fleabane, hairy golden aster, penstemon, and desert phlox.

1994 TREND ASSESSMENT

Bare ground has remained about the same since 1988, while litter cover has decreased. However, soil trend is still considered stable. The mountain big sagebrush population has greatly decreased since 1988, but most of

the change is due to the lengthening of the baseline to get a more representative sample for browse species. Fifty seven percent of the population is now decadent which is an increase from 44% in 1988. More of the plants have been heavily hedged and show reduced vigor. The black sagebrush population also has a high percent of decadent plants at 45%. Trend for browse is down. Summed nested frequency for grasses and forbs combined has decreased greatly since 1988. Most of the decrease is from the forb composition while grasses actually increased slightly. Herbaceous understory trend is down for forbs but stable for grasses.

TREND ASSESSMENT

soil - stable

browse - down

herbaceous understory - overall, slightly down; down for forbs but stable for grasses

1999 TREND ASSESSMENT

Trend for soil continues to be stable. Percent cover for bare ground has declined, although litter cover is also down compared to 1994 estimates. Total vegetative cover has increased from 26% to 33%. Trend for the key browse species, mountain big sagebrush, is up. Use is heavier, yet vigor and recruitment have improved, and percent decadence has declined from 58% to 13%. Trend for the herbaceous understory down slightly for grasses and stable for forbs. Cover or grasses and forbs have increased nearly two fold compared to 1994. The most abundant grass, mutton bluegrass, has remained stable, but Sandberg bluegrass declined significantly in frequency. Overall, the herbaceous trend is considered stable.

TREND ASSESSMENT

soil - stable

browse - up

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 25

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron trachycaulum	-	-	5	-	-	2	-	.03
G	Bouteloua gracilis	9	26	15	3	10	7	.39	.40
G	Carex spp.	a-	a-	b14	-	-	7	-	.42
G	Elymus salina	19	8	25	9	3	10	.33	.47
G	Koeleria cristata	b91	b66	a37	37	34	16	.42	.95
G	Oryzopsis hymenoides	-	2	3	-	1	2	.00	.15
G	Poa fendleriana	304	192	190	104	73	69	3.29	6.55
G	Poa secunda	a14	c200	b131	6	75	53	1.75	1.45
G	Sitanion hystrix	52	44	51	23	19	21	.22	.64
G	Stipa comata	b143	b118	a53	59	48	24	2.07	.96
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		632	656	524	241	263	211	8.49	12.04
Total for Grasses		632	656	524	241	263	211	8.49	12.04
F	Allium spp.	b14	a-	a-	6	-	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Antennaria microphylla</i>	4	-	-	1	-	-	-	-
F	<i>Arabis</i> spp.	_b 73	_a 12	_a 18	33	5	8	.03	.04
F	<i>Astragalus convallarius</i>	-	5	6	-	2	2	.15	.18
F	<i>Aster</i> spp.	1	-	-	1	-	-	-	-
F	<i>Astragalus</i> spp.	1	4	4	1	2	1	.03	.03
F	<i>Castilleja chromosa</i>	_c 183	_b 36	_a -	78	16	-	.15	-
F	<i>Castilleja linariaefolia</i>	_a 3	_a 6	_b 22	1	4	12	.02	.62
F	<i>Cirsium calcareum</i>	-	-	1	-	-	1	-	.03
F	<i>Crepis acuminata</i>	_b 169	_a 55	_a 64	72	29	34	.30	2.25
F	<i>Cryptantha</i> spp.	_b 51	_a 7	_a 1	25	4	1	.04	.00
F	<i>Delphinium nuttallianum</i>	_b 14	_b 9	_a -	6	5	-	.02	-
F	<i>Draba</i> spp. (a)	-	3	-	-	1	-	.00	-
F	<i>Eriogonum alatum</i>	-	15	17	-	7	6	.06	.18
F	<i>Erigeron eatonii</i>	113	113	125	38	46	58	.80	1.80
F	<i>Erigeron pumilus</i>	_a 16	_b 48	_a 10	9	21	5	.18	.07
F	<i>Eriogonum racemosum</i>	_a 19	_b 42	_{ab} 33	10	22	19	.19	.76
F	<i>Eriogonum umbellatum</i>	_b 166	_a 15	_a 28	67	8	15	.35	.61
F	<i>Gilia</i> spp. (a)	-	6	3	-	2	1	.01	.03
F	<i>Heterotheca villosa</i>	_a -	_a 3	_b 36	-	1	14	.15	1.74
F	<i>Linum lewisii</i>	1	-	-	1	-	-	-	-
F	<i>Lithospermum ruderale</i>	8	1	2	4	1	1	.00	.00
F	<i>Machaeranthera grindelioides</i>	22	26	11	8	13	7	.09	.40
F	<i>Penstemon humilis</i>	_b 36	_b 37	_a 4	18	16	1	.66	.15
F	<i>Penstemon</i> spp.	_a -	_a -	_b 58	-	-	28	-	1.83
F	<i>Phlox austromontana</i>	_b 121	_a 74	_a 99	48	34	37	1.49	2.34
F	<i>Phlox longifolia</i>	-	1	-	-	1	-	.00	-
F	<i>Polygonum douglasii</i> (a)	-	12	6	-	6	3	.05	.01
F	<i>Potentilla gracilis</i>	_a -	_a -	_b 7	-	-	3	-	.06
F	<i>Schoenocrambe linifolia</i>	-	-	3	-	-	1	-	.03
F	<i>Senecio integerrimus</i>	_a -	_b 6	_b 8	-	3	4	.04	.04
F	<i>Senecio multilobatus</i>	23	15	12	11	7	6	.03	.03
F	<i>Townsendia</i> spp.	2	-	-	1	-	-	-	-
F	<i>Trifolium</i> spp.	_b 75	_a 21	_a 5	39	14	3	.09	.01
F	<i>Zigadenus paniculatus</i>	_b 15	_a -	_a 1	7	-	1	-	.00
Total for Annual Forbs		0	21	9	0	9	4	0.07	0.04
Total for Perennial Forbs		1130	551	575	485	261	268	4.94	13.27
Total for Forbs		1130	572	584	485	270	272	5.01	13.32

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

BROWSE TRENDS --
Herd unit 16C, Study no: 25

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	5	2	1.18	-
B	Artemisia frigida	1	2	-	-
B	Artemisia nova	-	2	-	.30
B	Artemisia tridentata vaseyana	91	79	7.42	8.57
B	Ceratoides lanata	0	3	-	-
B	Chrysothamnus depressus	50	49	1.20	1.92
B	Chrysothamnus viscidiflorus	31	28	.46	.60
B	Eriogonum corymbosum	-	-	.03	-
B	Gutierrezia sarothrae	18	15	.21	.19
B	Leptodactylon pungens	32	24	.51	.61
B	Pediocactus simpsonii	1	1	.00	-
B	Symphoricarpos oreophilus	3	3	.15	-
B	Tetradymia canescens	6	5	.03	.15
Total for Browse		238	213	11.24	12.06

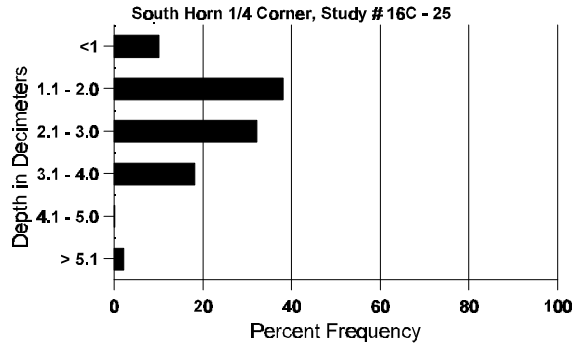
BASIC COVER --
Herd unit 16C, Study no: 25

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	335	330	12.50	25.56	32.70
Rock	69	58	.25	.42	3.50
Pavement	85	139	1.50	.37	1.58
Litter	391	350	44.25	33.93	24.04
Cryptogams	118	161	4.00	2.63	3.77
Bare Ground	345	319	37.50	38.25	33.43

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 25, Study Name: South Horn 1/4 Corner

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.5	55.6 (12.9)	6.8	57.4	28.7	13.8	1.3	2.5	115.2	0.5

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 25

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	23	14	n/a
Elk	38	34	71 (175)
Deer	6	19	9 (22)
Cattle	-	3	3 (7)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 25

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				
Amelanchier utahensis																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	8	1	-	-	-	-	-	-	-	-	-	-	9	180	27	36	9
	'99	-	1	1	-	-	-	-	-	-	-	-	-	2	40	36	45	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
'88		00%			00%			00%										
'94		11%			00%			00%				-78%						
'99		50%			50%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	180		-			
												'99	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					
Artemisia frigida													
S	88	2	-	-	-	-	-	-	2	133		2	
	94	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	20	5	7	1
	99	2	-	-	-	-	-	-	-	40	9	9	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'88		00%			00%			00%					
'94		00%			00%			00%		+50%			
'99		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-
										'94	20		-
										'99	40		-
Artemisia nova													
Y	88	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	20	6	18	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'88		00%			00%			00%					
'94		00%			00%			00%					
'99		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-
										'94	0		-
										'99	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							
<i>Artemisia tridentata vaseyana</i>												
S	88	2	-	-	-	-	-	2	133		2	
	94	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	3	60		3	
Y	88	21	18	4	7	-	-	50	3333		50	
	94	7	4	3	-	-	-	14	280		14	
	99	9	15	25	-	-	1	50	1000		50	
M	88	16	13	5	-	-	-	33	2266	10 13	34	
	94	54	24	5	-	-	-	83	1660	12 22	83	
	99	4	37	74	-	10	36	159	3220	16 25	161	
D	88	36	19	12	1	-	-	54	4533		68	
	94	60	19	33	-	-	-	36	2240		112	
	99	-	9	16	-	1	5	19	620		31	
X	88	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	1120		56	
	99	1	-	-	-	-	-	-	720		36	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		33%		14%		10%		-59%				
'94		22%		20%		36%		+14%				
'99		30%		65%		06%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	10132	Dec:	45%
									'94	4180		54%
									'99	4840		13%
<i>Ceratoides lanata</i>												
Y	88	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	1	20		1	
M	88	-	-	-	-	-	-	-	0	- -	0	
	94	-	-	-	-	-	-	-	0	- -	0	
	99	1	3	-	-	-	-	4	80	- -	4	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'88		00%		00%		00%						
'94		00%		00%		00%						
'99		60%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'88	0	Dec:	-
									'94	0		-
									'99	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		1	2					
Chrysothamnus depressus													
S	88	2	-	-	-	-	-	-	2	-	2		
	94	-	-	-	-	-	-	-	-	-	0		
	99	2	-	-	-	-	-	-	2	-	2		
Y	88	10	12	6	-	-	-	-	28	-	28		
	94	1	-	-	-	-	-	-	1	-	1		
	99	5	-	-	-	-	-	-	5	-	5		
M	88	17	1	3	-	-	-	3	24	-	24		
	94	101	14	2	5	-	-	-	122	-	122		
	99	139	7	-	-	-	-	-	146	-	146		
D	88	12	1	1	-	-	-	-	9	-	14		
	94	2	-	-	-	-	-	-	2	-	2		
	99	2	-	-	-	-	-	-	2	-	2		
X	88	-	-	-	-	-	-	-	-	-	0		
	94	-	-	-	-	-	-	-	-	-	0		
	99	-	-	-	-	-	-	-	-	-	20		
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		21%		15%		08%		-43%					
'94		11%		02%		00%		+18%					
'99		05%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	4399	Dec:	21%
										'94	2500		2%
										'99	3060		1%
Chrysothamnus viscidiflorus													
Y	88	12	2	5	-	-	-	-	19	-	19		
	94	1	-	-	-	-	-	-	1	-	1		
	99	3	-	-	-	-	-	-	3	-	3		
M	88	5	1	-	-	-	-	-	6	-	6		
	94	50	9	-	-	-	-	-	59	-	59		
	99	60	-	-	-	-	-	-	60	-	60		
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'88		12%		20%		00%		-28%					
'94		15%		00%		00%		+ 5%					
'99		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'88	1666	Dec:	-
										'94	1200		-
										'99	1260		-

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				
Gutierrezia sarothrae																	
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5
M	88	2	-	-	-	-	-	-	-	2	-	-	-	133	3	4	2
	94	29	-	-	-	-	-	-	-	29	-	-	-	580	4	6	29
	99	32	-	-	-	-	-	-	-	32	-	-	-	640	5	7	32
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			+54%						
'94		00%			00%			00%			+22%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	266	Dec:	-			
											'94	580		-			
											'99	740		-			
Leptodactylon pungens																	
S	88	5	-	-	-	-	2	-	-	7	-	-	-	466		7	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	24	-	-	-	-	2	-	-	26	-	-	-	1733		26	
	94	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	6	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	88	107	1	-	3	-	-	-	-	111	-	-	-	7400	4	4	111
	94	59	-	-	7	-	-	-	-	66	-	-	-	1320	3	6	66
	99	60	-	-	-	-	-	-	-	60	-	-	-	1200	4	5	60
D	88	7	-	-	-	-	-	-	-	5	-	-	2	466		7	
	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		.69%			00%			01%			-86%						
'94		00%			00%			00%			- 4%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	9599	Dec:	5%			
											'94	1380		3%			
											'99	1320		0%			
Pediocactus simpsonii																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	1	-	-	-	20	1	2	1
	99	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%									
'94		00%			00%			00%			+ 0%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	20		-			
											'99	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									
Symphoricarpos oreophilus																	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	1	-	-	-	-	-	-	1	-	-	1	40	13	28	2
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	13	20	4
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		25%			00%			25%			+ 0%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	0%				
										'94	80		50%				
										'99	80		0%				
Tetradymia canescens																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	1	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	5	2	-	-	-	-	-	-	7	-	-	-	140	4	6	7
	99	2	2	-	-	-	-	-	-	4	-	-	-	80	6	8	4
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		22%			00%			00%			-44%						
'99		40%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	180		-				
										'99	100		-				

Trend Study 16C-26-99

Study site name: Dry Mountain .

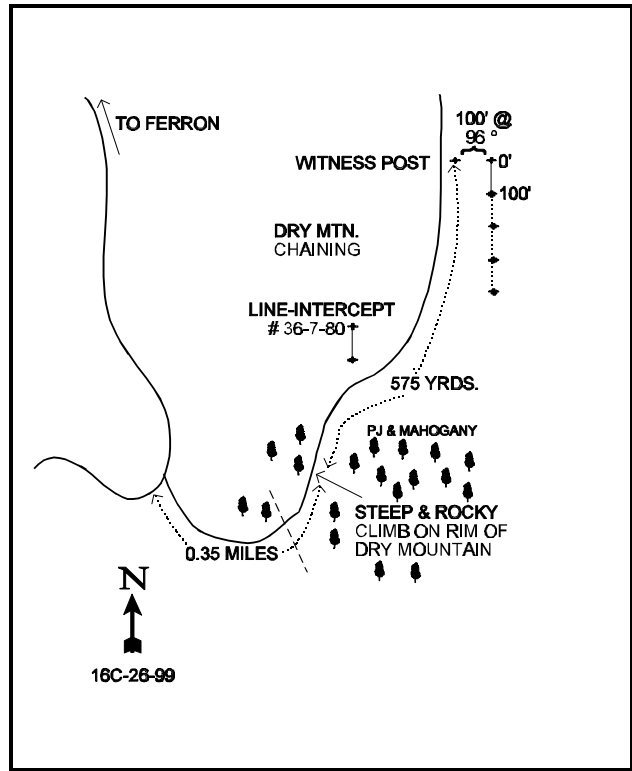
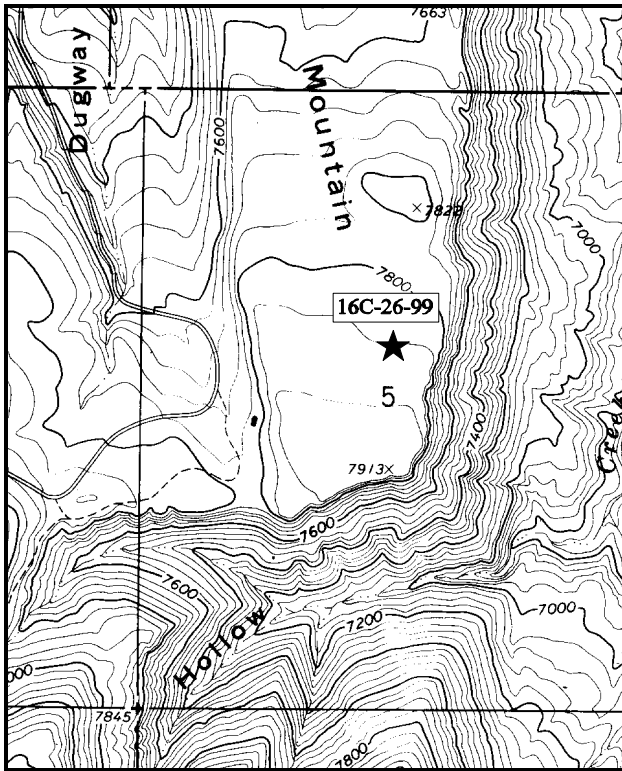
Range type: Chained, Seeded P-J .

Compass bearing: frequency baseline 180°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 junction of Highway U-10 and Canyon Road in Ferron, proceed west up Ferron Canyon toward Ferron Reservoir for 12.85 miles. At this point, bear left (SE) and go 0.35 mile to the base of Dry Mountain, where the road becomes impassably steep and rocky. From the top of this steep section, hike north down the road approximately 575 yards to a witness post on the right side of the road. From the witness post walk east about 100 feet to the 0-foot baseline stake. The study stakes are short green fenceposts.



Map Name: Flagstaff Peak

Diagrammatic Sketch

Township 20S, Range 6E, Section 5

UTM 4328948.015 N, 476649.171 E

DISCUSSION

Trend Study No. 16C-26 (31-24)

The Dry Mountain study site is on the north-facing Dry Mountain plateau which provides excellent winter range for deer and elk in mild to normal winters. The plateau was chained and seeded in 1967 and now supports a vigorous stand of mountain big sagebrush and antelope bitterbrush. Along the edges are mature pinyon-juniper and curlleaf mountain mahogany populations. The trend site has a gentle 5% slope and a north aspect. The whole plateau slopes to the north, and ends in high cliffs above Ferron Creek. The only access is on the south end. Elevation is 7,850 feet. Deer pellet groups are abundant while elk sign is scarce. There is little cattle sign on this part of the Ferron grazing allotment. Summer cattle use is restricted by the lack of water and access to the plateau. Pellet group data from 1999 estimate 72 deer, 1 elk and 2 cow days use/acre (178 ddu/ha, 3 edu/ha, and 5 cdu/ha). About 90% of the deer pellet groups encountered were from the previous winter and the remainder from this spring. Rabbit pellets are very abundant.

The soil is very sandy and moderately deep, but sandstone bedrock is found at an average depth of 14 inches. There are scattered sandstone rock outcrops near the 0 ft stake. The soil has a loamy sand texture with a neutral to slightly alkaline pH (7.3). Phosphorus and potassium are limited at 2.9 and 41.6 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium have been found to limit normal plant growth and development. Erosion is slight due to good vegetative, litter cover, and lack of significant slope. There are few rocks or pavement on the surface.

Both mountain big sagebrush and antelope bitterbrush are abundant on the site and provide valuable forage. Mountain big sagebrush is the most abundant shrub with a density of 7,199 plants/acre in 1988, 3,840 in 1994, and 3,940 by 1999. Most of the differences in population density between 1988 and 1994 is due to the much larger sample taken in 1994 and 1999, but some of the change is due to the lack of young plants being sampled in 1994. Seedlings and young sagebrush were numerous in 1988 due to the wet years in the mid 1980's. Most of these plants did not survive the drought years that followed causing a large decline in population densities. The number of mature sagebrush on the site have remained fairly stable (3,000 in 1988 to 2,880 in 1999) and the number of decadent plants actually declined from 2,266 in 1988 to 860 by 1999. Currently ('99) mountain big sagebrush provides 69% of the browse cover. Mature plants comprise 73% of the population and generally have a moderately hedged form. Vigor is normal and percent decadence is 22%.

The highly palatable antelope bitterbrush is moderately abundant and currently ('99) produces 14% of the browse cover. It displayed mostly moderate use in 1988 and 1994, with more heavy utilization in 1999. Estimated density was 1,500 plants/acre in 1994, increasing slightly to 1,720 by 1999. Vigor is normal and percent decadence low. Rabbitbrush is also present and exhibits a mature population. Juniper and pinyon tree density in 1994 was estimated at 52 and 25 trees/acre respectively according to point-center quarter data. In 1999, many pinyon and juniper trees were cut down as part of a chainsaw chaining maintenance treatment. Point quarter data estimates surviving trees at 9 trees/acre for juniper and 13 for pinyon. Average diameter of juniper is 6.6 inches while that of pinyon is 2.2 inches.

The understory is diverse but not very abundant due to the dominance of shrubs. The most abundant grass species include, western wheatgrass, blue grama, and needle-and-thread. Eleven species of forbs were identified in 1994, and 17 in 1999. Combined, forbs account for less than 1% cover in 1994 and 3% in 1999. The only common species sampled in 1999 was lobeleaf groundsel.

1994 TREND ASSESSMENT

Litter cover has decreased from 70% in 1988 to 47% in 1994. Bare ground has increased to 24% with signs of only slight erosion. Vegetative cover almost entirely from browse, with sum of nested frequency for

herbaceous plants down. Trend for soil is considered down slightly. Although the total mountain big sagebrush population has decreased, the mature population is apparently stable. Most of the decrease is due to high numbers of young plants sampled in 1988 and the much larger sample size used in 1994. The rate of decadency is moderately high and there is reduced vigor on the decadent plants. Mature antelope bitterbrush have increased in density but the population shows increased decadency (13% to 23%). This is still low for a bitterbrush stand. Overall browse trend is stable. There is a poor composition of forbs and they offer very little forage. Grasses dominant the herbaceous understory. Sum of nested frequency of perennial grasses has remained stable while the sum of nested frequency for perennial forbs has declined. Overall the herbaceous understory trend is slightly down.

TREND ASSESSMENT

soil - down slightly

browse - stable

herbaceous understory - slightly down

1999 TEND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1994. Trend for browse is up slightly for the key species, mountain big sagebrush and antelope bitterbrush. Mountain big sagebrush displays a stable population with mostly moderate use, improved vigor, and reduced decadence. Bitterbrush shows more heavy use, but improved recruitment and reduced decadence. Trend for the herbaceous understory is mixed. Sum of nested frequency of perennial grasses has declined slightly, while nested frequency of perennial forbs has increased dramatically. Overall trend for the herbaceous understory is considered stable.

TREND ASSESSMENT

soil - stable

browse - up slightly

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 26

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
G	Agropyron smithii	105	98	68	47	40	36	.35	.40
G	Bouteloua gracilis	64	47	42	24	18	17	1.86	1.60
G	Carex spp.	1	4	4	1	2	2	.03	.15
G	Elymus salina	-	-	3	-	-	1	-	.03
G	Oryzopsis hymenoides	_a 6	_b 26	_{ab} 16	2	10	7	.69	.43
G	Poa fendleriana	12	15	10	5	5	4	.05	.02
G	Sitanion hystrix	_a -	_b 11	_b 6	-	5	4	.02	.02
G	Sporobolus cryptandrus	3	3	2	2	1	1	.00	.15
G	Stipa comata	_b 117	_{ab} 97	_a 75	50	40	32	1.76	1.34
G	Stipa lettermani	-	-	6	-	-	2	-	.18
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		308	301	232	131	121	106	4.78	4.34

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
	Total for Grasses	308	301	232	131	121	106	4.78	4.34
F	<i>Androsace septentrionalis</i> (a)	-	_a -	_b 14	-	-	8	-	.06
F	<i>Antennaria</i> spp.	2	-	-	1	-	-	-	-
F	<i>Arabis</i> spp.	_b 23	_a 3	_b 22	11	2	11	.01	.05
F	<i>Arabis perennans</i>	_b 13	_a 1	_a -	6	1	-	.00	-
F	<i>Astragalus convallarius</i>	2	-	-	2	-	-	-	-
F	<i>Aster</i> spp.	_a -	_a -	_b 30	-	-	14	-	.17
F	<i>Astragalus</i> spp.	-	1	4	-	1	2	.00	.03
F	<i>Chaenactis douglasii</i>	12	3	16	6	2	7	.01	.08
F	<i>Crepis acuminata</i>	4	-	1	2	-	1	-	.00
F	<i>Cryptantha</i> spp.	_a -	_b 15	_b 27	-	8	12	.09	.72
F	<i>Descurainia pinnata</i> (a)	-	-	1	-	-	1	-	.00
F	<i>Erigeron pumilus</i>	_a 3	_a -	_b 15	1	-	8	-	.14
F	<i>Eriogonum racemosum</i>	4	2	3	3	2	2	.01	.04
F	<i>Gaillardia pinnatifida</i>	-	1	-	-	1	-	.00	-
F	<i>Gayophytum ramosissimum</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Ipomopsis aggregata</i>	-	-	1	-	-	1	-	.00
F	<i>Lygodesmia</i> spp.	-	1	3	-	1	1	.03	.15
F	<i>Machaeranthera canescens</i>	_a -	_a -	_b 11	-	-	5	-	.08
F	<i>Oenothera</i> spp.	3	-	1	1	-	1	-	.00
F	<i>Polygonum douglasii</i> (a)	-	3	-	-	1	-	.00	-
F	<i>Schoenrambe linifolia</i>	22	23	12	10	11	7	.08	.03
F	<i>Senecio multilobatus</i>	_b 36	_a 10	_c 118	17	6	54	.06	1.24
F	<i>Trifolium</i> spp.	-	-	2	-	-	2	-	.01
	Total for Annual Forbs	0	5	15	0	2	9	0.00	0.07
	Total for Perennial Forbs	124	60	266	60	35	128	0.31	2.77
	Total for Forbs	124	65	281	60	37	137	0.31	2.84

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

BROWSE TRENDS --
Herd unit 16C, Study no: 26

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia tridentata vaseyana	88	86	19.94	21.67
B	Chrysothamnus viscidiflorus	53	55	1.53	2.07
B	Echinocereus triglochidatus	0	4	-	-
B	Gutierrezia sarothrae	7	8	.00	.02
B	Juniperus osteosperma	0	0	.66	-
B	Leptodactylon pungens	19	18	.13	.25
B	Opuntia spp.	5	9	-	.05
B	Pinus edulis	0	3	.44	.18
B	Purshia tridentata	43	51	5.56	7.15
Total for Browse		215	234	28.28	31.39

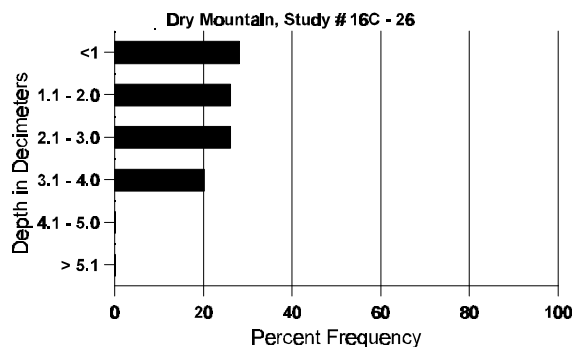
BASIC COVER --
Herd unit 16C, Study no: 26

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	261	255	5.75	37.89	34.27
Rock	60	48	2.25	2.88	3.32
Pavement	30	38	.25	.52	.63
Litter	382	361	69.50	46.47	49.09
Cryptogams	92	76	2.50	3.01	2.12
Bare Ground	243	243	19.75	24.49	26.34

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 26, Study Name: Dry Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.0	53.4 (14.0)	n/a	83.6	5.8	10.6	1.0	2.9	41.6	0.7

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 26

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'84	'89	
Rabbit	21	42	n/a
Elk	2	-	1 (2)
Deer	64	34	72 (178)
Cattle	-	-	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 26

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	'88	14	-	-	-	-	-	1	-	-	15	-	-	-	1000		15
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	'99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	'88	15	12	2	-	-	-	-	-	-	29	-	-	-	1933		29
	'94	2	2	-	-	-	-	-	-	-	3	-	-	1	80		4
	'99	7	-	-	1	-	-	2	-	-	10	-	-	-	200		10
M	'88	8	31	6	-	-	-	-	-	-	44	1	-	-	3000	19 29	45
	'94	77	39	6	-	-	-	-	-	-	122	-	-	-	2440	20 36	122
	'99	45	83	11	3	1	1	-	-	-	144	-	-	-	2880	23 36	144
D	'88	11	23	-	-	-	-	-	-	-	32	-	-	2	2266		34
	'94	18	39	9	-	-	-	-	-	-	26	-	-	40	1320		66
	'99	12	18	5	2	2	2	2	-	-	34	-	1	8	860		43
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	380		19
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	700		35
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		61%			07%			02%			-47%						
'94		42%			08%			21%			+ 3%						
'99		53%			10%			05%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	7199	Dec:	31%			
											'94	3840		34%			
											'99	3940		22%			

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														
S	88	2	-	-	-	-	-	-	2	-	-	133		2
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	8	-	-	-	-	-	-	8	-	-	160		8
Y	88	18	-	-	-	-	1	-	19	-	-	1266		19
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	14	-	-	2	-	-	1	17	-	-	340		17
M	88	52	-	-	-	1	-	1	54	-	-	3600	8 9	54
	94	85	9	3	-	-	-	-	97	-	-	1940	11 14	97
	99	70	9	-	7	1	-	-	87	-	-	1740	14 16	87
D	88	1	-	-	-	-	1	1	3	-	-	200		3
	94	1	-	-	-	-	-	-	-	-	-	20		1
	99	2	-	-	-	-	-	-	1	-	-	40		2
X	88	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'88		01%			01%			00%			-61%			
'94		09%			03%			01%			+ 8%			
'99		09%			00%			.94%						
Total Plants/Acre (excluding Dead & Seedlings)										'88	5066	Dec:	4%	
										'94	1960		1%	
										'99	2120		2%	
Echinocereus triglochidatus														
Y	88	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	1	-	-	20		1
M	88	-	-	-	-	-	-	-	-	-	-	0	- -	0
	94	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	3	-	-	-	-	-	-	3	-	-	60	1 3	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'88		00%			00%			00%						
'94		00%			00%			00%						
'99		00%			00%			00%						
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-	
										'94	0		-	
										'99	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				
Gutierrezia sarothrae																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	17	-	-	-	-	-	-	-	-	17	-	-	-	340	5	6	
	99	14	-	-	-	-	-	-	-	-	14	-	-	-	280	7	6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%			+10%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	360		-			
												'99	400		-			
Juniperus osteosperma																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'94	0		-			
												'99	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							
Leptodactylon pungens															
S	88	2	-	-	-	-	-	-	2	-	-	133		2	
	94	-	-	-	-	-	-	-	-	-	-	0		0	
	99	9	-	-	-	-	-	-	9	-	-	180		9	
Y	88	12	-	-	-	-	2	-	14	-	-	933		14	
	94	-	-	-	-	-	-	-	-	-	-	0		0	
	99	9	-	-	1	-	-	1	11	-	-	220		11	
M	88	20	-	-	-	-	2	-	22	-	-	1466	5	5	22
	94	40	-	-	-	-	-	-	40	-	-	800	6	6	40
	99	31	-	-	5	-	-	1	36	-	1	740	5	7	37
D	88	1	-	-	-	-	-	-	1	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	2	-	-	80		4	
X	88	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>					
'88		00%		00%		00%				-68%					
'94		00%		00%		00%				+23%					
'99		00%		00%		06%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	2465	Dec:	3%		
										'94	800		0%		
										'99	1040		8%		
Opuntia spp.															
Y	88	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	1	-	-	20		1	
	99	3	-	-	-	-	-	-	3	-	-	60		3	
M	88	3	-	-	-	-	-	-	3	-	-	200	2	2	3
	94	5	-	-	-	-	-	-	5	-	-	100	3	11	5
	99	10	-	-	-	-	-	-	10	-	-	200	2	6	10
D	88	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	0		0	
	99	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%				-40%					
'94		00%		00%		00%				+57%					
'99		00%		00%		07%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	200	Dec:	0%		
										'94	120		0%		
										'99	280		7%		

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	88	-	-	-	-	-	-	2	-	-	2	-	-	-	133		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	2	-	1	-	60		3	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			33%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	-			
												'94	0		-			
												'99	60		-			
Purshia tridentata																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	2	-	-	-	-	-	3	-	-	-	60		3	
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	9	3	3	-	-	-	2	-	-	17	-	-	-	340		17	
M	88	1	8	-	-	-	-	-	-	-	9	-	-	-	600	14 28	9	
	94	21	30	5	-	-	-	-	-	-	56	-	-	-	1120	15 40	56	
	99	35	6	13	3	1	3	-	-	-	61	-	-	-	1220	19 39	61	
D	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133		2	
	94	9	8	-	-	-	-	-	-	-	13	-	-	4	340		17	
	99	5	-	-	2	-	1	-	-	-	7	-	-	1	160		8	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		67%			00%			00%			+33%							
'94		51%			07%			05%			+13%							
'99		12%			23%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	999	Dec:	13%			
												'94	1500		23%			
												'99	1720		9%			

Trend Study 16C-27-99

Study site name: Birch Creek Chaining .

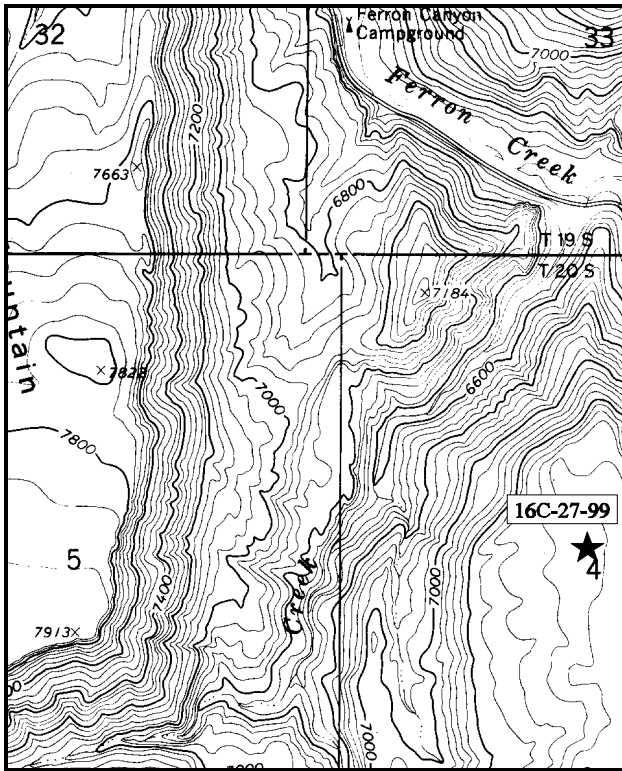
Range type: Chained, Seeded, P-J .

Compass bearing: frequency baseline 180°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

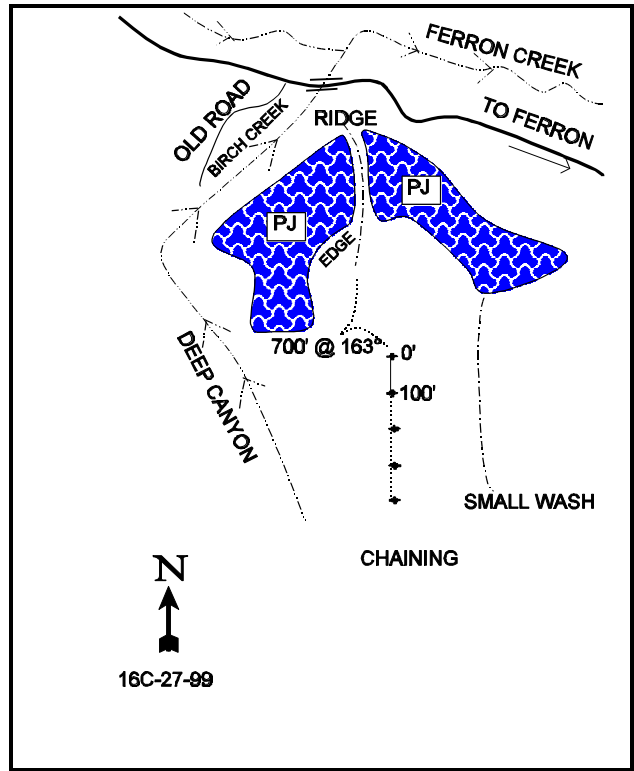
LOCATION DESCRIPTION

From Ferron, go west up the Ferron Canyon Road approximately 8.5 miles, past Millsite Reservoir and the FS boundary, to a bridge over Birch Creek, a tributary of Ferron Creek (2.1 miles from forest boundary). The Birch Creek chaining is located on top of the bench to the south. The easiest way to the study site is to hike up along the steep and rocky ridge to the P-J on top. Continue south up through the P-J to the edge of the chaining. The study site is in the middle of the chaining, marked by 18" fenceposts. From the highest point along the edge of the P-J, walk south (163°)for 146 paces to the 0-foot baseline stake. This stake is marked by browse tag #9026.



Map Name: Flagstaff Peak

Township 20S , Range 6E , Section 4



Diagrammatic Sketch

UTM 4328633.358 N, 478415.943 E

DISCUSSION

Trend Study No. 16C-27 (31-25)

The Birch Creek Chaining trend study is located on the remote, north end of a bench on Forest Service land above Ferron Creek. A large area was chained, trenched on contour, and seeded in 1972. Grass is the dominant vegetation over much of the area and browse is limited within the chaining. On this side of the mesa, general exposure is to the west. The terrain is gently sloping (5%). The study is located in the center of the chaining at an elevation of 7,950 feet. Elk and deer pellet groups are moderately abundant. Pellet group data from 1999 estimate 11 deer, 35 elk and 23 cow days use/acre (27 ddu/ha, 87 edu/ha, and 57 cdu/ha). Rabbit pellets are very abundant. Cows were on the site during the 1999 reading (7/27/99) and had heavily utilized much of the grass.

Soil on the site is moderately deep with an effective rooting depth estimated at 15 inches. It is actually deeper, but due to soil compaction, deeper penetrometer readings were not possible. Soil texture is a sandy clay loam with a slightly alkaline pH (7.4). Phosphorus is marginal and potassium limited at 9.6 ppm and 51.2 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium have been shown to limit normal plant growth and development. The surface layer is loose and slightly rocky. A dense stand of grasses provides excellent soil protection, along with abundant well dispersed litter. The well-vegetated trenches prevent most erosion on this gentle slope. The steeper slopes are more closely terraced and no erosion is evident.

Mountain big sagebrush provided 61% of the browse cover in 1994 and 75% in 1999. The population density was estimated at 3,132 plants/acre in 1988 and 3,660 by 1999. They show moderately to heavy use with good vigor and low decadence. Recruitment of seedlings and young have steadily declined since 1988, but there are currently enough young to maintain the population. The only other common browse consist of released pinyon and juniper trees from the original chaining. Twenty percent of the pinyon and 30% of the juniper consist of surviving chained trees. Point quarter data from 1999 estimate 53 pinyon and 76 juniper trees/acre with average diameters of 3.6 and 3.4 inches respectively. Mature stands of pinyon-juniper were left on the edges and steeper slopes. Valuable browse species such as curleaf and true mountain mahogany, serviceberry, ephedra, and bitterbrush are found on the undisturbed slopes.

Grasses are a very important forage resource on this chained site. Seeded species; crested wheatgrass, intermediate wheatgrass, and smooth brome are the dominate grasses. They accounted for 95% of the grass cover in 1994 and 92% in 1999. Only a few forbs were found and they provide little forage and less than 1/4 of 1% cover.

1994 TREND ASSESSMENT

Bare ground has decreased since 1988 from 29% to 27%. Litter cover has also decreased to only 44% cover with rock and pavement cover combined remained nearly the same. Vegetation cover is split nearly equally between grasses and browse. Soil trend is stable. The key browse is mountain big sagebrush. It displays a stable population with a good reproductive potential (proportion of young) and a low decadency rate. Browse trend is stable. The herbaceous understory trend is slightly down. Sum of nested frequency of both grasses and forbs declined since 1988. Forbs are very rare and offer little to the community. The majority of the grasses are seeded species with a few natives.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly down

1999 TEND ASSESSMENT

Trend for soil is up slightly due to an increase in litter and vegetation cover and a decline in percent cover of bare ground. There is no significant erosion occurring due to the abundant protective ground cover combined with the gentle terrain and the contour furrow treatment. Trend for the key browse species, mountain big sagebrush, is stable. Use is heavier compared to 1994, but vigor is still good, and percent decadence is low at only 13%. Biotic potential and young recruitment has declined steadily since 1988, but there is still adequate numbers of young plants to maintain the population. Trend for the herbaceous understory is up slightly for grasses. Forbs are very limited and none were encountered in 1999. Nested frequency of crested wheatgrass and smooth brome have both increased significantly.

TREND ASSESSMENT

soil - up slightly

browse - stable

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 27

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	_a 159	_a 154	_b 191	58	55	63	8.27	10.18
G	Agropyron intermedium	_b 162	_a 77	_a 56	63	28	22	1.88	.99
G	Bromus inermis	_{ab} 77	_a 53	_b 90	32	20	33	1.08	1.47
G	Elymus salina	-	2	-	-	1	-	.00	-
G	Oryzopsis hymenoides	37	18	23	16	8	14	.61	1.00
G	Sitanion hystrix	_b 23	_a 3	_a 7	11	1	3	.00	.04
G	Sporobolus cryptandrus	-	1	-	-	1	-	.00	-
G	Stipa pinetorum	_b 9	_a -	_a -	5	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		467	308	367	185	114	135	11.88	13.69
Total for Grasses		467	308	367	185	114	135	11.88	13.69
F	Arabis spp.	-	2	-	-	2	-	.03	-
F	Chenopodium glaucum (a)	_b 9	_a 1	_a -	3	1	-	.00	-
F	Cryptantha spp.	1	-	-	1	-	-	-	-
F	Descurainia pinnata (a)	-	5	-	-	2	-	.01	-
F	Ipomopsis aggregata	3	3	-	1	1	-	.00	-
F	Penstemon caespitosus	5	5	-	2	2	-	.03	-
F	Senecio multilobatus	_b 11	_a -	_a -	5	-	-	-	-
Total for Annual Forbs		9	6	0	3	3	0	0.01	0
Total for Perennial Forbs		20	10	0	9	5	0	0.07	0
Total for Forbs		29	16	0	12	8	0	0.09	0

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

BROWSE TRENDS --
Herd unit 16C, Study no: 27

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	0	1	-	-
B	Artemisia tridentata vaseyana	56	68	7.80	11.03
B	Gutierrezia sarothrae	2	5	-	.16
B	Juniperus osteosperma	0	1	2.36	1.62
B	Opuntia spp.	1	1	-	-
B	Pinus edulis	0	2	2.64	1.85
B	Purshia tridentata	0	0	-	-
Total for Browse		59	78	12.81	14.68

CANOPY COVER --
Herd unit 16C, Study no: 27

Species	Percent Cover '09
Juniperus osteosperma	2

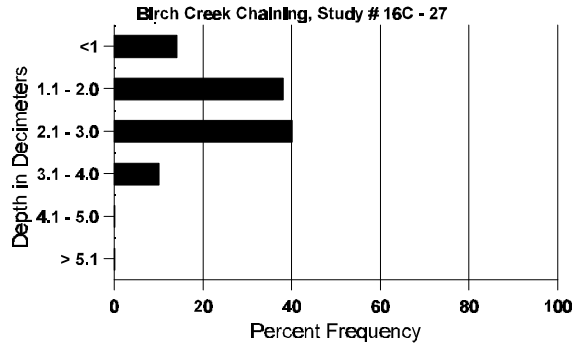
BASIC COVER --
Herd unit 16C, Study no: 27

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	274	276	2.50	25.13	27.78
Rock	135	72	1.75	2.50	2.96
Pavement	62	128	2.00	.49	1.72
Litter	389	377	65.00	44.10	56.28
Cryptogams	10	8	0	.09	.04
Bare Ground	278	253	28.75	26.70	24.94

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 27, Study Name: Birch Creek Chaining

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.0	n/a	7.4	72.7	5.4	21.8	1.7	9.6	51.2	0.6

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 27

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	31	40	n/a
Elk	23	18	35 (87)
Deer	24	14	11 (27)
Cattle	-	3	23 (57)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 27

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																		
	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	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%						
		'94			00%			00%				00%						
		'99			00%			00%				00%						
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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 vaseyana</i>																	
S	88	6	2	-	-	-	-	1	-	-	9	-	-	-	600		9
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	88	11	2	2	-	-	-	1	-	-	16	-	-	-	1066		16
	94	32	3	-	-	-	-	-	-	-	35	-	-	-	700		35
	99	25	2	-	-	-	-	-	-	-	27	-	-	-	540		27
M	88	2	16	7	-	-	-	-	-	-	25	-	-	-	1666	12 18	25
	94	60	30	8	-	-	-	-	-	-	98	-	-	-	1960	17 27	98
	99	58	40	35	-	-	-	-	-	-	133	-	-	-	2660	17 27	133
D	88	-	2	4	-	-	-	-	-	-	4	-	2	-	400		6
	94	-	13	4	-	-	-	-	-	-	15	-	-	2	340		17
	99	13	6	3	1	-	-	-	-	-	19	-	1	3	460		23
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		43%			28%			04%			- 4%						
'94		31%			08%			01%			+18%						
'99		26%			21%			02%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	3132	Dec:	13%			
											'94	3000		11%			
											'99	3660		13%			
<i>Gutierrezia sarothrae</i>																	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	27 11	1
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5 7	2
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100	6 7	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-39%						
'94		00%			00%			00%			+60%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-			
											'94	40		-			
											'99	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				
Juniperus osteosperma																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	47	19	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	132	Dec:	-			
												'94	0		-			
												'99	40		-			
Opuntia spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	4	1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	11	1
D	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			100%			-70%							
'94		00%			00%			00%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	100%			
												'94	20		0%			
												'99	20		0%			
Pinus edulis																		
Y	88	3	-	-	-	-	-	1	-	-	3	-	1	-	266			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	43	57	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			20%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	332	Dec:	-			
												'94	0		-			
												'99	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				
Purshia tridentata																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	31	80	0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			

Trend Study 16C-28-99

Study site name: South of Dry Wash .

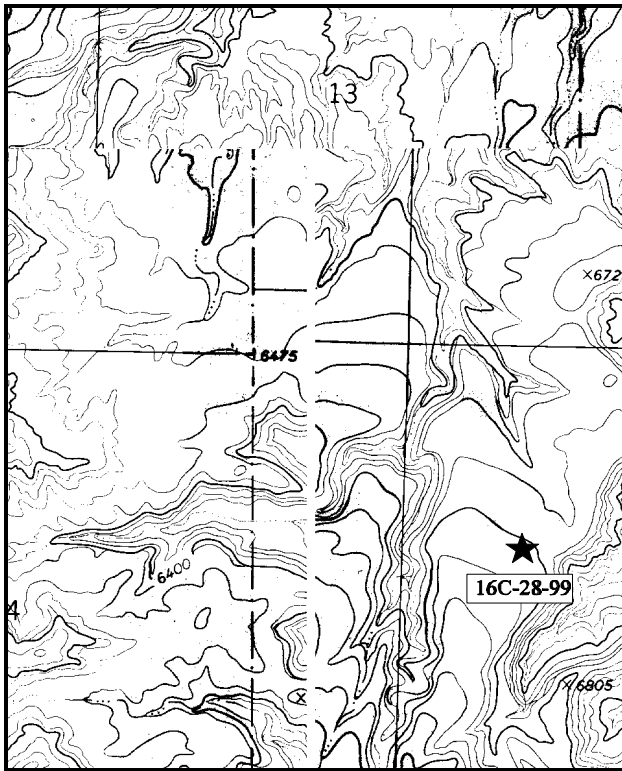
Range type: Chained, Seeded P-J .

Compass bearing: frequency baseline 180°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

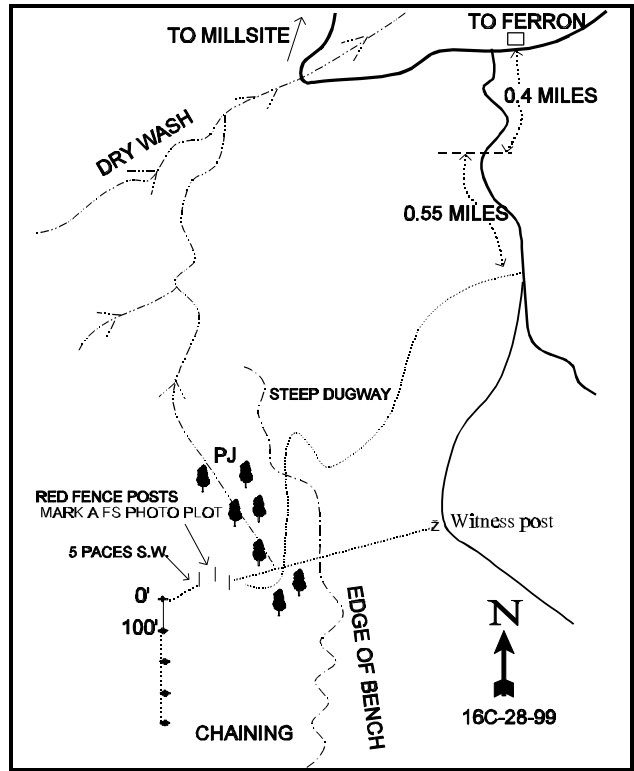
LOCATION DESCRIPTION

From the town of Ferron, proceed west up Canyon Road for 3.7 miles. 300 ft after the entrance to Millsite State Park, turn left onto a dirt road. Go south on the dirt road 0.45 miles to a gate. Continue 1.3 miles to a witness post on F.S. Road #118. From the witness post, walk up the ridge to the west. There is a game trail going to the top at a bearing of 238°M. Take this trail southwest along the edge of the chained area. The road continues up into the east edge of the chaining, where FS photo study plots and the trend study are located. The FS study is marked by tall red fenceposts. The range trend study, marked by 2 foot fenceposts, is adjacent.



Map Name: Ferron

Township 20S , Range 6E , Section 24



Diagrammatic Sketch

UTM 4323868.493 N, 482672.847 E

DISCUSSION

Trend Study No. 16C-28 (31-26)

The South of Dry Wash study samples a chaining on a bench below Nelson Mountain, south of Dry Wash. The 35 acre chaining and seeding was done in 1972 as a Forest Service wildlife habitat enhancement project. A rather isolated site, it receives little use by cattle. It produces an abundance of quality forage for wintering big game and appears to be used into the spring by deer. Pellet group data from 1999 estimate 85 deer and 11 elk days use/acre (209 ddu/ha and 27 edu/ha).

The site is on a gentle slope (7%) with a slight north aspect and an elevation of 6,800 feet. Effective rooting depth is estimated at 13 inches, although at about 4 inches in depth a compacted soil horizon is encountered which contains a lot of clay. The soil surface and profile are very rocky. Overall, soil texture is a sandy clay loam with a slightly alkaline pH (7.5). Phosphorus and potassium are low at only 3 ppm and 38.4 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium have been shown to limit normal plant growth and development. Even with the gentle slope, there is a fair amount of soil movement. This erosion causes gullies, sedimentation, and concentrations of erosion pavement in open areas.

Black sagebrush is the most numerous browse species with 3,440 plants/acre estimated in 1994 and 3,800 by 1999. It provided 32% of the browse cover in 1994 and 34% in 1999. These low growing shrubs were moderately to heavily hedged in 1994, while use was light to moderate in 1999. Vigor is generally good but many decadent plants sampled in 1994 and 1999 appeared to be dying. Recruitment has been variable since 1988, but currently ('99) 8% of the population consists of young plants.

True mountain mahogany is also fairly abundant and produces additional valuable forage. It produced 34% of the browse cover in 1994 and 33% by 1999. The population consists of about 600 plants/acre. Mature mahogany average 4 to 5 feet in height. Available portions of these shrubs show mostly moderate use. Vigor is good and percent decadence low. Green ephedra is another palatable shrub found on the sight. It has been moderately hedged and has good vigor.

Other palatable browse include four-wing saltbush and slender buckwheat. Released pinyon and juniper trees are abundant and currently ('99) provide 29% of the browse cover. Data from 1999 estimate a density of 185 pinyon and 108 juniper trees/acre. Average diameter of pinyon was estimated at 2 inches while that of juniper was 3.3 inches. Twenty-one percent of the juniper trees sampled were knocked down by the chaining but still living. The knocked down juniper trees had an average diameter of 8.5 inches.

The herbaceous understory is not very abundant. The most common grass is the native Indian ricegrass. It provided 77% of the grass cover in 1994 and 79% in 1999. Individuals were very robust and vigorous in 1999, with mature plants as tall as 17 inches. Salina wildrye, a bunchgrass that is slightly rhizomatous, is present but not abundant. Forbs are rare, typically small, and don't offer much forage or cover.

1994 TREND ASSESSMENT

Litter cover has decreased but still provides moderate cover to the soil. There is a decrease in rock and pavement cover. Bare ground has increased slightly. Sixty-seven percent of the vegetative cover is provided by browse and 30% of the browse cover is from pinyon and juniper trees which do not provide as much soil protection as cover of herbaceous plants. However, the soil trend is considered stable. Black sagebrush shows an increasing mature population and an increasing decadency rate. True mountain mahogany also shows an increasing mature population, but a decreasing decadency rate. Both species currently have poor recruitment. Browse trend is stable. Herbaceous understory trend is stable as well. Sum nested frequency of grasses has remained constant while forb nested frequency has declined only slightly. The only down side to the trend is the significant decrease in Indian ricegrass combined with the appearance of Salina wildrye, a

poor forage species. The increased sample size taken in 1994 may be responsible for these changes however. The new lengthened baseline likely picked up some Salina wildrye which was formally outside the study area. Forbs combined provide just over 1% cover and have slightly decreased in nested frequency. They provide little forage and are not an important aspect of the vegetative composition.

TREND ASSESSMENT

- soil - stable
- browse - stable
- herbaceous understory - stable

1999 TREND ASSESSMENT

The soil trend is up slightly. Percent cover of bare ground has declined from 25% to 19% and litter cover has increased from 39% to 48%. However, there is still some erosion occurring however. Trend for browse is up slightly for the key species black sagebrush. Density has increased slightly, use is lighter, recruitment improved, and percent decadence has declined from 30% to only 17%. True mountain mahogany shows a stable trend. The only negative aspect to the browse trend is the increase in cover of released pinyon and juniper trees. Trend for the herbaceous understory is up slightly but still limited. Sum of nested frequency of perennial grasses increased including a significant increase in the frequency of Indian ricegrass. Nested frequency for perennial forbs declined although they were never very abundant.

TREND ASSESSMENT

- soil - up slightly
- browse - up slightly
- herbaceous understory - up slightly but poor

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 28

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron cristatum	4	5	1	2	2	1	.03	.00
G	Elymus salina	a-	c34	b30	-	15	12	1.88	1.61
G	Oryzopsis hymenoides	b116	a84	ab113	54	39	50	7.11	6.82
G	Sitanion hystrix	20	17	17	12	8	8	.19	.16
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		140	140	161	68	64	71	9.22	8.61
Total for Grasses		140	140	161	68	64	71	9.22	8.61
F	Artemisia ludoviciana	-	3	-	-	1	-	.00	-
F	Cruciferae	b9	b5	a-	5	3	-	.01	-
F	Cryptantha spp.	45	52	29	20	22	15	1.48	.42
F	Descurainia pinnata (a)	-	-	3	-	-	1	-	.00
F	Eriogonum ovalifolium	4	6	2	2	3	2	.01	.01
F	Gilia spp. (a)	-	3	-	-	1	-	.00	-
F	Lepidium spp. (a)	-	-	5	-	-	2	-	.06
F	Machaeranthera canescens	2	-	-	1	-	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Penstemon spp.	_b 23	_a 9	_a 3	16	5	2	.02	.01
F	Phlox austromontana	4	-	-	1	-	-	-	-
F	Schoenocrambe linifolia	-	-	2	-	-	1	-	.00
F	Stanleya spp.	3	-	-	1	-	-	-	-
F	Thelesperma subnudum	_b 14	_a 2	_a -	6	1	-	.00	-
F	Townsendia incana	3	3	-	1	1	-	.00	-
Total for Annual Forbs		0	3	8	0	1	3	0.00	0.06
Total for Perennial Forbs		107	80	36	53	36	20	1.55	0.44
Total for Forbs		107	83	44	53	37	23	1.55	0.50

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

BROWSE TRENDS --

Herd unit 16C, Study no: 28

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	0	0	-	-
B	Artemisia nova	69	74	7.10	8.23
B	Atriplex canescens	0	0	-	-
B	Cercocarpus montanus	26	25	7.46	7.96
B	Chrysothamnus nauseosus	2	0	-	-
B	Chrysothamnus viscidiflorus	0	1	-	-
B	Ephedra viridis	15	15	.78	.96
B	Eriogonum microthecum	21	15	.02	.01
B	Juniperus osteosperma	0	8	1.58	2.04
B	Opuntia spp.	4	4	.03	.18
B	Pinus edulis	0	13	4.87	5.03
Total for Browse		137	155	21.87	24.42

CANOPY COVER --

Herd unit 16C, Study no: 28

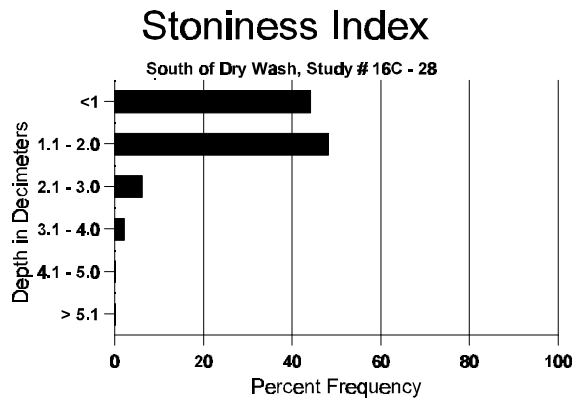
Species	Percent Cover '09
Cercocarpus montanus	3

BASIC COVER --
Herd unit 16C, Study no: 28

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	206	221	2.25	29.27	32.51
Rock	250	159	6.00	10.97	8.50
Pavement	248	251	16.25	4.17	12.60
Litter	373	364	52.00	39.35	48.24
Cryptogams	29	35	.25	.16	.75
Bare Ground	295	245	23.25	24.50	19.09

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 28, Study Name: South of Dry Wash

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.1	64.0 (11.7)	7.5	54.7	21.4	23.8	3.9	3.0	38.4	0.7



PELLET GROUP DATA --
Herd unit 16C, Study no: 28

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	17	18	n/a
Elk	-	6	11 (27)
Deer	34	27	85 (210)

BROWSE CHARACTERISTICS --

Herd unit 16C, 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>Amelanchier utahensis</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	7	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			
<i>Artemisia nova</i>																		
S	88	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	23	1	-	1	-	-	-	-	-	25	-	-	-	833			25
	94	1	1	1	-	-	-	-	-	-	3	-	-	-	60			3
	99	12	1	-	1	1	-	1	-	-	16	-	-	-	320			16
M	88	24	11	-	-	-	-	2	-	-	36	-	1	-	1233	8	17	37
	94	54	41	25	6	5	-	-	-	-	118	-	-	-	2360	7	21	118
	99	93	35	3	5	-	-	5	-	-	141	-	-	-	2820	8	20	141
D	88	7	1	-	-	-	-	-	-	-	7	-	1	-	266			8
	94	6	30	9	3	3	-	-	-	-	40	-	-	11	1020			51
	99	20	4	-	4	3	-	2	-	-	16	-	2	15	660			33
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		19%			00%			03%			+37%							
'94		43%			19%			06%			+3%							
'99		23%			02%			09%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	2332	Dec:	11%			
												'94	3440		28%			
												'99	3800		17%			
<i>Atriplex canescens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	20	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	28	35	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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	88	14	-	-	1	-	-	20	-	-	35	-	-	-	1166			35
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	94	5	-	1	-	-	-	-	-	-	6	-	-	-	120			6
	99	11	-	-	4	-	-	-	-	-	15	-	-	-	300			15
M	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133	45	47	4
	94	3	13	3	-	1	-	-	-	-	20	-	-	-	400	52	64	20
	99	1	8	-	1	1	2	-	-	-	13	-	-	-	260	59	67	13
D	88	1	-	-	-	-	-	-	-	-	-	-	-	1	33			1
	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	-	1	-	-	1	-	-	-	-	2	-	-	-	40			2
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			14%			+57%							
'94		56%			15%			00%			+10%							
'99		37%			07%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	232	Dec:	14%			
												'94	540		4%			
												'99	600		7%			
Chrysothamnus nauseosus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	1	-	-	-	-	-	-	1	-	-	-	20	11	13	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	1	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		50%			50%			50%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	40		50%			
												'99	0		0%			
Chrysothamnus viscidiflorus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	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%										
'94		00%			00%			00%										
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	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>																		
S	88	2	-	-	-	-	-	1	-	-	3	-	-	-	100			3
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	1	1	-	-	-	-	-	2	-	-	-	40			2
M	88	10	1	-	1	-	1	-	-	-	12	-	1	-	433	27	22	13
	94	8	2	2	2	-	-	-	-	-	14	-	-	-	280	34	43	14
	99	3	7	-	1	1	-	-	-	-	12	-	-	-	240	39	46	12
D	88	6	-	1	-	-	-	-	-	-	7	-	-	-	233			7
	94	1	1	-	-	-	-	-	-	-	1	-	-	1	40			2
	99	-	1	1	1	-	-	-	-	-	3	-	-	-	60			3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		04%			08%			04%			-59%							
'94		18%			12%			06%			+ 0%							
'99		53%			12%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	832	Dec:	28%				
											'94	340		12%				
											'99	340		18%				
<i>Eriogonum microthecum</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	99	8	-	-	-	1	-	1	-	-	10	-	-	-	200			10
M	88	20	-	-	1	-	-	3	-	-	24	-	-	-	800	2	2	24
	94	19	1	4	3	-	-	-	-	-	27	-	-	-	540	1	3	27
	99	9	4	2	1	-	-	-	-	-	16	-	-	-	320	2	4	16
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	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%			-40%							
'94		03%			14%			03%			- 7%							
'99		19%			07%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	966	Dec:	3%				
											'94	580		3%				
											'99	540		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				
Juniperus osteosperma																		
S	88	-	-	-	1	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	7	-	-	-	-	-	-	-	-	6	1	-	-	140			7
M	88	-	-	-	1	-	-	-	-	-	1	-	-	-	33	63	41	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	199	Dec:	-				
											'94	0		-				
											'99	160		-				
Opuntia spp.																		
Y	88	3	-	-	-	-	-	1	-	-	4	-	-	-	133			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	6	-	-	-	-	-	1	-	-	7	-	-	-	233	2	5	7
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	13	3
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	12	3
D	88	1	-	-	-	-	-	-	-	-	-	-	-	1	33			1
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			08%			-80%							
'94		00%			00%			00%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	399	Dec:	8%				
											'94	80		25%				
											'99	80		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	88	3	-	-	1	-	-	1	-	-	5	-	-	-	166		5	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	10	-	-	-	-	-	-	-	10	-	-	-	333		10		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	7	-	-	-	-	-	-	-	7	-	-	-	140		7		
M	88	1	-	-	1	-	-	-	-	1	-	1	-	66	44	52	2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	6	-	-	-	-	-	-	-	6	-	-	-	120	-	-	6	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			08%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	399	Dec:	-				
											'94	0		-				
											'99	260		-				

Trend Study 16C-29-99

Study site name: Scab Hollow .

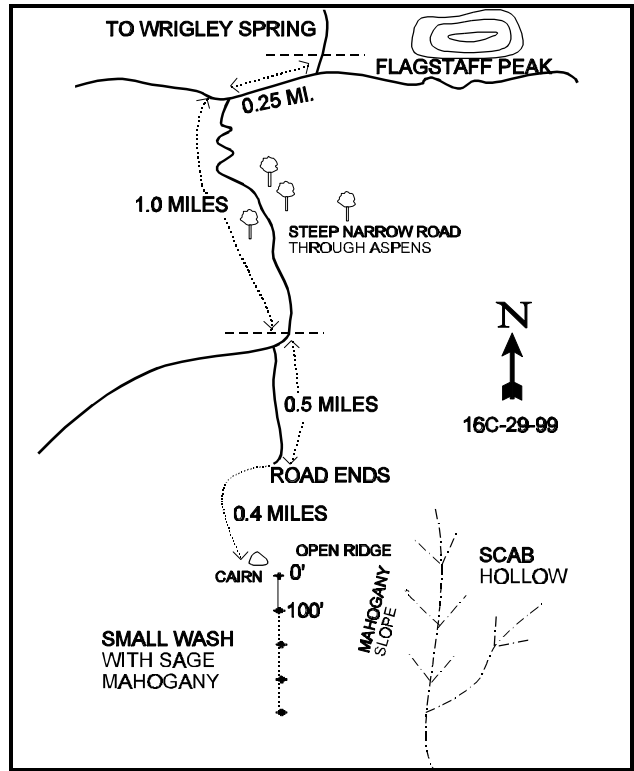
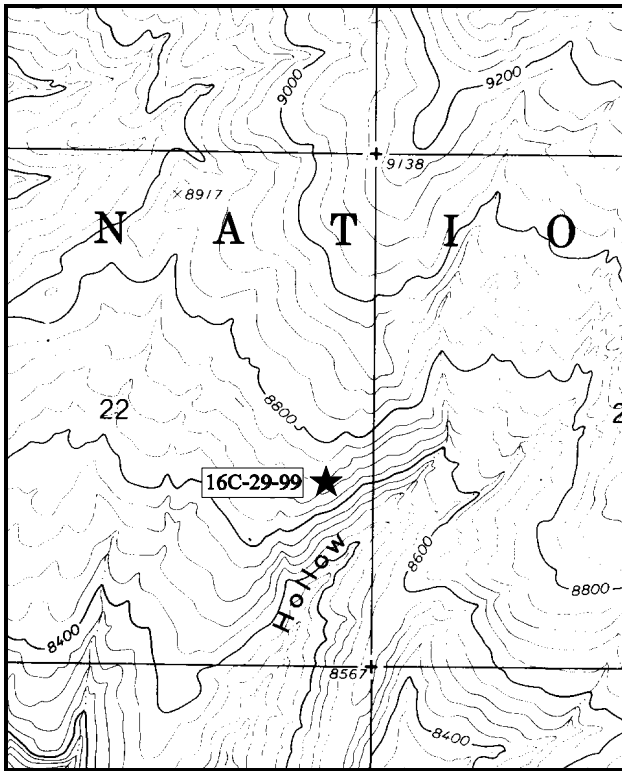
Range type: Curleaf Mountain Mahogany.

Compass bearing: frequency baseline 183°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 Forest Service boundary up Ferron Canyon, travel 7.8 miles to Wrigley Reservoir. From Wrigley Springs Reservoir on F.S. Road #43, continue on the main road SW to Wrigley Spring. Proceed south 0.9 miles to a T-intersection. Turn right toward Twelve Mile Flat. Go 0.25 miles and turn left onto a dirt road (F.S. Road #274). Go 1.0 miles down through the aspens on the steep narrow road to a fence. Just past the fence, bear left at a faint fork. Continue 0.5 miles to the end of the road. It is possible to continue driving down the ridge. Turn right down the small hill then go down the ridge bearing left through the clearings for .4 miles to the SE edge of the small, open ridge above Scab Hollow. There is a rock cairn along the edge to mark the study site. From the cairn, it is 15 feet SE to the 0-foot baseline stake, identified by a red browse tag #9027 on the short fencepost. The study runs down across the slope.



Map Name: Flagstaff Peak

Diagrammatic Sketch

Township 20S ,Range 5E , Section 22

UTM 4322386.215 N, 470769.185 E

DISCUSSION

Trend Study No. 16C-29 (31-27)

The Scab Hollow study is located in the upper end of Scab Hollow, a small drainage on the north side of Muddy Creek. The study samples a curlleaf mountain mahogany and grass slope. Further up the slope are some extremely large, old individuals of curlleaf mountain mahogany. The area is considered important elk winter range. Little elk sign was observed in 1994, but pellet group data from 1999 estimate 10 deer, 61 elk and 2 cow days use/acre (25 ddu/ha, 151 edu/ha, and 5 cdu/ha). Cattle graze this Forest Service land in summer as part of the Ferron allotment.

The soil is derived from a limestone parent material. It has a clay texture with a slightly alkaline pH (7.6). The soil is rocky and loose in the surface layer and easily disturbed. It is moderately deep with an effective rooting depth estimated at almost 16 inches. Phosphorus is limited at only 2.6 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Rock in the profile consists mainly of gravel, although some large rocks are present in the profile and on the surface. Many of the rocks in the profile have a white coating of calcium carbonate. Open areas have high amounts of pavement cover. Erosion potential is high, yet current erosion is moderate. There is evidence of pedestaling and terracing on the steeper slopes. There are no active gullies on the site and grasses provide good overall soil protection.

The slope is dominated by a vigorous stand of curlleaf mountain mahogany that is light to moderately hedged. Some of the mature plants are large trees which are highlined and mostly unavailable to browsing. Average height of mature curlleaf was 6 ½ feet in 1994 and 7 feet in 1999. Overhead canopy cover was estimated at 14% in 1999. None of the plants sampled in 1994 or 1999 were decadent, but many plants contained numerous dead branches which is normal for curlleaf mountain mahogany. Young are common. Curlleaf mountain mahogany provided 42% of the browse cover in 1994 and 63% in 1999.

There are pockets of mountain big sagebrush and black sagebrush on the ridge which show light to moderate hedging. Other browse species which occur infrequently include rabbitbrush, buckwheat, broom snakeweed, Oregon grape, snowberry, and gray horsebrush. A few scattered pinyon and juniper trees occur on the site.

The herbaceous understory is abundant and provides the majority of the vegetation cover on the site. The dominant grass species is Salina wildrye which made up 93% of the herbaceous cover in 1994 and 72% by 1999. There is also some slender wheatgrass and Indian ricegrass present in small numbers. A variety of forbs are present on the site but all species combined made up less than one percent cover in 1994. Frequency and cover increased by 1999. However two species, bastard toadflax and gumweed aster, are the most common.

1994 TREND ASSESSMENT

Litter cover has decreased by 55% since 1988, while bare ground has increased by 23%. Most of the ground cover is provided by Salina wildrye, which is a slightly rhizomatous bunchgrass, and often leaves bare interspaces between individual plants. Trend for soil is slightly down. Curlleaf mountain mahogany is the key browse on this site. It is a vigorous stand with a small, but expanding, population. The increase in density of curlleaf mahogany and changes in density of other species are mostly due to the lengthening of the baseline in 1994 in order to sample a larger area. Browse trend is stable. Herbaceous understory trend is slightly down. Sum nested frequency of grasses have declined slightly while those of forbs decreased considerably since 1988.

TREND ASSESSMENT

soil - slightly down

browse - stable

herbaceous understory - slightly down, especially for forbs

1999 TREND ASSESSMENT

Trend for soil is slightly up. Percent cover of bare ground has declined from 31% to 22% while percent cover of litter has increased slightly. There is some erosion occurring and rock-pavement cover increased from 29% to 37% which would indicate some soil loss. Terracing and pedestaling are common on the steeper slopes. However, there are no active gullies on site and it appears that soil movement is localized. Trend for the key browse species, curlleaf mountain mahogany, is considered stable. The stand has a balanced population of young and mature plants which display moderate to heavy use. Vigor is normal and there were no decadent plants sampled. Trend for the herbaceous understory is stable for grasses and up slightly for forbs. Nested frequency of the dominant grass, Salina wildrye, has remained stable since 1988. Other grasses are infrequent. Sum of nested frequency of perennial forbs has increased and cover has gone up from 0.6% in 1994 to 5.5% in 1999. Sixty six percent of the forb cover comes from bastard toadflax. Overall herbaceous trend is considered up slightly.

TREND ASSESSMENT

soil - slightly up

browse - stable

herbaceous understory - stable for grasses and up for forbs, slightly up overall

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 29

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	-	-	2	-	-	2	-	.02
G	Agropyron trachycaulum	_b 18	_a 5	_{ab} 21	11	3	7	.18	.65
G	Carex spp.	4	-	2	2	-	1	-	.03
G	Elymus salina	286	276	268	93	93	93	20.00	17.11
G	Oryzopsis hymenoides	27	33	19	11	16	10	.84	.37
G	Poa spp.	3	-	-	1	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		338	314	312	118	112	113	21.03	18.19
Total for Grasses		338	314	312	118	112	113	21.03	18.19
F	Astragalus convallarius	3	-	-	3	-	-	-	-
F	Castilleja linariaefolia	3	-	2	1	-	1	-	.03
F	Calochortus nuttallii	1	-	3	1	-	1	-	.00
F	Chaenactis douglasii	_a 3	_a -	_b 20	1	-	10	-	.25
F	Comandra pallida	_b 61	_a 25	_b 82	23	13	29	.06	3.60
F	Cymopterus spp.	-	-	1	-	-	1	-	.00
F	Eriogonum alatum	_a -	_{ab} 1	_b 7	-	1	3	.00	.06

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	<i>Erigeron eatonii</i>	-	-	2	-	-	1	-	.00
F	<i>Erigeron</i> spp.	2	-	3	1	-	1	-	.03
F	<i>Hymenopappus filifolius</i>	_b 8	_{ab} 5	_a -	3	2	-	.01	-
F	<i>Hymenoxys richardsonii</i>	12	2	3	6	1	3	.03	.18
F	<i>Lappula occidentalis</i> (a)	-	2	-	-	1	-	.00	-
F	<i>Lesquerella</i> spp.	_b 28	_a 4	_a 8	12	2	5	.01	.10
F	<i>Linum lewisii</i>	-	4	3	-	2	3	.03	.04
F	<i>Lithospermum ruderale</i>	3	-	-	1	-	-	-	-
F	<i>Machaeranthera canescens</i>	9	-	3	4	-	1	-	.00
F	<i>Machaeranthera grindelioides</i>	_b 51	_a 21	_a 20	21	11	9	.32	.67
F	<i>Penstemon caespitosus</i>	5	1	-	4	1	-	.00	-
F	<i>Penstemon</i> spp.	_{ab} 1	_a -	_b 8	1	-	3	-	.04
F	<i>Petradoria pumila</i>	8	4	9	3	2	3	.06	.33
F	<i>Phlox hoodii</i>	14	6	4	5	2	2	.03	.06
F	<i>Senecio multilobatus</i>	1	-	-	1	-	-	-	-
F	<i>Tragopogon dubius</i>	-	-	2	-	-	1	-	.03
Total for Annual Forbs		0	2	0	0	1	0	0.00	0
Total for Perennial Forbs		213	73	180	91	37	77	0.58	5.47
Total for Forbs		213	75	180	91	38	77	0.59	5.47

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

BROWSE TRENDS --

Herd unit 16C, Study no: 29

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	<i>Artemisia nova</i>	3	3	.30	.18
B	<i>Artemisia tridentata vaseyana</i>	2	2	-	.00
B	<i>Cercocarpus ledifolius</i>	19	22	3.09	5.56
B	<i>Chrysothamnus viscidiflorus</i>	1	2	-	.06
B	<i>Eriogonum corymbosum</i>	18	9	.52	.48
B	<i>Gutierrezia sarothrae</i>	13	20	.05	.44
B	<i>Juniperus scopulorum</i>	0	1	2.25	2.00
B	<i>Mahonia repens</i>	10	11	.04	.06
B	<i>Pinus edulis</i>	0	1	-	-
B	<i>Pinus flexilis</i>	-	-	.98	-
B	<i>Symphoricarpos oreophilus</i>	2	1	-	-
B	<i>Tetradymia canescens</i>	2	2	.15	.03
Total for Browse		70	74	7.40	8.84

CANOPY COVER --
Herd unit 16C, Study no: 29

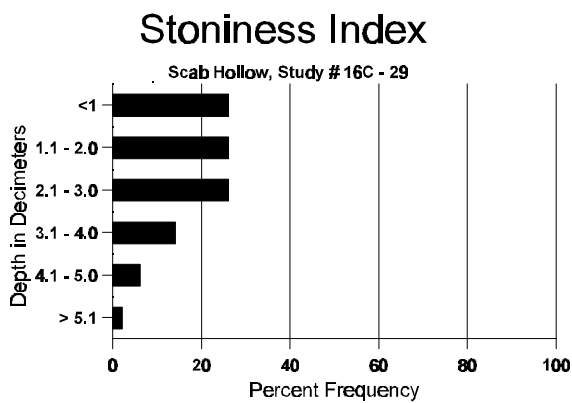
Species	Percent Cover 09
Cercocarpus ledifolius	14
Juniperus scopulorum	3

BASIC COVER --
Herd unit 16C, Study no: 29

Cover Type	Nested Frequency		Average Cover %		
	04	09	'88	'94	'99
Vegetation	297	303	5.50	29.47	30.78
Rock	331	261	6.50	19.67	16.20
Pavement	307	320	13.25	9.30	20.36
Litter	351	351	51.00	22.71	28.31
Cryptogams	3	7	0	.00	.04
Bare Ground	312	311	23.75	30.78	21.73

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 29, Study Name: Scab Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.7	53.6 (16.7)	7.6	34.0	24.2	41.8	2.9	2.3	89.6	0.6



PELLET GROUP DATA --
Herd unit 16C, Study no: 29

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'84	'89	
Rabbit	27	15	n/a
Elk	11	29	61 (151)
Deer	7	6	10 (25)
Cattle	1	-	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16C, 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				
Artemisia nova																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	1	5	-	-	-	-	-	-	-	6	-	-	-	120			6
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	2	1	-	-	-	-	-	-	-	3	-	-	-	60	10	22	3
	'99	-	3	3	-	-	-	-	-	-	6	-	-	-	120	8	19	6
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	'99	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		60%			00%			10%			-30%							
'99		57%			43%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	200		10%				
											'99	140		14%				
Artemisia tridentata vaseyana																		
M	'88	2	-	-	-	-	-	-	-	-	2	-	-	-	66	12	15	2
	'94	1	1	-	-	-	-	-	-	-	2	-	-	-	40	6	10	2
	'99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	15	17	1
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	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%							
'94		50%			00%			00%			+ 0%							
'99		00%			50%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	0%				
											'94	40		0%				
											'99	40		50%				

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 ledifolius																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	94	14	1	-	-	-	-	-	-	-	15	-	-	-	300			15
	99	15	1	-	-	1	-	-	-	-	17	-	-	-	340			17
M	88	-	1	-	-	-	-	-	1	-	2	-	-	-	66	119	116	2
	94	9	4	-	-	-	-	-	1	-	14	-	-	-	280	77	67	14
	99	4	5	3	-	1	1	1	1	-	16	-	-	-	320	84	78	16
D	88	-	-	-	-	-	-	1	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		20%			00%			00%			+72%							
'94		17%			00%			00%			+12%							
'99		24%			12%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	165	Dec:	20%			
												'94	580		0%			
												'99	660		0%			
Chrysothamnus viscidiflorus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20	7	11	1
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20	7	9	1
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	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%										
'94		100%			00%			00%			+50%							
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	20		0%			
												'99	40		50%			

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>Eriogonum corymbosum</i>										
S	88	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	20		1
Y	88	1	-	-	-	-	-	33		1
	94	17	1	-	-	-	-	360		18
	99	-	-	-	-	-	-	0		0
M	88	-	-	-	-	-	-	0	-	0
	94	15	5	4	-	-	2	520	10 13	26
	99	13	6	-	-	-	-	380	7 9	19
D	88	1	-	-	-	-	-	33		1
	94	-	2	-	-	-	-	40		2
	99	2	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>			<u>%Change</u>			
'88		00%	00%	00%			+93%			
'94		17%	09%	04%			-54%			
'99		29%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'88	66	Dec:	50%		
					'94	920		4%		
					'99	420		10%		
<i>Gutierrezia sarothrae</i>										
Y	88	2	-	-	2	-	-	4		4
	94	8	-	-	-	-	-	8		8
	99	9	-	-	1	-	-	10		10
M	88	40	-	-	1	-	-	41	8 10	41
	94	10	-	-	-	-	-	200	11 11	10
	99	75	-	-	-	-	-	1500	6 8	75
D	88	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	20		1
	99	1	-	-	-	-	-	20		1
X	88	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	20		1
	99	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>			<u>%Change</u>			
'88		00%	00%	00%			-75%			
'94		00%	00%	05%			+78%			
'99		00%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'88	1499	Dec:	0%		
					'94	380		5%		
					'99	1720		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			
<i>Juniperus scopulorum</i>																	
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	1	-	-	1	-	-	-	20	-	1
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	33	Dec:	-			
											'94	0		-			
											'99	20		-			
<i>Mahonia repens</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	88	19	-	-	4	-	-	3	-	-	26	-	-	-	866		26
	94	19	-	-	-	-	-	-	-	-	19	-	-	-	380		19
	99	26	-	-	-	-	-	-	-	-	26	-	-	-	520		26
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	8	-	-	2	-	-	-	-	-	10	-	-	-	200	3	10
	99	17	-	-	2	-	-	-	-	-	19	-	-	-	380	2	19
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			-35%						
'94		00%			00%			00%			+36%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	899	Dec:	4%			
											'94	580		0%			
											'99	900		0%			
<i>Pinus edulis</i>																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	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%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-			
											'94	0		-			
											'99	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	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	-	2	-	-	-	-	-	-	2	-	-	-	40	7	13	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	11	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+45%							
'94		00%			33%			00%			-67%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'94	120		-			
												'99	40		-			
Tetradymia canescens																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33	8	11	
	94	3	1	-	-	-	-	-	-	-	4	-	-	-	80	7	13	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	18	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	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%			+18%							
'94		25%			00%			00%			-50%							
'99		50%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'94	80		0%			
												'99	40		50%			

Trend Study 16C-30-99

Study site name: Upper Hole Trail.

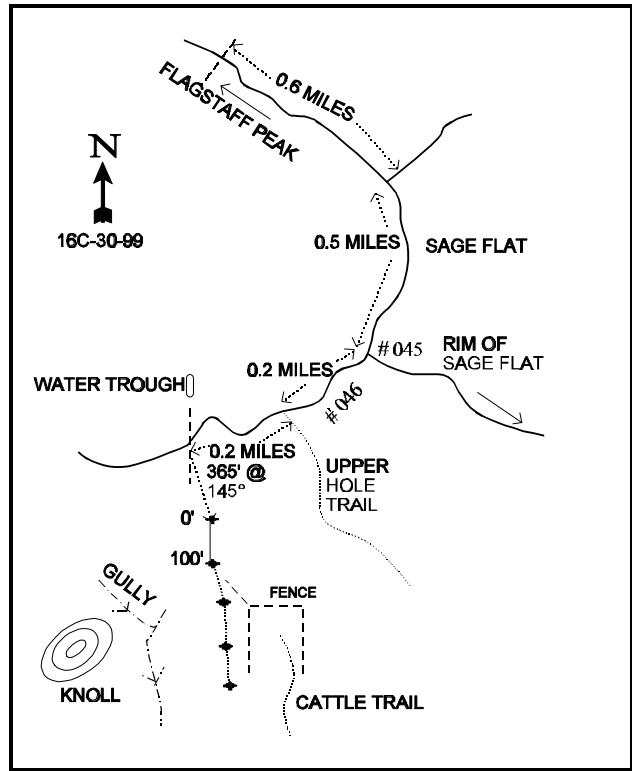
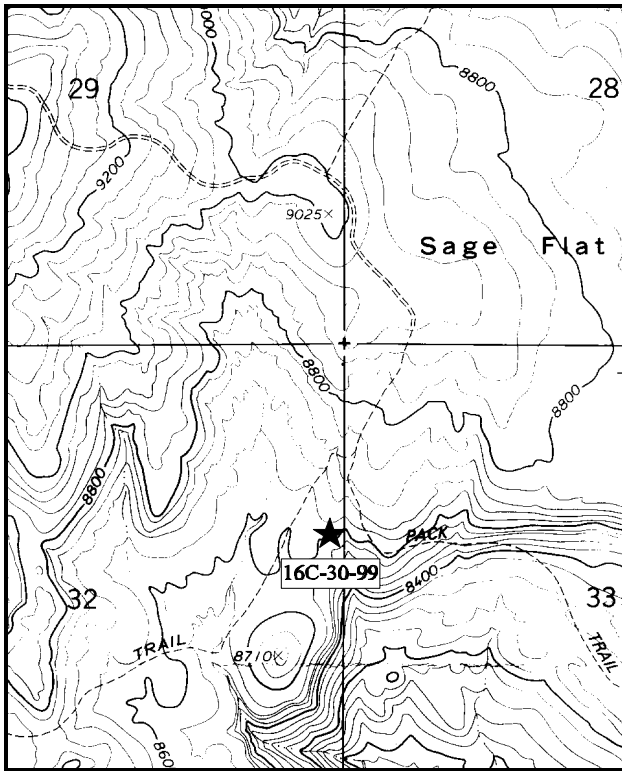
Range type: Mixed Mountain Brush.

Compass bearing: frequency baseline 181°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 Wrigley Springs Reservoir, continue SE 3.0 miles to the T-intersection by Flagstaff Peak. Turn left towards Sage Flat. Go 1.65 miles and cross a cattleguard. Continue straight 0.9 miles to a fence and cattleguard by a pond. Continue SE 1.0 miles to the Sage Flat seeding. Go 0.6 miles to a fork. Continue straight on the main road about 0.5 miles to a fork. At this point, a road that runs along the rim of Sage Flat takes off to the left (#045). Turn right at 0.35 miles on F.S. Road #046. Continue south 0.2 miles to the Hole Trail. Go another 0.2 miles on the main road to an old fence line by an unused water trough. The study starts about 100 yards south of the road. The first baseline stake, a 2' green fencepost with browse tag #9020 attached, is along an old fence line.



Map Name: Flagstaff Peak,

Diagrammatic Sketch

Township 20S, Range 6E, Section 32

UTM 4320734.339 N, 477350.307 E

DISCUSSION

Trend Study No. 16C-30 (31-28)

The Upper Hole Trail trend study is located near Sage Flat. The area around Sage Flat and South Sage Flat on the southeast side of Ferron Mountain is listed as important elk winter range although there was little elk sign encountered in 1994, but sign increased substantially in 1999. It is an open sagebrush community with scattered mountain brush, mostly on the slopes. The study itself is located in a low saddle between the large sagebrush flats, in a mixed mountain brush type near the edge of the cliffs where the Upper Hole Trail climbs up from the pinyon-juniper country below. At the study site, slope is 12% with a southern exposure. The elevation is 8,600 feet. This Forest Service land is in the Ferron allotment and is grazed by cattle in the summer from June 21 to October 5. Pellet group data from 1999 estimate 5 deer, 32 elk and 31 cow days use/acre (12 ddu/ha, 79 edu/ha, and 77 cdu/ha). Rabbit pellet groups are very numerous. Most of the elk pellet groups are from last winter, but some are from this spring ('99). About 40% of the cattle pats are from this season, while the rest are from last season. Cattle were in the area during the 1999 reading.

The soil has a clay loam texture with a neutral pH (7.3). The soil depth is moderately deep with an effective rooting depth estimated at almost 16 inches. Phosphorus and potassium are limited at just 2.6 ppm and 54.4 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium have been shown to limit normal plant growth and development. There is some rock on the surface and within the profile and there is a compacted layer at about 10 to 12 inches in depth. Although there is substantial soil movement and gullyng on surrounding areas, especially on cattle and game trails, vegetative cover is generally adequate to prevent serious erosion on the study site.

The mountain brush slope is extremely diverse with 17 browse species encountered. The dominant species on the site include Utah serviceberry, antelope bitterbrush, mountain big sagebrush, and curleaf mountain mahogany. Wood's rose and snowberry are also common. Serviceberry had a population density of 4,799 plants/acre in 1988. Nearly all (98.6%) of these shrubs were classified as young plants. Seedlings were also abundant. This artificially inflated population returned to a more sustainable level by 1994 when 1,180 mostly mature plants were estimated. Mature plants averaged two and one-half feet in height with a crown diameter of almost three feet. Utilization was mostly light with a few individuals displaying moderate to heavy use. By 1999, the population has declined to 680 plants/acre. Use is mostly moderate to heavy, vigor normal, and percent decadence low at only 12%. Some of the differences in density between years may be partly due to the larger sample used in 1994 and 1999, and counting stems instead of whole plants.

Antelope bitterbrush had a density of 2,720 mostly mature plants/acre in 1994. Utilization is light to moderate, vigor is good and there were few decadent individuals. The mature shrubs averaged about 1 foot in height with a three foot crown. There were few young and no seedlings reported in 1988 or 1994. In 1999, density was estimated at 1,980 plants/acre, 75% of which are represented by low, prostrate mature plants. Utilization is moderate to heavy with nearly half of the population showing heavy use with a clubbed growth form. Young plants are common, vigor is good and decadent plants are rare. Some of the difference in density between 1994 estimates and 1999 counts may be caused by the difficulty in counting this large, prostrate shrub. In some instances, it is hard to tell where one plant stops and another starts.

Mountain big sagebrush appears to have a stable population of about 2,200 plants/acre that are mostly lightly hedged. Recruitment is adequate and percent decadency is fairly low at 23% in 1994 and only 10% in 1999. Black sagebrush has increased in density from 300 plants/acre in 1994 to 1,280 by 1999. This site appears to be a marginal one for mountain big sagebrush. Poor vigor was common in 1988 for both species and several mountain big sagebrush plants sampled in 1999 were chlorotic. Recall the very low amounts of phosphorus in the soil. The compaction layer found in the soil profile at 10 to 12 inches in depth may be a partial rooting barrier for mountain big sagebrush.

Curleaf mountain mahogany made up 25% of the shrub cover in 1994 and 28% in 1999. There is currently an estimated 800 plants/acre with a good mix of tall partly available mature plants and shorter all available mature and young plants. Utilization has been light in the past, but current use is moderate to heavy. There is also a small population of heavily hedged true mountain mahogany. This along with rabbitbrush, Wood's rose, and snowberry provide some additional browse forage. A few scattered pinyon and limber pine are also found on the site.

Diversity is also high in the herbaceous component of the community. Eleven species of grass were identified in 1994 and 1999. Although combined all together they only provided 8% cover in 1994 and 7% in 1999. Of those, Salina wildrye is the most abundant. It accounted for 61% of the grass cover in 1994 and 43% in 1999. Diversity of forbs is excellent with 31 different species found in 1994 and 28 in 1999. Many are valuable forage species. Indian paintbrush, penstemon, redroot and sulfur eriogonum, and Oregon fleabane are most often utilized. Two low value forbs, rock goldenrod and desert phlox, provide nearly half of the forb cover.

1994 TREND ASSESSMENT

Bare ground and litter cover have both decreased. At this time vegetative cover offers as much protection to the soil as does the litter. Most of the vegetative cover (58%) comes from browse, but there is also an abundant herbaceous component which has increased in nested frequency since 1988. Soil trend is slightly up. Most preferred browse species appear to have stable mature populations, although mountain big sagebrush and black sagebrush have increased decadency rates. Several additional species were picked up in the shrub density strips due to the lengthening of the baseline in 1994. This new larger sample gives a better, more representative sample of the area. The browse trend is stable. Grasses are shifting toward more native and palatable species for both livestock and big game. Sum nested frequency of grasses increased slightly since 1988. There was a large increase in summed nested frequency for forbs, most of which offer moderate ground cover. The herbaceous understory trend is slightly up.

TREND ASSESSMENT

soil - slightly up

browse - stable

herbaceous understory - slightly up

1999 TREND ASSESSMENT

Trend for soil is up slightly. Percent cover of bare ground has declined and litter cover has increased. Vegetation cover has also increased but the improvement comes entirely from shrub cover which is less effective at protecting the soil. Rock and pavement cover have doubled since 1994 which may indicate some soil loss. Trend for the key browse species, serviceberry, mountain big sagebrush and curleaf mountain mahogany, are considered stable. Utilization is moderate to heavy on serviceberry and curleaf, but vigor remains good and percent decadence low. Mountain big sagebrush shows mostly light use. Vigor has improved and percent decadence has declined from 23% to 10%. Trend for the herbaceous is stable. Sum of nested frequency for perennial grasses and forbs have declined slightly but the dominant species, Salina wildrye, rock goldenrod, and desert phlox which provide 53% of the herbaceous cover, have remained stable.

TREND ASSESSMENT

soil - up slightly

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 30

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Agropyron cristatum</i>	-	1	4	-	1	2	.03	.03
G	<i>Agropyron trachycaulum</i>	32	52	41	14	19	19	1.06	.26
G	<i>Aristida purpurea</i>	-	-	1	-	-	1	-	.00
G	<i>Bouteloua gracilis</i>	-	1	-	-	1	-	.00	-
G	<i>Carex</i> spp.	_a 6	_b 35	_a 16	2	14	7	.41	.37
G	<i>Elymus salina</i>	_b 251	_a 173	_a 169	87	69	68	5.05	4.10
G	<i>Koeleria cristata</i>	10	5	1	3	2	1	.06	.00
G	<i>Oryzopsis hymenoides</i>	10	12	10	4	5	4	.10	.09
G	<i>Poa fendleriana</i>	_a 63	_b 85	_{ab} 76	29	37	30	1.14	1.08
G	<i>Sitanion hystrix</i>	1	7	3	1	3	1	.04	.00
G	<i>Stipa comata</i>	7	8	2	5	3	1	.04	.00
G	<i>Stipa lettermani</i>	_a -	_b 31	_c 66	-	12	23	.57	1.25
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		380	410	389	145	166	157	8.53	7.24
Total for Grasses		380	410	389	145	166	157	8.53	7.24
F	<i>Antennaria microphylla</i>	-	-	3	-	-	2	-	.03
F	<i>Arenaria fendleri</i>	_a -	_{ab} 5	_b 9	-	2	4	.03	.24
F	<i>Astragalus convallarius</i>	2	13	1	1	5	1	.11	.01
F	<i>Astragalus coltoni</i>	_a -	_b 24	_a -	-	11	-	.37	-
F	<i>Astragalus miser</i>	_a -	_b 7	_a -	-	5	-	.15	-
F	<i>Aster</i> spp.	-	-	4	-	-	2	-	.01
F	<i>Astragalus</i> spp.	_a 10	_{ab} 19	_b 33	5	8	17	.16	.99
F	<i>Caulanthus crassicaulis</i>	3	-	-	2	-	-	-	-
F	<i>Castilleja linariaefolia</i>	_b 62	_{ab} 29	_a 28	29	14	15	.19	.22
F	<i>Calochortus nuttallii</i>	-	3	-	-	1	-	.00	-
F	<i>Chaenactis douglasii</i>	_b 23	_a 1	_{ab} 19	12	1	8	.00	.06
F	<i>Cirsium</i> spp.	1	6	8	1	4	4	.04	.10
F	<i>Crepis acuminata</i>	13	6	4	7	3	3	.01	.01
F	<i>Cryptantha</i> spp.	1	-	-	1	-	-	-	-
F	<i>Cymopterus</i> spp.	2	2	-	1	2	-	.01	-
F	<i>Erigeron eatonii</i>	40	48	35	21	22	17	.33	.18
F	<i>Erigeron flagellaris</i>	-	-	3	-	-	1	-	.00
F	<i>Erigeron</i> spp.	_a -	_a -	_b 9	-	-	4	-	.04
F	<i>Erigeron pumilus</i>	8	8	4	3	4	1	.02	.15
F	<i>Eriogonum racemosum</i>	-	42	36	-	19	17	.27	.26
F	<i>Erigeron speciosus</i>	_b 16	_c 29	_a -	6	12	-	.33	-
F	<i>Eriogonum umbellatum</i>	_a -	_b 9	_b 14	-	5	6	.22	.30
F	<i>Hymenopappus filifolius</i>	_b 10	_a -	_a 2	7	-	1	-	.03

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
F	<i>Hymenoxys richardsonii</i>	28	25	17	15	12	9	.08	.14
F	<i>Lesquerella</i> spp.	7	18	20	6	10	9	.05	.09
F	<i>Lithospermum incisum</i>	-	5	-	-	2	-	.01	-
F	<i>Linum lewisii</i>	-	2	-	-	2	-	.01	-
F	<i>Lupinus</i> spp.	2	10	8	2	5	4	.08	.16
F	<i>Machaeranthera canescens</i>	_b 46	_{ab} 18	_a 11	20	11	5	.10	.10
F	<i>Machaeranthera grindelioides</i>	_b 37	_a 11	_a 8	16	6	4	.08	.07
F	<i>Oxytropis lambertii</i>	_b 22	_a 1	_a -	11	1	-	.00	-
F	<i>Penstemon carnosus</i>	34	39	33	18	16	18	.18	.68
F	<i>Penstemon</i> spp.	33	39	35	14	20	16	1.21	.81
F	<i>Petrorhiza pumila</i>	_a 19	_b 63	_b 56	11	24	24	2.26	2.49
F	<i>Phlox austromontana</i>	_a -	_b 71	_b 71	-	26	27	1.92	2.25
F	<i>Polygonum douglasii</i> (a)	-	11	6	-	4	2	.02	.01
F	<i>Senecio multilobatus</i>	_a 3	_{ab} 5	_b 14	1	3	8	.01	.07
F	<i>Taraxacum officinale</i>	4	-	3	2	-	2	-	.01
Total for Annual Forbs		0	11	6	0	4	2	0.01	0.00
Total for Perennial Forbs		426	558	488	212	256	229	8.32	9.57
Total for Forbs		426	569	494	212	260	231	8.35	9.59

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

BROWSE TRENDS --
Herd unit 16C, Study no: 30

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	29	23	3.10	2.87
B	Artemisia nova	7	21	.42	.91
B	Artemisia tridentata vaseyana	66	50	2.99	5.00
B	Cercocarpus ledifolius	24	26	5.79	7.88
B	Cercocarpus montanus	5	5	.00	.21
B	Chrysothamnus depressus	19	17	.28	.37
B	Chrysothamnus viscidiflorus	21	19	.69	.45
B	Eriogonum corymbosum	3	2	.15	.03
B	Gutierrezia sarothrae	14	12	.21	.10
B	Juniperus osteosperma	-	-	.15	-
B	Leptodactylon pungens	8	8	.15	.36
B	Pinus edulis	0	1	.15	-
B	Purshia tridentata	33	37	4.69	4.87
B	Rosa woodsii	13	13	.82	.96
B	Symphoricarpos oreophilus	36	41	3.26	4.06
B	Tetradymia canescens	1	1	.03	-
B	Yucca baileyi navajoa	7	7	.09	.16
Total for Browse		286	283	23.03	28.29

CANOPY COVER --
Herd unit 16C, Study no: 30

Species	Percent Cover '09
Amelanchier utahensis	3
Cercocarpus ledifolius	11
Pinus edulis	2

BASIC COVER --
Herd unit 16C, Study no: 30

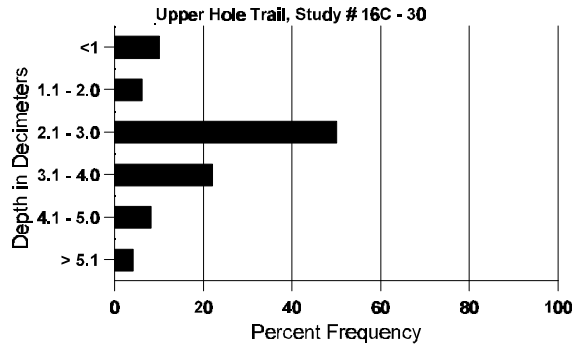
Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	316	315	13.25	38.02	42.09
Rock	128	109	.50	3.47	5.51
Pavement	94	135	0	.59	2.87
Litter	380	383	55.50	38.12	52.62
Cryptogams	1	3	.25	.03	.03
Bare Ground	281	244	30.50	26.51	21.57

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 30, Study Name: Upper Hole Trail

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.1	54.0 (14.4)	7.3	44.0	22.2	33.8	2.6	2.6	54.4	0.6

Stoniness Index



PELLET GROUP DATA --

Herd unit 16C, Study no: 30

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Rabbit	15	48	n/a
Elk	3	14	32 (79)
Deer	3	3	5 (12)
Cattle	5	8	31 (77)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 30

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																		
S	88	19	1	-	-	-	-	-	-	-	20	-	-	-	1333		20	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	3	-	-	-	-	-	6	-	-	-	120		6	
Y	88	67	4	-	-	-	-	-	-	-	71	-	-	-	4733		71	
	94	8	-	-	4	-	-	1	-	-	13	-	-	-	260		13	
	99	4	5	3	2	-	1	-	-	-	15	-	-	-	300		15	
M	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	27	12	
	94	36	4	1	4	-	-	-	-	-	45	-	-	-	900	29	31	
	99	-	9	1	1	1	1	2	-	-	15	-	-	-	300	80	81	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	2	2	-	-	-	-	-	-	2	-	-	2	80		4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		07%			00%			00%			-75%							
'94		08%			02%			00%			-42%							
'99		50%			24%			06%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	4799	Dec:	0%				
											'94	1180		2%				
											'99	680		12%				
Artemisia nova																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	7	-	-	-	-	-	-	-	-	6	-	1	-	140		7	
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	88	2	-	-	-	-	-	-	-	-	1	-	1	-	133	7	8	
	94	9	-	-	-	-	-	-	-	-	9	-	-	-	180	11	19	
	99	26	14	1	-	-	-	-	-	-	38	-	3	-	820	8	15	
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	6	-	-	-	-	-	-	-	-	1	-	-	5	120		6	
	99	9	-	-	-	-	-	-	-	-	5	-	-	4	180		9	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			25%			+12%							
'94		00%			00%			33%			+77%							
'99		22%			02%			11%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	265	Dec:	25%				
											'94	300		40%				
											'99	1280		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 vaseyana</i>																		
S	88	11	-	-	-	-	-	1	-	-	12	-	-	-	800		12	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	47	1	-	-	-	-	1	-	-	48	1	-	-	980		49	
Y	88	12	-	-	1	-	-	-	-	-	12	-	1	-	866		13	
	94	16	1	-	4	-	-	-	-	-	21	-	-	-	420		21	
	99	30	3	-	-	-	-	-	-	-	32	-	1	-	660		33	
M	88	10	3	1	-	-	-	-	-	-	6	-	8	-	933	20	21	14
	94	62	5	-	2	-	-	3	-	-	72	-	-	-	1440	17	21	72
	99	57	7	-	2	-	-	-	-	-	64	-	2	-	1320	19	27	66
D	88	4	-	-	-	-	-	1	-	-	2	-	3	-	333		5	
	94	25	2	-	1	-	-	-	-	-	11	-	-	17	560		28	
	99	11	-	-	-	-	-	-	-	-	8	-	2	1	220		11	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	260		13	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		09%			03%			38%			+12%							
'94		07%			00%			14%			- 9%							
'99		09%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	2132	Dec:	16%				
											'94	2420		23%				
											'99	2200		10%				
<i>Cercocarpus ledifolius</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	2	-	-	2	-	-	-	-	-	4	-	-	-	80		4	
	99	-	3	1	1	-	-	-	-	-	5	-	-	-	100		5	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	29	1	2	-	-	-	-	-	-	32	-	-	-	640	46	47	32
	99	14	7	2	-	1	7	1	-	-	32	-	-	-	640	68	57	32
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	2	1	-	-	-	-	-	-	3	-	-	-	60		3	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		03%			06%			00%			+10%							
'99		33%			28%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	720		0%				
											'99	800		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				
Cercocarpus montanus																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	3	-	-	3	-	-	-	60		3	
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	8	-	-	-	-	1	-	-	9	-	-	-	180	25	37	
	99	2	-	6	-	-	2	-	-	-	10	-	-	-	200	20	24	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		67%			00%			00%			- 8%							
'99		09%			73%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	240		-			
												'99	220		-			
Chrysothamnus depressus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	36	9	-	-	-	-	1	-	-	46	-	-	-	920	6	7	
	99	8	10	2	-	-	1	-	-	-	21	-	-	-	420	3	12	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	4	-	-	-	-	-	-	-	-	3	-	-	1	80		4	
	99	-	5	3	-	-	-	-	-	-	7	-	-	1	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		18%			00%			02%			-34%							
'99		45%			18%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'94	1000		8%			
												'99	660		24%			

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 viscidiflorus																		
Y	88	3	1	1	-	-	-	-	-	-	4	-	1	-	333		5	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	3	-	-	-	-	-	7	-	-	2	-	8	-	666	2	4	10
	94	23	2	-	10	-	-	-	-	-	35	-	-	-	700	6	10	35
	99	6	13	1	2	-	-	-	-	-	19	-	3	-	440	12	13	22
D	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66		1	
	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
	99	1	2	1	-	-	-	-	-	1	3	-	-	2	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		06%			06%			56%			-27%							
'94		05%			00%			00%			-28%							
'99		54%			11%			18%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	1065	Dec:	6%			
												'94	780		5%			
												'99	560		18%			
Eriogonum corymbosum																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	2	1	-	4	-	-	-	-	-	7	-	-	-	140	9	15	7
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	18	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		14%			00%			00%			-71%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	140		-			
												'99	40		-			
Gutierrezia sarothrae																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	2	1
	94	20	-	-	2	-	-	-	-	-	22	-	-	-	440	6	6	22
	99	27	-	-	-	-	-	-	-	-	27	-	-	-	540	6	6	27
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+86%							
'94		00%			00%			00%			+29%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'94	480		-			
												'99	680		-			

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																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	'99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	29	-	-	-	-	-	-	-	-	29	-	-	-	580	13	8	29
	'99	36	-	-	-	-	-	-	-	-	36	-	-	-	720	6	7	36
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	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%										
'94		00%			00%			00%			+25%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'94	600		0%				
											'99	800		5%				
Pinus edulis																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	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%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'94	0		-				
											'99	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										
Purshia tridentata															
S	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	3	-	-	-	-	-	-	-	3	-	-	60		3
Y	88	8	1	-	-	-	-	-	-	9	-	-	600		9
	94	8	-	-	-	-	-	-	-	8	-	-	160		8
	99	2	12	6	1	-	-	1	-	22	-	-	440		22
M	88	-	6	-	1	-	-	-	-	7	-	-	466	12 39	7
	94	101	23	1	2	-	-	-	-	123	4	-	2540	11 36	127
	99	1	22	19	-	10	22	-	-	74	-	-	1480	16 38	74
D	88	1	-	-	-	-	-	-	-	1	-	-	66		1
	94	-	1	-	-	-	-	-	-	1	-	-	20		1
	99	2	-	-	1	-	-	-	-	1	-	-	60		3
X	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	80		4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>							
'88		41%		00%		00%		+58%							
'94		18%		.73%		00%		-27%							
'99		44%		47%		02%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	1132	Dec:	6%		
										'94	2720		1%		
										'99	1980		3%		
Rosa woodsii															
S	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	37	-	-	2	-	-	-	-	39	-	-	780		39
Y	88	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	23	-	-	4	-	-	-	-	27	-	-	540		27
	99	52	-	-	11	-	-	4	-	67	-	-	1340		67
M	88	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	62	-	-	64	-	-	-	-	126	-	-	2520	8 5	126
	99	21	-	-	12	-	-	4	-	37	-	-	740	17 10	37
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>							
'88		00%		00%		00%									
'94		00%		00%		00%		-32%							
'99		00%		00%		00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-		
										'94	3060		-		
										'99	2080		-		

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	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	3	-	-	7	-	-	-	140		7	
Y	88	22	-	-	-	-	-	-	-	22	-	-	-	1466		22		
	94	5	-	-	3	-	-	-	-	8	-	-	-	160		8		
	99	10	3	-	11	-	-	2	-	26	-	-	-	520		26		
M	88	1	-	-	-	-	-	-	-	1	-	-	-	66	64	43	1	
	94	63	8	-	30	-	5	2	-	108	-	-	-	2160	12	24	108	
	99	39	-	-	20	-	-	1	-	60	-	-	-	1200	17	27	60	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	94	1	1	-	-	-	-	-	-	2	-	-	-	40		2		
	99	-	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%			+35%							
'94		08%			04%			00%			-26%							
'99		05%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	1532	Dec:	0%				
											'94	2360		2%				
											'99	1740		1%				
Tetradymia canescens																		
Y	88	7	-	-	-	-	-	-	-	7	-	-	-	466		7		
	94	2	-	-	-	-	-	-	-	2	-	-	-	40		2		
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
M	88	3	-	-	-	-	-	-	-	3	-	-	-	200	5	6	3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	4	6	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-94%							
'94		00%			00%			00%			-50%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	666	Dec:	-				
											'94	40		-				
											'99	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 baileyi navajoa																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
	'99	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9 10	1	
	'94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	8 10	5	
	'99	6	-	-	-	-	-	-	-	-	7	-	-	-	140	6 12	7	
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+79%							
'94		00%			00%			00%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'94	320		-			
												'99	320		-			

Trend Study 16C-31-99

Study site name: Box Canyon Knolls .

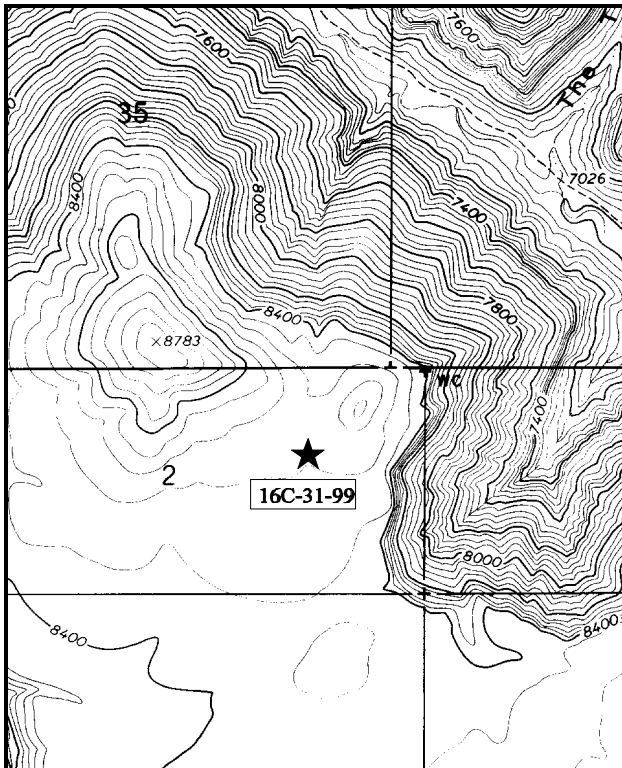
Range type: Black Sagebrush .

Compass bearing: frequency baseline 180°M.

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

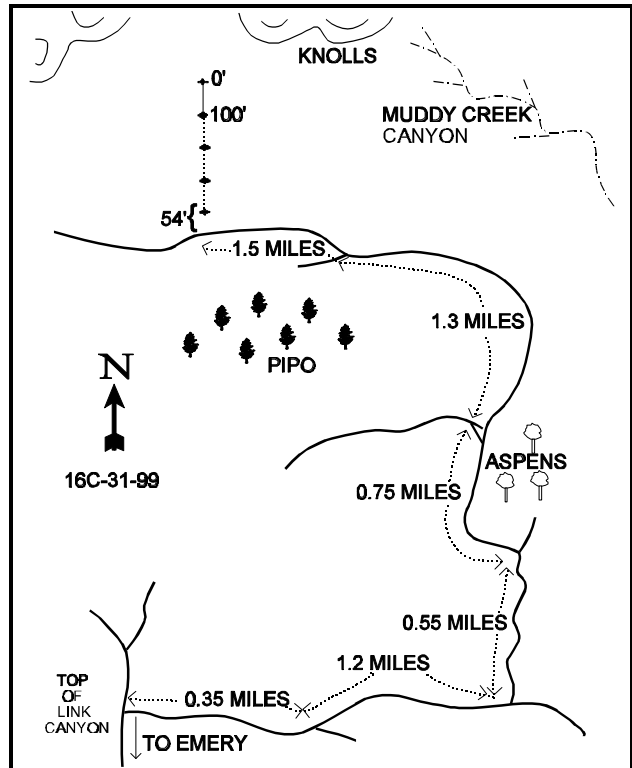
LOCATION DESCRIPTION

From Center Street in the town of Emery, continue south on Highway 10 for 1.2 miles. Turn right onto a dirt road and go 0.6 miles. Turn left and travel up Link Canyon 7 miles (4WD road) to the top. Turn right at the fork and proceed 0.35 miles. Bear left and continue 1.2 miles. Turn left off the jeep trail and go 0.55 miles to a faint fork. Bear left onto F.S. Road #28 and go 0.75 miles to a junction. Bear right and continue northwest 1.3 miles to another fork. Stay right on F.S. #278. Travel 1.5 miles and stop just past a lone limber pine. In the sage flat on the right side of the road, the study is marked by short fenceposts. The 400-foot baseline stake is 54 feet north of the road. The 0-foot baseline stake is 400 feet further north, and is marked by browse tag #9028.



Map Name: Flagstaff Peak

Township 21S, Range 5E, Section 2



Diagrammatic Sketch

UTM 4318109.110 N, 472087.366 E

DISCUSSION

Trend Study No. 16C-31 (31-29)

The Box Canyon Knolls are located on the south side of the steep Muddy Creek canyon. This remote area is used by elk in winter. The study site is located in the open black sagebrush/grass type that covers most the flats. Elevation is 8,500 feet. The slope on the flat is very gentle with a southern aspect. The area is managed by the Forest Service, usually as an early unit in the summer rest-rotation system on the Emery cattle allotment. Abundant elk sign was encountered in 1994 and 1999. Pellet group data from 1999 estimate 5 deer, 108 elk and 9 cow days use/acre (12 ddu/ha, 267 edu/ha, and 22 cdu/ha). Most of the elk pellet groups are from winter use but some are more recent. All of the cow pats appear to be from last season.

Soil on the site is moderately shallow with an effective rooting depth of almost 14 inches. Texture is a clay loam with a neutral pH (6.8). There is very little rock in the profile or on the surface. The soil is very dense with a compacted horizon which varies in depth from 8 to 12 inches. The 1% slope precludes most soil movement and erosion is minimal, although bare spots are frequent. Some soil pedestaling is evident around shrubs and grasses. The surface of the clay loam soil shows expansion/contraction cracking which would indicate the presence of shrink/swell clays. Soil parent material appears to be limestone.

The dominant key browse species, black sagebrush, has a low-growing dense population. The majority of the plants have been lightly hedged, although some display moderate use. The age class structure indicates a stable population with excellent young recruitment, good vigor, and low decadence. Even with the large numbers of young plants, the population will likely not increase much in the future due to the high density of shrubs on the site. A small population of stunted mountain big sagebrush also occurs on the site. These shrubs show heavier use.

Low rabbitbrush is extremely abundant on the site. These shrubs are small, measuring only 4 x 8 inches and have an estimated population density of 22,420 plants/acre in 1994 and 19,220 by 1999. They are lightly hedged, in good vigor, and have low decadence. Other species on the site include small numbers of Utah serviceberry, fringed sagebrush, dwarf rabbitbrush, rubber rabbitbrush, broom snakeweed, and gray horsebrush.

Grasses are abundant on the site with pinewoods needlegrass, the dominant species, providing 72% of the grass cover in 1994 and 41% in 1999. Sheep fescue and mutton bluegrass are also common. All grasses combined provided 14% cover in 1994 and 11% in 1999. Forbs are diverse but provided only 2% cover in 1994 and 3% in 1999. Forbs tend to be low growing species. Narrowleaf paintbrush and lupine are the only large species, with common paintbrush, penstemon, and redroot eriogonum provide palatable spring forage.

1994 TREND ASSESSMENT

Trend for soil is up due mostly to a decrease in bare ground from 54% to 40%. Litter cover has increased slightly and provides well dispersed protective cover. The key browse on this site is black sagebrush. The mature plants in the population have increased while the number of decadent plants have decreased. There are many young plants in the population but few seedlings. Trend for browse is slightly up. Sum of nested frequency of grasses have increased since 1988, while those of forbs declined. Sum of nested frequency for grasses and forbs combined have remained similar indicating a stable herbaceous understory trend.

TREND ASSESSMENT

soil - up

browse - slightly up

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of litter has declined but cover of bare ground has remained stable. There is some soil pedestaling apparent around plants but erosion is minimal due to the level terrain. Trend for browse is stable. Density of the key species, black sagebrush, has increased slightly and there are abundant seedlings and young. Utilization is heavier but vigor is normal on most plants. Percent decadency has increased slightly but it is still low at 14%. The small stand of stunted mountain big sagebrush has increased slightly in density. It displays moderate to heavy use, good vigor and increased decadence since 1994. Rabbitbrush is still the most abundant numerous shrub on the site. This increaser, has declined steadily in density since 1988 from 32,599 plants/acre to 19,220 by 1999. The population is mostly mature with a moderate amount of young plants sampled. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses and forbs have declined slightly. Both slender wheatgrass and pinewoods needlegrass have declined significantly in nested frequency.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 31

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron trachycaulum	_b 121	_b 128	_a 72	52	47	31	1.15	.84
G	Festuca ovina	_a 26	_a 15	_b 110	12	6	45	.10	2.92
G	Poa fendleriana	_a 130	_b 157	_b 140	59	63	51	2.85	2.59
G	Sitanion hystrix	_b 27	_a 1	_b 19	13	1	9	.00	.13
G	Stipa pinetorum	_b 236	_c 281	_a 208	90	97	77	10.37	4.43
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		540	582	549	226	214	213	14.49	10.93
Total for Grasses		540	582	549	226	214	213	14.49	10.93
F	Antennaria parvifolia	5	16	18	2	6	6	.65	.84
F	Androsace septentrionalis (a)	-	_a -	_b 33	-	-	19	-	.15
F	Arabis spp.	_b 18	_a -	_a 3	13	-	1	-	.00
F	Artemisia frigida	-	2	-	-	1	-	.00	-
F	Astragalus agrestis	_a 8	_{ab} 16	_b 19	3	7	10	.03	.17
F	Astragalus convallarius	-	3	2	-	2	1	.01	.00
F	Castilleja chromosa	_b 43	_a -	_a -	22	-	-	-	-
F	Castilleja linariaefolia	3	3	7	1	1	5	.00	.10
F	Calochortus nuttallii	_b 20	_a -	_b 8	8	-	4	-	.02
F	Chaenactis douglasii	_b 21	_a -	_a 1	13	-	1	-	.00
F	Crepis acuminata	11	5	4	5	3	2	.01	.06
F	Cryptantha spp.	-	2	-	-	1	-	.00	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'04	'09
F	Eriogonum alatum	a-	ab3	b3	-	1	1	.00	.03
F	Erigeron eatonii	c197	b141	a67	77	59	34	.54	.59
F	Erigeron pumilus	a7	b22	a5	3	10	3	.21	.04
F	Eriogonum racemosum	72	64	70	31	30	32	.25	.92
F	Eriogonum umbellatum	24	33	16	11	16	8	.15	.09
F	Hymenoxys richardsonii	9	7	3	3	4	1	.02	.00
F	Lupinus argenteus	ab3	a-	b9	2	-	5	-	.08
F	Machaeranthera canescens	b9	a-	a-	4	-	-	-	-
F	Penstemon caespitosus	c31	b7	a-	14	3	-	.04	-
F	Penstemon carnosus	a-	a1	b10	-	1	5	.00	.05
F	Polygonum douglasii (a)	-	1	-	-	1	-	.00	-
F	Senecio multilobatus	a-	ab3	b8	-	1	4	.00	.04
F	Sphaeralcea coccinea	-	-	2	-	-	1	-	.00
F	Townsendia incana	1	-	-	1	-	-	-	-
F	Tragopogon dubius	ab2	a-	b6	2	-	3	-	.01
Total for Annual Forbs		0	1	33	0	1	19	0.00	0.15
Total for Perennial Forbs		484	328	261	215	146	127	1.96	3.09
Total for Forbs		484	329	294	215	147	146	1.97	3.24

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

BROWSE TRENDS --

Herd unit 16C, Study no: 31

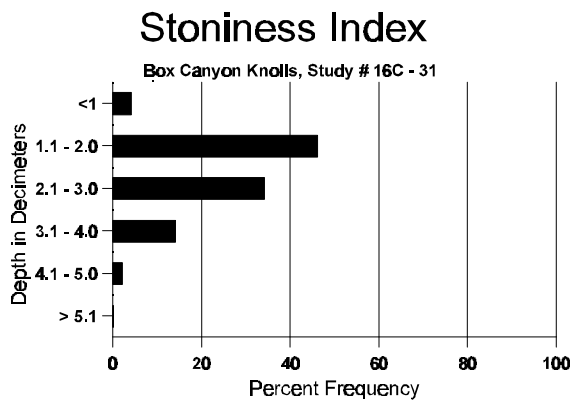
Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Amelanchier utahensis	0	0	-	-
B	Artemisia frigida	3	4	.00	.01
B	Artemisia nova	97	94	5.50	9.05
B	Artemisia tridentata vaseyana	22	29	1.80	1.95
B	Ceratoides lanata	0	1	.03	.03
B	Chrysothamnus depressus	3	6	.18	.16
B	Chrysothamnus nauseosus	0	0	-	-
B	Chrysothamnus viscidiflorus	93	93	5.15	7.64
B	Gutierrezia sarothrae	8	8	.04	.09
B	Opuntia spp.	0	0	-	-
B	Tetradymia canescens	6	9	.18	.24
Total for Browse		232	244	12.90	19.17

BASIC COVER --
Herd unit 16C, Study no: 31

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	342	335	8.75	35.04	34.84
Rock	178	45	1.25	1.14	.76
Pavement	224	151	.25	.70	1.35
Litter	393	355	35.75	37.44	27.93
Cryptogams	49	71	.50	.23	.82
Bare Ground	370	326	53.50	40.24	39.54

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 31, Study Name: Box Canyon Knolls

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.8	55.6 (16.4)	6.8 4	42.0	25.4	32.6	2.9	13.2	137.6	0.4



PELLET GROUP DATA --
Herd unit 16C, Study no: 31

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	16	7	n/a
Elk	62	55	108 (267)
Deer	11	5	5 (12)
Cattle	1	7	9 (22)

BROWSE CHARACTERISTICS --
 Herd unit 16C, Study no: 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				
Amelanchier utahensis																		
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	20	0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	36	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	0		-			
												'99	0		-			
Artemisia frigida																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	2	5	4
	'99	1	2	-	-	-	-	-	-	-	3	-	-	-	60	6	6	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%										
'94		00%			00%			00%			+20%							
'99		60%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'94	80		-			
												'99	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>Artemisia nova</i>																	
S	88	25	-	-	-	-	67	-	-	92	-	-	-	6133		92	
	94	-	-	-	1	-	-	-	-	1	-	-	-	20		1	
	99	57	-	-	-	-	-	-	-	57	-	-	-	1140		57	
Y	88	49	6	-	-	1	-	-	-	50	-	6	-	3733		56	
	94	184	6	-	-	-	-	-	-	190	-	-	-	3800		190	
	99	182	12	5	-	-	-	-	-	199	-	-	-	3980		199	
M	88	30	14	2	-	-	-	-	-	42	-	4	-	3066	8 13	46	
	94	229	57	-	1	-	-	-	-	287	-	-	-	5740	6 13	287	
	99	183	139	24	-	-	-	-	-	346	-	-	-	6920	7 15	346	
D	88	46	6	1	-	-	-	-	-	49	-	3	1	3533		53	
	94	27	8	-	1	-	-	-	-	6	-	-	30	720		36	
	99	64	25	-	-	-	-	-	-	78	-	-	11	1780		89	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	480		24	
	99	-	-	-	-	-	-	-	-	-	-	-	-	1220		61	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		17%		02%		09%		- 1%									
'94		14%		00%		06%		+19%									
'99		28%		05%		02%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	10332	Dec:	34%				
										'94	10260		7%				
										'99	12680		14%				
<i>Artemisia tridentata vaseyana</i>																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	3	-	-	-	-	-	3	-	-	-	60		3	
Y	88	1	2	-	-	-	-	-	-	3	-	-	-	200		3	
	94	4	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	4	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	94	36	-	-	-	-	-	-	-	36	-	-	-	720	11 18	36	
	99	16	11	9	-	-	-	-	-	36	-	-	-	720	15 24	36	
D	88	2	-	-	-	-	-	-	-	2	-	-	-	133		2	
	94	1	-	-	-	-	-	-	-	-	-	-	1	20		1	
	99	2	7	3	1	-	-	-	-	11	-	1	1	260		13	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'88		40%		00%		00%		+59%									
'94		00%		00%		02%		+23%									
'99		34%		23%		04%											
Total Plants/Acre (excluding Dead & Seedlings)										'88	333	Dec:	40%				
										'94	820		2%				
										'99	1060		25%				

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				
Ceratoides lanata												
S	88	1	-	-	-	-	-	-	1	66		1
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	0		0
Y	88	3	-	-	-	-	-	-	3	200		3
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	0		0
M	88	15	-	-	-	-	-	-	15	1000	6 6	15
	94	-	-	-	-	-	-	-	-	0	5 7	0
	99	-	2	-	-	-	-	-	2	40	4 5	2
D	88	1	-	-	-	-	-	-	1	66		1
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>							
'88		00%	00%	00%								
'94		00%	00%	00%								
'99		100%	00%	00%								
Total Plants/Acre (excluding Dead & Seedlings)					'88	1266	Dec:	5%				
					'94	0		0%				
					'99	40		0%				
Chrysothamnus depressus												
Y	88	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	1	20		1
M	88	-	-	-	-	-	-	-	-	0	- -	0
	94	5	-	-	-	-	-	-	5	100	4 9	5
	99	7	-	-	-	-	-	-	7	140	3 9	7
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>							
'88		00%	00%	00%								
'94		00%	00%	00%	+38%							
'99		00%	00%	00%								
Total Plants/Acre (excluding Dead & Seedlings)					'88	0	Dec:	-				
					'94	100		-				
					'99	160		-				
Chrysothamnus nauseosus												
M	88	-	-	-	-	-	-	-	-	0	- -	0
	94	-	-	-	-	-	-	-	-	0	21 24	0
	99	-	-	-	-	-	-	-	-	0	18 24	0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>							
'88		00%	00%	00%								
'94		00%	00%	00%								
'99		00%	00%	00%								
Total Plants/Acre (excluding Dead & Seedlings)					'88	0	Dec:	-				
					'94	0		-				
					'99	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				
<i>Chrysothamnus viscidiflorus</i>									
S	88	16	-	-	-	2	-	18	18
	94	-	-	-	-	-	-	0	0
	99	4	-	-	-	-	-	4	4
Y	88	99	1	-	-	9	-	108	109
	94	404	-	-	-	-	-	404	404
	99	144	2	-	-	-	-	146	146
M	88	280	22	-	-	10	-	303	312
	94	705	12	-	-	-	-	717	717
	99	753	23	-	-	-	-	776	776
D	88	55	11	-	-	2	-	58	68
	94	-	-	-	-	-	-	0	0
	99	39	-	-	-	-	-	35	39
X	88	-	-	-	-	-	-	0	0
	94	-	-	-	-	-	-	20	1
	99	-	-	-	-	-	-	140	7
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>				
'88		07%	00%	04%	-31%				
'94		01%	00%	00%	-14%				
'99		03%	00%	.41%					
Total Plants/Acre (excluding Dead & Seedlings)					'88	32599	Dec:	14%	
					'94	22420		0%	
					'99	19220		4%	
<i>Gutierrezia sarothrae</i>									
Y	88	-	-	-	-	-	-	0	0
	94	1	-	-	-	-	-	20	1
	99	-	-	-	-	-	-	0	0
M	88	-	-	-	-	-	-	0	0
	94	8	-	-	-	-	-	200	10
	99	21	-	-	-	-	-	420	21
D	88	-	-	-	-	-	-	0	0
	94	-	-	-	-	-	-	0	0
	99	2	-	-	-	-	-	40	2
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>				
'88		00%	00%	00%					
'94		00%	00%	00%	+52%				
'99		00%	00%	04%					
Total Plants/Acre (excluding Dead & Seedlings)					'88	0	Dec:	0%	
					'94	220		0%	
					'99	460		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		1	2									
Opuntia spp.																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	2	-	-	-	-	-	-	-	2	-	-	-	133	2	6	2
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	3	15	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	133	Dec:	-				
										'94	0		-				
										'99	0		-				
Tetradymia canescens																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	6	1	-	-	-	-	-	-	7	-	-	-	140	6	8	7
	99	4	5	2	-	-	1	-	-	12	-	-	-	240	6	8	12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		13%			00%			00%			+33%						
'99		42%			25%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'88	0	Dec:	-				
										'94	160		-				
										'99	240		-				

Trend Study 16C-32-99

Study site name: Muddy Creek .

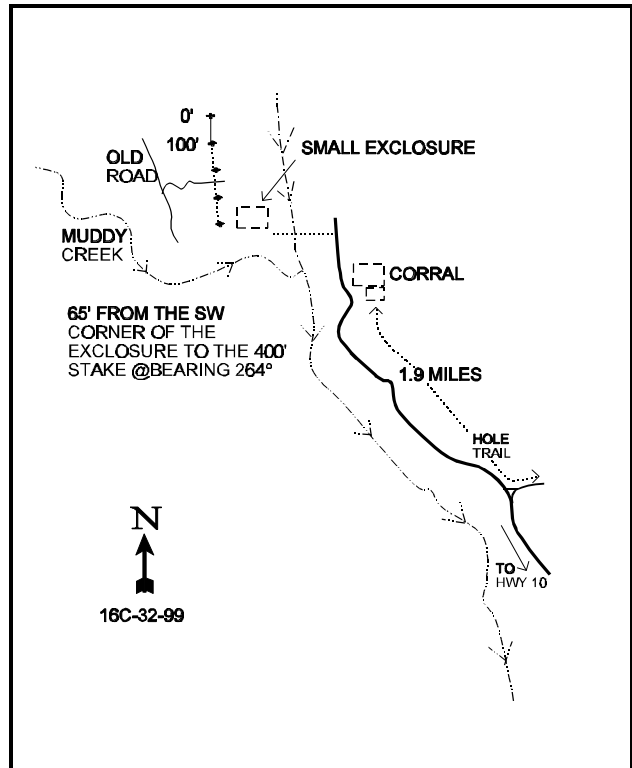
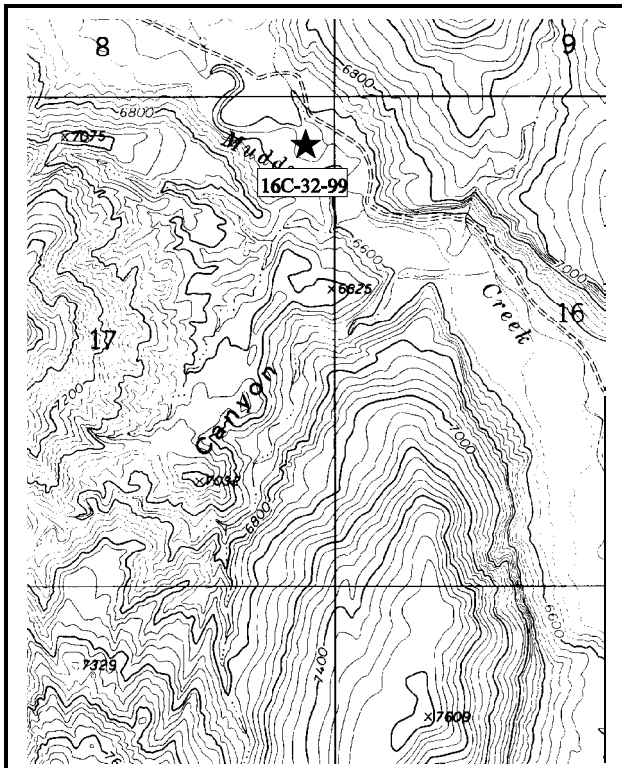
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 162°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 Ferron, proceed south on Highway U-10 for 12 miles to the turnoff to Muddy Creek, which is just across from the southern Moore Road. Turn right and go 4.9 miles. Once you reach Muddy Creek, take a left across the creek for 0.1 miles to the site. From the small fenced enclosure, the 400-foot baseline stake is 65 feet west of the SW corner of the enclosure. The baseline start 400 feet north of this stake, and the 18 inch green fencepost marking the 0-foot end of the baseline has a red browse tag, #9029, attached.



Map Name: Emery West

Diagrammatic Sketch

Township 21S, Range 6E, Section 17

UTM 4316545.626 N, 477156.004 E

DISCUSSION

Trend Study No. 16C-32 (31-30)

This trend study samples a unique area within the Muddy Creek drainage. A small flat (approximately 30 acres) in the bottom of the canyon supports a stand of Wyoming big sagebrush mixed with more typical desert shrubs. Large basin big sagebrush grow in the riparian areas, while pinyon-juniper woodland and mountain mahogany dominate the slopes. The study site is adjacent to a small Forest Service enclosure. Terrain is nearly level and drainage is to the southwest into Muddy Creek. Elevation is 6,600 feet. The flat is heavily used by deer and elk and to a lesser extent, trespass cattle from private land below the Forest Service fence. Pellet group data from 1999 estimate 12 deer and 70 elk days use/acre (30 ddu/ha and 173 edu/acre). One old cow pat was also encountered. Most of the elk pellet groups were from winter, although a few were more recent.

Soil is dense and shallow with an effective rooting depth estimated at just over 10 inches. Texture is a sandy clay loam with a slightly alkaline pH (7.6). Phosphorus is limited at 5.9 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Soil temperature is high at 72.2°F at an average depth of almost 10 inches. Percent organic matter was the lowest of all sites within this management unit (.7). Rock and pavement are rare on the surface or within the profile. Stoniness index measurements did not hit rock but instead, a compacted hard pan which varies in depth and is sometimes exposed on the surface. Beyond the hardpan, soil would be considered deep on this alluvial plain. Numerous gullies flow from the flat into the deeply cut washes. Even with the level terrain, there is obvious erosion, pedestaled plants, and large bare areas. Much of the soil on the site has eroded away. Pedestaling between plants varied from 2 to 8 inches in height.

Wyoming big sagebrush is the key browse species in this area. The population was estimated at 7,532 plants/acre in 1988 when 52% of the population was classified as young. These shrubs actually appeared fairly old and stunted. Many of the mature shrubs (2,533/acre) generally had a heavily hedged appearance, where most of the new growth was short and protected by plant browsed structure. Seed production would be affected by prolonged drought, excessively high soil temperatures, and heavy utilization. Growth and vigor appeared reduced compared to the response of plants that were protected for in the Forest Service enclosure at that time. During the 1994 reading, 3,120 sagebrush plants/acre were estimated. The number of mature and decadent plants remained nearly the same, but the number of young declined from nearly 4,000 plants/acre to only 220. Some of these differences would be due to the larger sample taken in 1994, although it appears more likely that a large number of the young sagebrush didn't survive to maturity. Utilization in 1994, was mostly light to moderate and vigor was generally good. Density has remained stable between 1994 and 1999. The number of mature plants declined and percentage of decadent plants doubled. Utilization is moderate to heavy, with nearly half of the population showing heavy use. Percent decadency has increased from 25% to 50% with 24% (380 plants/acre) classified as dying. Seedlings and young were rarely sampled.

Shadscale is co-dominant with sagebrush. This spiny plant shows light to moderate hedging with good vigor. The highly palatable bud sagebrush was also fairly common in 1988 and 1994 but was not encountered in 1999. Use is difficult to determine on these small prostrate shrubs and most were classified as lightly hedged. Low rabbitbrush is very common, with 9,466 plants/acre estimated in 1988, 4,540 in 1994 and 4,080 by 1999. These shrubs are small and generally not utilized as forage. Like sagebrush, many of the young counted in 1988 did not survive to maturity (drought and high soil temperatures). Other shrubs encountered on the site include a small number of winterfat, broom snakeweed, greasewood, and spiny horsebrush.

The herbaceous understory is typical for a mixed salt desert shrub community. All grasses combined had a cover value of only 5% in 1994 and 7% in 1999 with increased moisture. Forbs are rare and produced only about 1% cover in 1994 and 1999. Grasses include bottlebrush squirreltail, Indian ricegrass, needle-and-thread, and blue grama. Blue grama distribution is patchy, but where it occurs it dominates the

surface as large mats. It provided 42% of the grass cover in 1994 and 45% in 1999. Indian ricegrass is also common and currently ('99) produces 47% of the grass cover. The only common forb is the annual woolly plantain.

1994 TREND ASSESSMENT

Ground cover characteristics have improved somewhat since 1988. Percent bare ground has declined from 67% to 57%. This is still a high amount of bare soil. With the lack of herbaceous vegetation, erosion is still occurring. The browse trend is stable for the time being with stable populations of mature shrubs. Many young shrubs died off since the 1988 reading and few seedlings were encountered in 1994. This is likely due to the drought conditions of the past several years. Biotic and reproductive potentials of desirable shrubs have declined on the site, but a return to normal precipitation patterns will reverse this trend. The herbaceous understory is lacking on the site, although sum of nested frequencies of perennial grasses and forbs have increased slightly indicating a slightly upward trend.

TREND ASSESSMENT

soil - slightly improved but still very poor

browse - stable for mature plants

herbaceous understory - slightly improved but still poor

1999 TREND ASSESSMENT

Trend for soil is slightly improved due to a decline in percent bare ground from 57% to 53% and an increase in litter and cryptogamic cover. Erosion is still a major problem however. Trend for browse is down slightly for the key species, Wyoming big sagebrush. Density has remained stable, but recruitment is down, utilization is heavy, and percent decadence has increased from 25% to 50%. There are currently more decadent/dying sagebrush than young to replace them indicating a most likely population decline in the future. Trend for the herbaceous understory is stable with similar sum of nested frequency values for grasses and forbs compared to 1994.

TREND ASSESSMENT

soil - up slightly but still in very poor condition

browse - down slightly

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 32

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	<i>Agropyron cristatum</i>	-	-	3	-	-	2	-	.03
G	<i>Agropyron smithii</i>	-	-	2	-	-	1	-	.15
G	<i>Agropyron spicatum inerme</i>	-	1	-	-	1	-	.15	-
G	<i>Bouteloua gracilis</i>	_a 2	_b 36	_b 55	1	12	19	2.23	3.11
G	<i>Bromus tectorum</i> (a)	-	-	10	-	-	5	-	.02
G	<i>Oryzopsis hymenoides</i>	_a 64	_b 112	_b 113	30	49	47	2.57	3.27
G	<i>Sitanion hystrix</i>	_b 94	_a 51	_a 33	44	25	19	.39	.27
G	<i>Sporobolus cryptandrus</i>	_b 5	_a -	_b 13	4	-	6	-	.10
Total for Annual Grasses		0	0	10	0	0	5	0	0.02
Total for Perennial Grasses		165	200	219	79	87	94	5.34	6.95
Total for Grasses		165	200	229	79	87	99	5.34	6.98
F	<i>Arabis</i> spp.	1	-	-	1	-	-	-	-
F	<i>Astragalus</i> spp.	23	32	14	12	14	9	.12	.04
F	<i>Calochortus nuttallii</i>	-	-	4	-	-	2	-	.01
F	<i>Castilleja</i> spp.	-	2	-	-	1	-	.00	-
F	<i>Descurainia pinnata</i> (a)	-	1	7	-	1	3	.00	.01
F	<i>Draba</i> spp. (a)	-	6	-	-	2	-	.01	-
F	<i>Eriogonum</i> spp.	-	2	-	-	1	-	.00	-
F	<i>Erigeron pumilus</i>	7	5	10	3	3	5	.01	.02
F	<i>Lappula occidentalis</i> (a)	-	_b 43	_a 18	-	14	7	.07	.03
F	<i>Machaeranthera canescens</i>	_b 11	_b 19	_a -	7	12	-	.11	-
F	<i>Plantago patagonica</i> (a)	-	_a 104	_b 191	-	37	65	.45	1.08
F	<i>Sphaeralcea coccinea</i>	5	11	8	4	5	6	.05	.03
F	<i>Townsendia incana</i>	_c 54	_b 34	_a 8	28	17	4	.25	.07
F	Unknown forb-annual (a)	-	2	-	-	1	-	.00	-
Total for Annual Forbs		0	156	216	0	55	75	0.54	1.13
Total for Perennial Forbs		101	105	44	55	53	26	0.56	0.18
Total for Forbs		101	261	260	55	108	101	1.11	1.31

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

BROWSE TRENDS --
Herd unit 16C, Study no: 32

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia spinescens	31	0	.51	-
B	Artemisia tridentata wyomingensis	69	72	3.58	4.68
B	Atriplex confertifolia	81	69	5.55	3.45
B	Ceratoides lanata	6	4	.06	.00
B	Chrysothamnus viscidiflorus	64	70	2.06	1.99
B	Gutierrezia sarothrae	1	0	-	-
B	Opuntia spp.	17	21	.40	.36
B	Sarcobatus vermiculatus	12	14	1.61	1.35
B	Sclerocactus	2	8	.03	.15
B	Tetradymia spinosa	13	14	.19	.36
Total for Browse		296	272	14.03	12.38

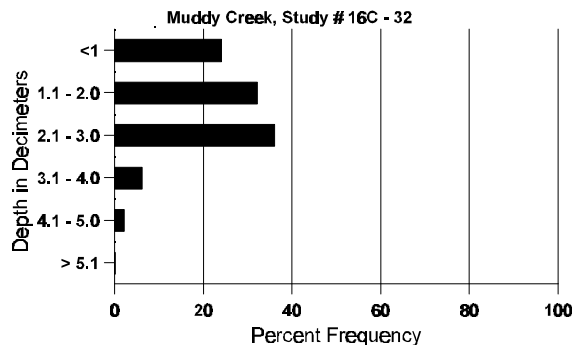
BASIC COVER --
Herd unit 16C, Study no: 32

Cover Type	Nested Frequency		Average Cover %		
	'04	'09	'88	'94	'99
Vegetation	287	288	2.50	22.87	19.34
Rock	99	16	0	.91	.50
Pavement	71	53	.75	.21	.46
Litter	370	342	20.00	14.56	17.69
Cryptogams	135	138	10.00	3.65	7.27
Bare Ground	359	348	66.75	56.71	52.81

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 32, Study Name: Muddy Creek

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.6	72.2 (9.4)	7.6	56.0	23.4	20.6	0.7	5.9	89.6	3.4

Stoniness Index



PELLET GROUP DATA --
Herd unit 16C, Study no: 32

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'84	'89	
Rabbit	10	12	n/a
Elk	35	55	70 (173)
Deer	33	9	12 (30)
Cattle	3	-	1 (2)

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 32

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>Artemisia spinescens</i>																		
S	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	'88	11	-	-	-	-	-	1	-	-	12	-	-	-	800		12	
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	3 5	8	
	'94	36	18	-	1	-	-	-	-	-	55	-	-	-	1100	4 9	55	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
D	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	'94	4	16	-	-	2	-	-	-	-	14	-	2	6	440		22	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+10%							
'94		46%			00%			10%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	1399	Dec:	5%				
											'94	1560		28%				
											'99	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	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																	
S	88	9	-	-	-	-	-	1	-	-	10	-	-	-	666		10
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	88	44	5	1	-	-	-	9	-	-	59	-	-	-	3933		59
	94	11	-	-	-	-	-	-	-	10	-	1	-	220		11	
	99	3	-	6	-	-	-	-	-	9	-	-	-	180		9	
M	88	14	14	10	-	-	-	-	-	37	1	-	-	2533	15 19	38	
	94	69	37	-	-	-	-	-	-	104	-	-	2	2120	13 17	106	
	99	13	20	31	-	4	3	-	-	71	-	-	-	1420	13 19	71	
D	88	5	9	1	-	-	-	1	-	16	-	-	-	1066		16	
	94	22	13	4	-	-	-	-	-	26	-	-	13	780		39	
	99	14	26	35	-	3	2	-	-	61	-	-	19	1600		80	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	1140		57	
	99	-	-	-	-	-	-	-	-	-	-	-	-	1240		62	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		25%			11%			00%			-59%						
'94		32%			03%			10%			+ 3%						
'99		33%			48%			12%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	7532	Dec:	14%			
											'94	3120		25%			
											'99	3200		50%			
<i>Atriplex confertifolia</i>																	
S	88	15	-	-	-	-	-	-	-	15	-	-	-	1000		15	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	45	4	2	-	-	-	3	-	54	-	-	-	3600		54	
	94	14	-	-	-	-	-	-	-	13	-	-	1	280		14	
	99	35	-	-	1	-	-	-	-	36	-	-	-	720		36	
M	88	32	6	4	-	-	-	1	-	43	-	-	-	2866	9 10	43	
	94	241	-	-	-	-	-	-	-	241	-	-	-	4820	8 15	241	
	99	120	16	2	-	-	-	-	-	138	-	-	-	2760	7 13	138	
D	88	16	3	1	-	-	-	1	-	21	-	-	-	1400		21	
	94	23	1	-	-	-	-	-	-	19	-	-	5	480		24	
	99	31	5	-	7	-	-	-	-	33	-	-	10	860		43	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		11%			06%			00%			-29%						
'94		.35%			00%			02%			-22%						
'99		10%			.92%			05%									
Total Plants/Acre (excluding Dead & Seedlings)											'88	7866	Dec:	18%			
											'94	5580		9%			
											'99	4340		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>Ceratoides lanata</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	1	1	3	-	-	-	1	-	-	6	-	-	-	400	6	6	6
	94	3	3	-	-	-	-	-	-	-	6	-	-	-	120	6	6	6
	99	-	-	1	-	-	-	-	-	-	1	-	-	-	20	4	5	1
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	4	-	-	1	-	-	-	5	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		11%			33%			00%			-77%							
'94		43%			00%			00%			-14%							
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	600	Dec:	0%				
											'94	140		14%				
											'99	120		83%				
<i>Chrysothamnus viscidiflorus</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	62	3	-	-	-	-	7	-	-	71	-	-	1	4800		72	
	94	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
	99	16	7	-	-	-	-	-	-	-	23	-	-	-	460		23	
M	88	61	3	1	-	-	-	5	-	-	70	-	-	-	4666	7	9	70
	94	209	-	-	-	-	-	2	-	-	209	-	-	2	4220	9	11	211
	99	146	24	2	-	-	-	-	-	-	153	-	19	-	3440	7	12	172
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	9	-	-	-	-	-	-	-	-	8	-	-	1	180		9	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		04%			.70%			.70%			-52%							
'94		00%			00%			.88%			-10%							
'99		15%			.98%			10%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	9466	Dec:	0%				
											'94	4540		1%				
											'99	4080		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			
Gutierrezia sarothrae																	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-		
												'94	20		-		
												'99	0		-		
Opuntia spp.																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7
M	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	6 16	2
	94	23	-	-	-	-	-	-	-	-	23	-	-	-	460	4 16	23
	99	29	-	-	-	-	-	-	-	-	29	-	-	-	580	5 13	29
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	-	-	2	-	40		2
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'88		00%			00%			00%			+71%						
'94		00%			00%			00%			+39%						
'99		00%			00%			05%									
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:	0%		
												'94	460		0%		
												'99	760		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				
Sarcobatus vermiculatus																		
Y	88	4	-	1	-	-	-	-	-	-	5	-	-	-	333			5
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	19	31	1
	94	20	-	-	-	-	-	-	-	-	20	-	-	-	400	17	27	20
	99	23	-	-	-	-	-	-	-	-	23	-	-	-	460	16	30	23
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	5	-	-	-	-	-	-	-	-	1	-	-	4	100			5
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			17%			00%			+ 9%							
'94		00%			00%			00%			+31%							
'99		00%			00%			13%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	399	Dec:	0%				
											'94	440		5%				
											'99	640		16%				
Sclerocactus																		
M	88	10	-	-	-	-	-	-	-	-	10	-	-	-	666	3	0	10
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	3	4	6
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220	3	4	11
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			-82%							
'94		00%			00%			00%			+45%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	666	Dec:	-				
											'94	120		-				
											'99	220		-				

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 spinosa																		
Y	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'99	4	-	-	-	-	-	-	-	-	-	-	4	-	80		4	
M	'88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	12 16	1	
	'94	18	1	-	-	-	-	-	-	-	19	-	-	-	380	11 18	19	
	'99	23	-	1	-	-	-	-	-	-	1	-	23	-	480	4 11	24	
D	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	1	-	1	-	-	-	-	-	-	1	-	-	1	40		2	
	'99	2	-	-	-	-	-	-	-	-	-	-	2	-	40		2	
X	'88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	280		14	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'88		00%			00%			00%			+85%							
'94		05%			05%			05%			+27%							
'99		00%			03%			97%										
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	0%				
											'94	440		9%				
											'99	600		7%				

Trend Study 16C-33-99

Study site name: Little Nelson Mountain .

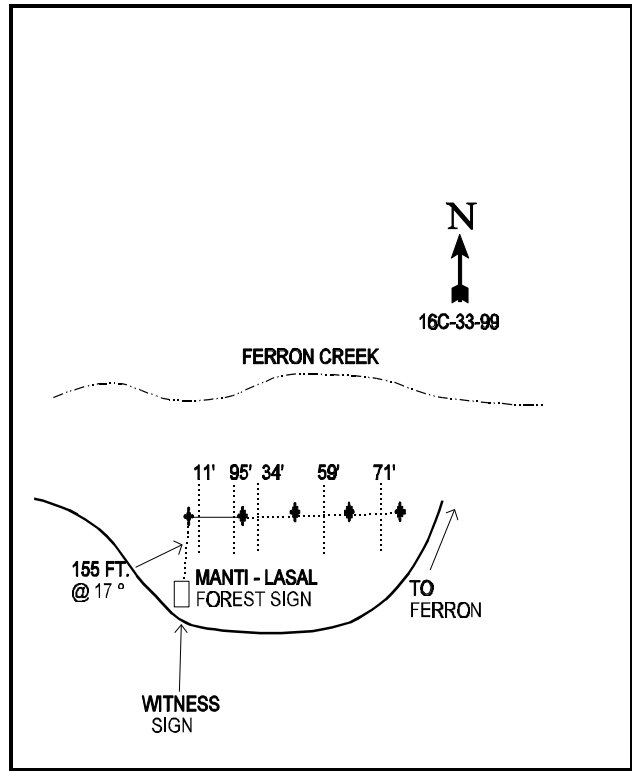
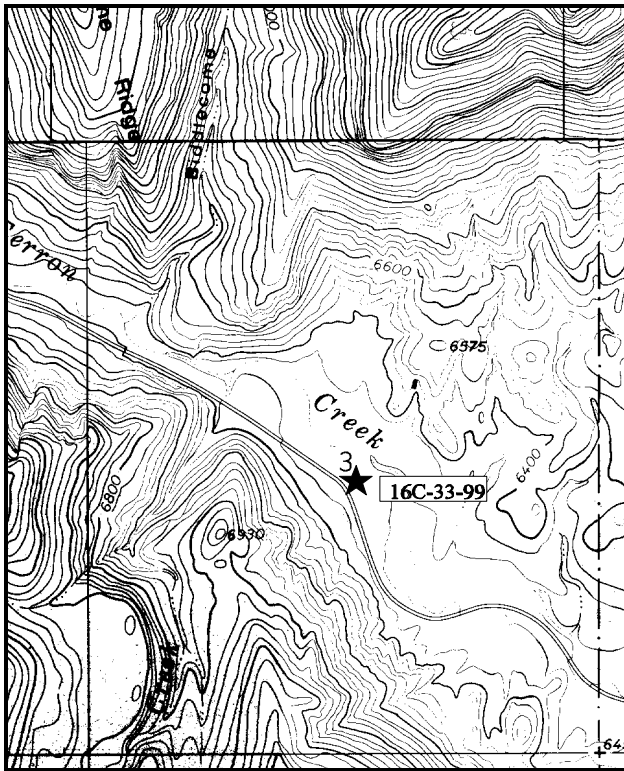
Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 127°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 Ferron, proceed up Ferron Canyon past Millsite State Park. Continue 0.7 miles past the forest boundary to the Manti-LaSal Forest sign. The 0-foot baseline stake is on the right hand side of the road approximately 155 feet away at a bearing of 17°M.



Map Name: Ferron

Diagrammatic Sketch

Township 20S , Range 6E , Section 3

UTM 4328643.864 N, 479914.299 E

DISCUSSION

Trend Study No. 16C-33 (31-31)

The Little Nelson Mountain study in Ferron Canyon was established in 1994. It samples a dry Wyoming big sagebrush site along the banks of Ferron creek, just up stream from Millsite reservoir. The terrain at the site gently slopes north toward the creek. Elevation is approximately 6,340 feet. The area receives concentrated use from wintering deer. Pellet group data from 1999 estimate 22 deer and 17 cow days use/acre (54 ddu/ha and 42 cdu/ha). All cattle pats were from last season. The site is within the Ferron allotment but is grazed only as cattle are trailed up the road to higher pastures.

The soils are alluvially deposited and deep with some river cobble on the surface and within the profile. Effective rooting depth is estimated at just over 26 inches. Texture is a loam with a slightly alkaline pH (7.6). Phosphorus is limited at only 3.5 ppm and potassium is marginal at 67.2 ppm. Values less than 10 ppm for phosphorus and 70 ppm for potassium have been shown to limit normal plant growth and development. There is a considerable amount of exposed bare ground between individual shrubs. Percent bare ground was estimated at 52% in 1994 and 44% in 1999. Soil pedestaling is evident to a height of 4 to 6 inches in some areas. Herbaceous vegetation was lacking on the site in 1994 with grasses and forbs providing only 10% cover. Cover increased by 1999 with grasses and forbs providing almost 20% cover. Most erosion in the area comes from high intensity thunderstorm events. One such event on the day following study site establishment in 1994, washed out the road just past the reservoir.

The key browse species on the site consists of a moderately dense population of Wyoming big sagebrush. These shrubs are small with mature plants averaging only 12 inches in height with a 20 inch crown. The majority of the population is mature. Percent decadence was moderately high in 1994 at 32% with 61% of these shrubs classified as dying. By 1999, the population of mature plants has remained similar. Young plants are more abundant and percent decadence has declined to 22% due to a die off of some decadent plants since 1994. Use remains moderate to heavy but vigor is normal on most plants.

Shadscale is also abundant with an estimated population of 2,700 plants/acre in 1994 and 2,540 by 1999. Use of these small shrubs was primarily light to moderate. Several other shrubs occurred in small numbers.

The herbaceous understory is diverse and moderately abundant for this type of site. The most common grass is blue grama which accounted for 81% of the grass cover in 1994 and 76% in 1999. Other fairly common grasses include Indian ricegrass and bottlebrush squirreltail. Forbs are diverse but combined, accounted for less than one percent cover in 1994, increasing to 4% by 1999. The most abundant species include an Astragalus, hoary aster, and wooly plantain.

1994 APPARENT TREND ASSESSMENT

Protective ground cover is lacking on this site primarily due to the lack of herbaceous plants. Percent bare ground is quite high and there are large areas of exposed soil. Pedestaling is evident and during high intensity rain events there is little protective cover to hold the soil in place. A return to normal precipitation patterns will improve the herbaceous cover on the site. The key browse consists of Wyoming big sagebrush. Apparent trend for these shrubs appears stable currently. There is an adequate number of seedlings and young to replace most of the dying plants. Percent decadency is low at 32% but utilization is fairly heavy. The herbaceous understory is in poor condition. The dominant grass consists of the low growing blue grama. Forbs are scarce.

1999 TREND ASSESSMENT

Trend for soil is up due to a decline in percent cover of bare ground from 52% to 44%. Litter cover also increased slightly while vegetative cover increased from 17% to 30%. Cryptogamic cover increased as well. There is still a considerable amount of unprotected bare soil on the site and erosion continues to occur. Trend for the key species, Wyoming big sagebrush, is up slightly. Utilization is still moderate to heavy but vigor has improved, percent decadence has declined, and recruitment is up. Shadscale, which is also abundant, appears to be stable. Trend for the herbaceous understory is up. Sum of nested frequency of perennial grasses has increased slightly while frequency of perennial forbs has increased substantially. Cover of both grasses and forbs has also increased since 1994. Blue gramma is stable and currently provides 76% of the grass cover and 60% of the total herbaceous cover. Indian ricegrass and bottlebrush squirreltail are also fairly abundant and combined they produce 18% of the grass cover. Indian ricegrass has increased significantly in sum of nested frequency since 1994, while bottlebrush squirreltail has remained stable.

TREND ASSESSMENT

soil - up

browse - slightly up

herbaceous understory - up

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 33

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	<i>Bouteloua gracilis</i>	143	160	39	40	7.73	11.74
G	<i>Bromus tectorum</i> (a)	-	75	-	32	-	.40
G	<i>Elymus salina</i>	18	*-	6	-	.08	-
G	<i>Hilaria jamesii</i>	1	5	1	1	.00	.03
G	<i>Oryzopsis hymenoides</i>	57	*79	25	36	.86	1.37
G	<i>Sitanion hystrix</i>	78	70	37	38	.68	1.37
G	<i>Sporobolus cryptandrus</i>	12	43	7	12	.12	.52
G	<i>Stipa comata</i>	6	1	2	1	.03	.03
Total for Annual Grasses		0	75	0	32	0	0.40
Total for Perennial Grasses		315	358	117	128	9.52	15.08
Total for Grasses		315	433	117	160	9.52	15.48
F	<i>Astragalus consobrinus</i>	8	*91	5	39	.02	.77
F	<i>Aster</i> spp.	15	*-	5	-	.02	-
F	<i>Castilleja</i> spp.	1	-	1	-	.00	-
F	<i>Cryptantha</i> spp.	2	-	1	-	.00	-
F	<i>Draba</i> spp. (a)	-	25	-	9	-	.07
F	<i>Erigeron</i> spp.	2	14	1	4	.00	.07
F	<i>Halogeton glomeratus</i> (a)	2	-	1	-	.00	-
F	<i>Lappula occidentalis</i> (a)	9	*46	4	22	.02	.11
F	<i>Machaeranthera canescens</i>	4	36	2	18	.01	1.70

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	Plantago patagonica (a)	32	*95	10	26	.07	.91
F	Salsola iberica (a)	9	*-	3	-	.01	-
F	Sphaeralcea coccinea	13	11	7	6	.06	.10
F	Townsendia incana	15	*47	8	24	.04	.31
F	Unknown forb-perennial	4	-	2	-	.01	-
Total for Annual Forbs		52	166	18	57	0.11	1.09
Total for Perennial Forbs		64	199	32	91	0.18	2.96
Total for Forbs		116	365	50	148	0.29	4.05

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 16C, Study no: 33

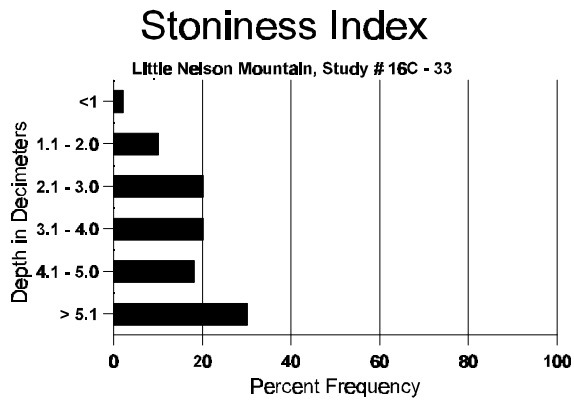
Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Amelanchier utahensis	0	1	-	-
B	Artemisia spinescens	1	3	-	.06
B	Artemisia tridentata wyomingensis	64	66	3.45	6.78
B	Atriplex canescens	0	0	.54	-
B	Atriplex confertifolia	50	53	1.08	3.03
B	Atriplex gardneri	-	-	.98	-
B	Ceratoides lanata	4	3	.00	.00
B	Chrysothamnus nauseosus	3	0	-	-
B	Chrysothamnus viscidiflorus	3	8	.03	-
B	Eriogonum microthecum	1	0	.00	-
B	Juniperus osteosperma	0	1	-	-
B	Leptodactylon pungens	3	6	.03	.15
B	Opuntia spp.	36	36	.84	1.57
B	Sarcobatus vermiculatus	1	1	.38	.38
B	Sclerocactus	0	4	-	.01
B	Tetradymia spinosa	0	2	-	-
Total for Browse		166	184	7.36	12.00

BASIC COVER --
Herd unit 16C, Study no: 33

Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	311	356	16.88	30.04
Rock	240	175	3.92	4.51
Pavement	286	342	1.43	8.14
Litter	419	393	13.36	16.00
Cryptogams	94	217	2.23	9.79
Bare Ground	460	459	51.92	43.53

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 33, Study Name: Little Nelson Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
26.1	55.4 (18.1)	7.6	48.0	33.4	18.6	1.5	3.5	67.2	0.6



PELLET GROUP FREQUENCY --
Herd unit 16C, Study no: 33

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) 09
	'94	'99	
Rabbit	-	11	n/a
Elk	7	-	0
Deer	42	43	22 (54)
Cattle	2	3	17 (42)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 33

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				
<i>Amelanchier utahensis</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	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%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	20		-			
<i>Artemisia spinescens</i>																		
M	94	1	-	-	-	-	-	-	-	-	-	-	-	20	-	-		1
	99	3	-	-	-	-	-	-	-	-	-	-	-	60	3	7		3
D	94	-	-	-	-	-	-	-	-	-	-	-	-	0				0
	99	4	-	-	-	-	-	-	-	-	-	-	-	80				4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+86%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	0%			
												'99	140		57%			
<i>Artemisia tridentata wyomingensis</i>																		
S	94	5	-	-	-	-	-	-	-	-	-	-	-	100				5
	99	6	1	2	-	-	-	-	-	-	-	-	-	180				9
Y	94	6	3	2	-	-	-	-	-	-	-	-	-	220				11
	99	21	15	-	3	3	2	-	-	-	-	-	-	880				44
M	94	30	25	27	4	-	-	-	-	-	-	-	-	1720	11	20		86
	99	4	17	6	4	36	20	5	-	-	-	-	-	1840	12	20		92
D	94	4	16	25	-	1	-	-	-	-	-	-	-	920				46
	99	2	-	8	-	2	17	9	-	-	-	-	-	760				38
X	94	-	-	-	-	-	-	-	-	-	-	-	-	1000				50
	99	-	-	-	-	-	-	-	-	-	-	-	-	960				48
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		31%			38%			23%			+18%							
'99		42%			30%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2860	Dec:	32%			
												'99	3480		22%			
<i>Atriplex canescens</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	0	8	17		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	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>Atriplex confertifolia</i>																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	14	-	1	-	1	-	-	-	-	16	-	-	-	320		16	
Y	94	2	2	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	21	-	-	-	1	4	5	-	-	31	-	-	-	620		31	
M	94	76	20	9	-	-	-	-	-	-	104	-	-	1	2100	8 16	105	
	99	20	7	2	10	7	5	4	-	-	55	-	-	-	1100	8 16	55	
D	94	20	5	1	-	-	-	-	-	-	15	-	-	8	520		26	
	99	6	-	-	8	5	1	21	-	-	18	-	3	20	820		41	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		20%			07%			07%			- 6%							
'99		16%			09%			18%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2700	Dec:	19%			
												'99	2540		32%			
<i>Ceratoides lanata</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	2	-	1	-	-	-	-	-	-	3	-	-	-	60	6 11	3	
	99	7	-	-	-	1	-	-	-	-	8	-	-	-	160	5 9	8	
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			25%			00%			+50%							
'99		13%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	80	Dec:	25%			
												'99	160		0%			
<i>Chrysothamnus nauseosus</i>																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	1	-	-	-	-	-	-	2	-	-	-	40	9 7	2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			33%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	-			
												'99	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 viscidiflorus																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	8	9	3
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140	6	12	7
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+63%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	-			
												'99	160		-			
Eriogonum microthecum																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	3	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-			
												'99	0		-			
Juniperus osteosperma																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	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%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	20		-			
Leptodactylon pungens																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	7	10	6
	99	12	-	-	-	-	-	-	-	-	12	-	-	-	240	5	7	12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+42%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	140	Dec:	-			
												'99	240		-			

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				
Opuntia spp.																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	94	53	-	-	-	-	-	-	-	-	53	-	-	-	1060	4	17	
	99	39	-	-	-	-	-	1	-	-	37	-	3	-	800	4	18	
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	10	-	-	-	-	-	-	-	-	5	-	-	5	200		10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			- 4%							
'99		00%			00%			15%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1120	Dec:	2%			
												'99	1080		19%			
Sarcobatus vermiculatus																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	16	21	
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20	16	23	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+ 0%							
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-			
												'99	20		-			
Sclerocactus																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	2	-	-	1	-	-	-	-	-	3	-	-	-	60	2	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	80		-			
Tetradymia spinosa																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	25	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	60		-			

Trend Study 16C-34-99

Study site name: South Sage Flat .

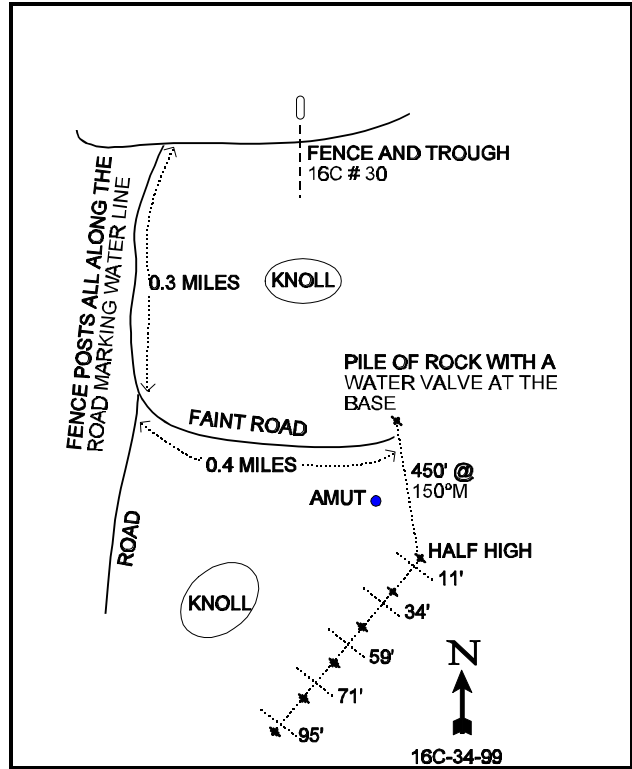
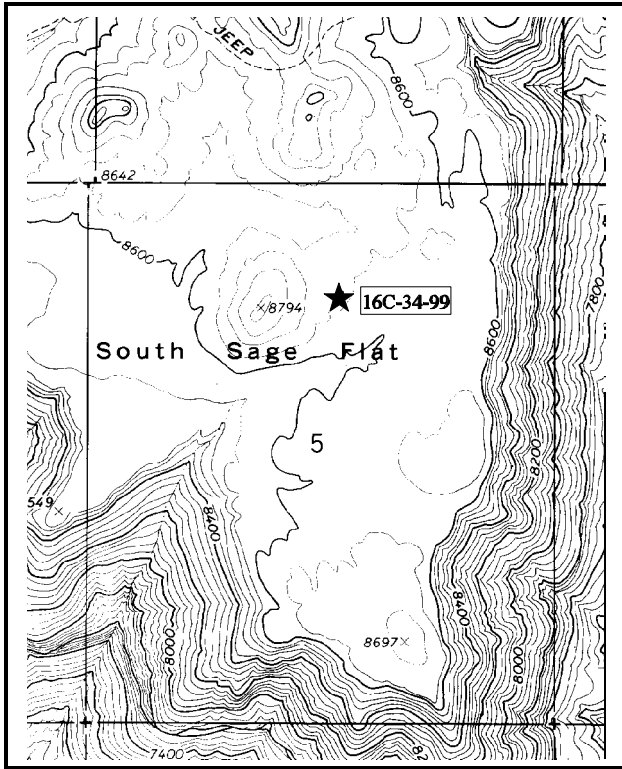
Range type: Black Sagebrush .

Compass bearing: frequency baseline 203°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 the fence and turnoff at site # 16C-30 (Upper Hole Trail), proceed west 0.7 miles. Turn left and travel along a road with fenceposts marking a water line for 0.3 miles. Turn left on a faint road and travel 0.4 miles to a fencepost and a pile of rocks on the left. From the rock pile, walk 450 ft at 150/ magnetic to the 0 ft baseline stake.



Map Name: Flagstaff Peak

Diagrammatic Sketch

Township 21S , Range 6E , Section 5

UTM 4319441.488 N, 476882.669 E

DISCUSSION

Trend Study No. 16C-34 (31-32)

The South Sage Flat study was established in 1994 at South Sage Flat. It samples a black sagebrush-mountain big sagebrush/grass community south-west of Little Nelson Mountain on Forest Service land. Elevation at the site is 8,650 feet with a general east aspect and nearly level terrain. It was added to monitor the increasing elk population on the unit. Quadrat frequency of elk pellet-groups on the site is quite high at 48% in 1994 and 59% in 1999. Cattle use the area as part of the Ferron grazing allotment which is grazed from June 21 to October 5 by 1,607 cattle on an 8 pasture rest rotation system. There is a water trough about 1/4 of a mile to the north of the site. Pellet group data from 1999 estimate 1 deer, 85 elk and 31 cow days use/acre (3 ddu/ha, 210 edu/ha, 77 cdu/ha).

Soil on the site is moderately shallow with an effective rooting depth of just over 12 inches. There is a clay layer at 10 inches. Soil texture is a sandy clay loam with a neutral pH (6.9). Pavement sized rock is common on the surface and throughout the profile, with a few larger rocks scattered on the surface and many of those have a calcium carbonate coating. There is quite a bit of bare ground exposed (40% in 1994 and 38% in 1999) and light soil pedestaling evident. Erosion is minimal, however this is due mostly to the level terrain.

The key browse species on the site consists of a dense population of relatively small statured black sagebrush. Density has averaged about 14,000, mostly mature plants/acre since 1994. Utilization has been light to moderate and vigor is generally good. There is a small but stable population of mountain big sagebrush on the site, indicating areas of deeper soil. The only other abundant shrub on the site consists of a dense stand of low growing rabbitbrush. Palatability of this shrub is poor and most individuals are not utilized. Several other species of shrubs occurred on the site, although none were very abundant.

The herbaceous understory is fairly abundant and diverse with grasses and forbs accounting for almost 11% cover in 1994 and about 15% in 1999. Sum of nested frequency for grasses and forbs indicates well dispersed cover which is effective at holding the soil in place. The dominant grass is crested wheatgrass which was seeded in the past. The next most abundant grass is letterman needlegrass. Forbs are diverse and fairly abundant. The most common species include Eaton fleabane, redroot eriogonum, pingue hymenoxys, and mat penstemon.

1994 APPARENT TREND ASSESSMENT

Protective ground cover is adequate to prevent serious erosion on the site. The apparent browse trend is stable with adequate numbers of seedlings and young, and low percent decadency for the preferred browse species, black sagebrush and Mountain big sagebrush. Utilization is generally light to moderate and vigor is good. The herbaceous understory is fairly abundant and diverse providing moderately effective protective ground cover for the soil.

1999 TREND ASSESSMENT

Trend for soil is stable. Litter and vegetative cover have increased slightly, but percent cover for bare ground remains similar to 1994. There is some erosion occurring, although it is minimal due to the level terrain. The browse trend is stable for the key species, black sagebrush and mountain big sagebrush. Both show stable populations, mostly light to moderate use, good recruitment and vigor, and low decadence. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses increased slightly while frequency of perennial forbs declined slightly. Grasses provide the bulk of the herbaceous cover and crested wheatgrass accounts for 66% of the grass cover and 47% of the herbaceous cover.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 34

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	Agropyron cristatum	233	254	79	82	4.23	6.86
G	Agropyron smithii	1	6	1	2	.00	.15
G	Bromus inermis	8	3	2	2	.01	.06
G	Elymus salina	15	41	7	13	.11	.21
G	Poa fendleriana	64	40	22	17	1.03	.50
G	Sitanion hystrix	2	2	1	2	.03	.06
G	Stipa lettermani	133	120	55	50	1.95	2.49
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		456	466	167	168	7.38	10.36
Total for Grasses		456	466	167	168	7.38	10.36
F	Androsace septentrionalis (a)	-	28	-	14	-	.14
F	Arabis spp.	3	3	1	2	.00	.01
F	Astragalus convallarius	6	-	2	-	.03	-
F	Astragalus miser	3	3	1	1	.15	.03
F	Aster spp.	-	*14	-	6	-	.05
F	Castilleja linariaefolia	3	2	1	2	.01	.01
F	Chaenactis douglasii	-	4	-	1	-	.00
F	Cryptantha spp.	2	-	1	-	.00	-
F	Eriogonum alatum	3	-	2	-	.03	-
F	Erigeron eatonii	128	*49	52	27	1.05	.36
F	Erigeron pumilus	15	*2	9	1	.04	.03
F	Eriogonum racemosum	25	*65	13	28	.16	.56
F	Hymenoxys acaulis	16	*4	6	2	.10	.01
F	Hymenoxys richardsonii	51	55	23	23	.78	1.23
F	Ipomopsis aggregata	-	2	-	1	-	.03
F	Linum lewisii	2	1	1	1	.03	.03
F	Lupinus argenteus	10	3	5	1	.07	.09
F	Machaeranthera canescens	3	3	2	1	.01	.01
F	Machaeranthera grindelioides	12	10	7	4	.08	.10
F	Penstemon caespitosus	63	55	26	25	.35	1.17
F	Penstemon spp.	5	-	2	-	.01	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	Petradoria pumila	5	2	2	2	.03	.03
F	Potentilla gracilis	3	*9	1	4	.03	.07
F	Senecio multilobatus	4	*22	1	9	.00	.07
F	Sphaeralcea coccinea	3	7	2	4	.01	.07
F	Trifolium spp.	36	43	17	17	.16	.09
Total for Annual Forbs		0	28	0	14	0	0.14
Total for Perennial Forbs		401	358	177	162	3.20	4.08
Total for Forbs		401	386	177	176	3.20	4.23

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 16C, Study no: 34

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Amelanchier utahensis	0	0	-	-
B	Artemisia nova	98	100	9.90	11.98
B	Artemisia tridentata vaseyana	29	37	3.06	3.95
B	Chrysothamnus depressus	0	4	-	.15
B	Chrysothamnus viscidiflorus	92	93	3.55	7.03
B	Eriogonum corymbosum	13	13	.36	.34
B	Gutierrezia sarothrae	14	14	.03	.09
B	Leptodactylon pungens	1	2	-	-
B	Opuntia spp.	1	1	-	-
B	Symphoricarpos oreophilus	1	1	-	-
B	Tetradymia canescens	0	0	-	-
Total for Browse		249	265	16.92	23.55

BASIC COVER --

Herd unit 16C, Study no: 34

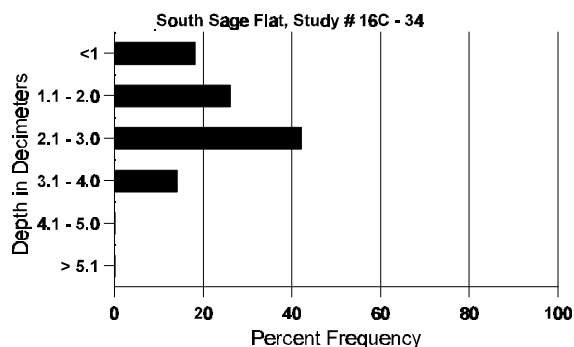
Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	380	387	29.04	33.97
Rock	302	106	4.80	1.56
Pavement	210	342	1.41	8.42
Litter	464	435	20.91	27.77
Cryptogams	-	9	0	.04
Bare Ground	442	425	40.17	38.25

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 34, Study Name: South Sage Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.2	56.0 (12.6)	6.9	62.0	15.4	22.6	1.9	10.5	115.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16C, Study no: 34

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) '99
	'94	'99	
Rabbit	10	15	n/a
Elk	48	59	85 (210)
Deer	12	8	1 (2)
Cattle	4	8	31 (77)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 34

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				
Amelanchier utahensis																		
M	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	11	0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	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>Artemisia nova</i>																		
S	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	99	33	-	-	1	-	-	-	-	-	35	-	-	-	700		35	
Y	94	33	23	13	-	-	-	-	-	-	69	-	-	-	1380		69	
	99	133	2	-	-	-	-	-	-	-	135	-	-	-	2700		135	
M	94	436	62	18	-	-	-	-	-	-	516	-	-	-	10320	6 16	516	
	99	312	89	27	-	-	-	-	-	-	428	-	-	-	8560	6 15	428	
D	94	73	33	4	-	-	-	-	-	-	95	-	-	15	2200		110	
	99	114	23	2	3	-	-	1	-	-	106	-	2	35	2860		143	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	440		22	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	520		26	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		17%			05%			02%			+ 2%							
'99		16%			04%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	13900	Dec:	16%			
												'99	14120		20%			
<i>Artemisia tridentata vaseyana</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
Y	94	4	5	-	-	-	-	-	-	-	9	-	-	-	180		9	
	99	18	-	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	94	49	18	-	-	-	-	-	-	-	67	-	-	-	1340	14 30	67	
	99	33	9	17	-	-	-	-	-	-	59	-	-	-	1180	14 27	59	
D	94	3	1	-	-	-	-	-	-	-	2	-	-	2	80		4	
	99	5	2	-	-	-	-	-	-	-	6	-	-	1	140		7	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		30%			00%			03%			+ 5%							
'99		13%			20%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1600	Dec:	5%			
												'99	1680		8%			
<i>Chrysothamnus depressus</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	2 5	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	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>Chrysothamnus viscidiflorus</i>																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
Y	94	22	-	-	-	-	-	-	-	-	22	-	-	-	440		22	
	99	64	2	-	-	-	-	-	-	-	66	-	-	-	1320		66	
M	94	450	-	-	1	-	-	-	-	-	451	-	-	-	9020	4	8	451
	99	544	5	-	-	-	-	-	-	-	549	-	-	-	10980	3	8	549
D	94	4	1	-	-	-	-	-	-	-	5	-	-	-	100		5	
	99	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		.20%			00%			00%			+23%							
'99		01%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	9560	Dec:	1%			
												'99	12480		1%			
<i>Eriogonum corymbosum</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	1	-	-	-	-	-	-	1	-	-	-	40		2	
M	94	14	-	-	-	-	-	-	-	-	14	-	-	-	280	9	19	14
	99	11	4	-	-	-	-	-	-	-	15	-	-	-	300	12	21	15
D	94	1	1	-	-	-	-	-	-	-	1	-	-	1	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		06%			00%			06%			+ 6%							
'99		24%			06%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	320	Dec:	13%			
												'99	340		0%			
<i>Gutierrezia sarothrae</i>																		
Y	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	94	28	-	-	-	-	-	-	-	-	28	-	-	-	560	5	7	28
	99	21	-	-	1	-	-	-	-	-	22	-	-	-	440	5	6	22
D	94	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			06%			-16%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	640	Dec:	6%			
												'99	540		0%			

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				
Leptodactylon pungens																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	6	2
D	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	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%							
'99		00%			00%			33%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	0%			
												'99	60		33%			
Opuntia spp.																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	5	2
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
D	94	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	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%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	0%			
												'99	40		50%			
Symphoricarpos oreophilus																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	38	1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	13	27	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+ 0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-			
												'99	20		-			
Tetradymia canescens																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	0	4	8	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	0		-			

Trend Study 16C-35-99

Study site name: Wildcat Knoll .

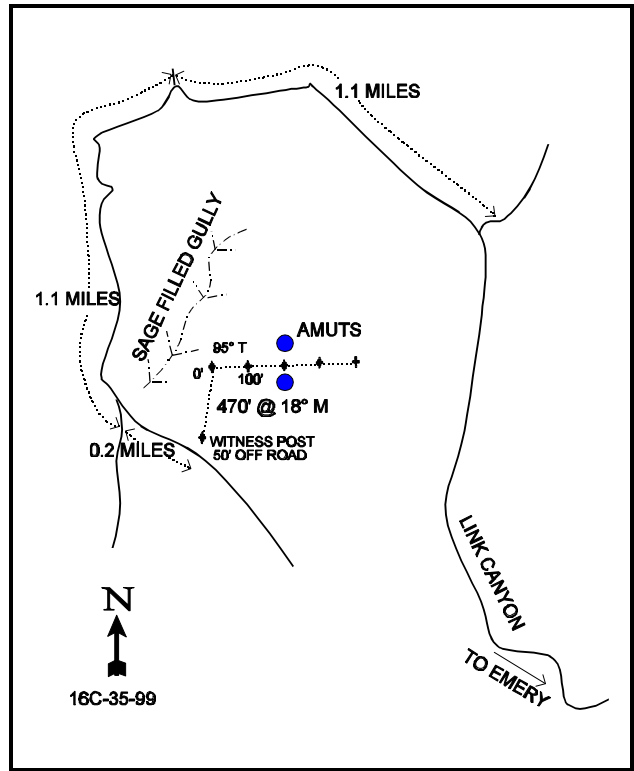
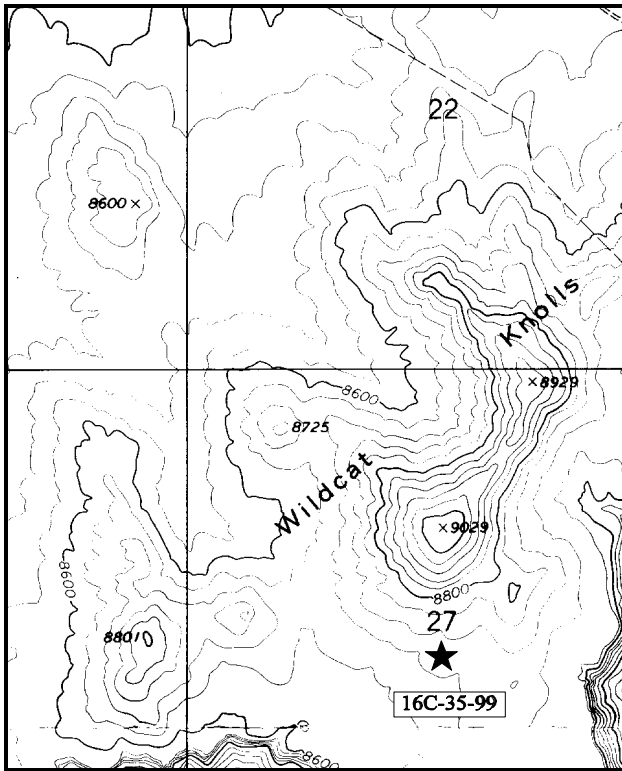
Range type: Sagebrush-Grass .

Compass bearing: frequency baseline 95°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), and line 5 (95 ft).

LOCATION DESCRIPTION

From Center St. in Emery, travel west 1.2 miles. Turn right onto a dirt road and proceed for 0.6 miles. Turn left and travel 8.7 miles (1.7 miles from turnoff to site 16C-31). Bear left at the fork and travel 1.1 miles to another fork. Stay left on F.S. #344 for 1.1 miles to another fork (at 0.1 miles on F.S. #344, go left at the fork). At the fork, bear left and travel 0.2 miles to a witness post. From the witness post to the 0 ft baseline stake, walk 470 ft at a bearing of 18°M. The 0 ft stake has browse tag #485 attached.



Map Name: Emery West

Diagrammatic Sketch

Township 21S , Range 5E , Section 27

UTM 4312156.702 N, 470095.514 E

DISCUSSION

Trend Study No. 16C-35 (31-33)

This is a new site established near Wildcat Knolls in 1994. It samples a Mountain big and black sagebrush/grass community which considered important for elk. The site has a general south aspect with a gentle slope of 3-5% at an elevation of 8,700 feet. Quadrat frequency for elk pellet-groups is high at 65% in 1994 and 51% in 1999. Pellet group data from 1999 estimate 9 deer, 109 elk and 29 cow days use/acre (22 ddu/ha, 269 edu/ha, 72 cdu/ha). Nearly all of the elk and deer pellet groups were from the previous winter, although a few were more recent. Most of the cattle pats appear to be from last season. There is very little escape or thermal cover on the site. About ½ mile away there is good cover provided by Ponderosa pine trees. This area is part of the Emery allotment which is grazed from June 16 to September 30 by 1,387 cows on a 5 pasture rest rotation system. Water is limited here with guzzlers fairly close, about ¾ of a mile from the site.

Soil depth varies on the site with deeper soils along the shallow ravine corridors where mountain big sagebrush, snowberry, woods rose, and large serviceberry shrubs grow. In between these wetter areas, the soil is more shallow and dry. Black sagebrush, rabbitbrush dominate here. Effective rooting depth averages just over 11 inches along the study site baseline. It has a sandy clay loam texture with a slightly acid pH (6.4). Parent material is limestone. There is little rock and pavement on the surface or in the profile, yet there is a hard compaction layer at about 8 to 12 inches in depth. There is some slight to moderate pedestaling of soil around the base of plants and there is a small gully on the site. However, protective ground cover appears adequate to control most erosion.

There are several varieties of palatable browse on the site including serviceberry, black sagebrush, mountain big sagebrush, antelope bitterbrush, and snowberry. Serviceberry occurs on areas with wetter and deeper soils. Individual serviceberry plants are large, highlined, and mostly unavailable. Mountain big sagebrush dominates the drainage corridors with a mostly mature population of about 4,500 plants/acre. Black sagebrush, dwarf rabbitbrush, and low rabbitbrush dominating the drier areas. It appears that there was a problem identifying dwarf rabbitbrush (*Chrysothamnus depressus*) and low rabbitbrush (*Chrysothamnus viscidiflorus*). Data from 1999 classified most of the rabbitbrush as low rabbitbrush. Both sagebrush species display light to moderate hedging, good vigor, and low decadency rates. Density of mountain big sagebrush has remained stable since 1994, while black sagebrush has increased from 4,740 to 8,020 plants/acre. The number of mature plants have remained stable but young plants have increased from 40 to 2,420 plants/acre. Density of decadent black sagebrush also increased but percent decadence is still relatively low at only 17%.

Herbaceous vegetation is diverse and abundant making up 50% of the vegetation cover on the site. Grasses provided 11% cover in 1994, increasing to 16% by 1999. The dominant species are mutton bluegrass, letterman needlegrass, and Salina wildrye which currently provide 89% of the grass cover. Forbs are diverse yet only a few species are common. The most abundant are three species of Astragalus, sulfur eriogonum, and redroot eriogonum. Utilization of grasses was light in 1999, while some of the large Astragalus showed heavy use.

1994 APPARENT TREND ASSESSMENT

Protective ground cover combined with the gentle terrain prevents serious erosion on the site. Browse species are diverse and abundant. The preferred species appear to have stable populations with low decadency rates and light to moderate utilization. The browse trend appears to be stable with the only negative aspect the abundance of less desirable dwarf rabbitbrush. The herbaceous understory is abundant and diverse. However, the grasses are dominated by the less preferred letterman needlegrass and Salina wildrye. Several more desirable species exist in small numbers including bluebunch wheatgrass, slender wheatgrass, *Carex spp*, Indian ricegrass, and bottlebrush squirreltail. Several desirable forbs are found on the site.

1999 TREND ASSESSMENT

Trend for soil is considered stable. Percent cover of bare ground has decreased slightly while vegetation cover has increased. Litter cover has remained similar. The increase in vegetation cover comes primarily from an increase in shrub cover. Herbaceous cover increased, but sum of nested frequency of grasses and forbs declined. Trend for browse is up for black sagebrush and stable for mountain big sagebrush. Black sagebrush density has nearly doubled due to a dramatic increase in young plants from 40 to 2,420 plants/acre. Use is heavier, although vigor is good and percent decadence has remained low. Mountain big sagebrush has a stable density with light to moderate use. Vigor remains good and decadency relatively low. The only other common shrub is low rabbitbrush (*Chrysothamnus viscidiflorus*) which was called dwarf rabbitbrush in 1994 (*Chrysothamnus depressus*). Combined density of these shrubs has increased slightly from 12,420 to 13,520 plants/acre. The population is mostly mature and not utilized. Overall, the browse trend is considered up slightly. Trend for the herbaceous understory is down slightly. Cover for grasses and forbs has increased but sum on nested frequency has declined slightly. Nested frequency of Salina wildrye, Carex, mutton bluegrass and letterman needlegrass have declined significantly.

TREND ASSESSMENT

soil - stable

browse - up slightly

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 35

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	Agropyron spicatum	3	4	1	2	.03	.03
G	Agropyron trachycaulum	42	36	12	14	.13	.34
G	Carex spp.	99	105	32	40	.21	.67
G	Elymus salina	253	*144	71	40	4.10	5.76
G	Oryzopsis hymenoides	20	11	6	3	.25	.04
G	Poa fendleriana	177	*231	62	70	1.85	5.41
G	Sitanion hystrix	11	3	4	3	.02	.04
G	Stipa comata	-	*23	-	10	-	.56
G	Stipa lettermani	225	*145	78	52	4.43	3.38
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		830	702	266	234	11.04	16.26
Total for Grasses		830	702	266	234	11.04	16.26
F	Agoseris glauca	-	*8	-	4	-	.09
F	Antennaria rosea	4	11	2	4	.06	.36
F	Astragalus convallarius	17	*8	9	3	.12	.01
F	Astragalus miser	35	38	16	18	.57	.93
F	Astragalus spp.	5	9	3	6	.16	.66
F	Castilleja chromosa	10	5	4	3	.04	.01
F	Castilleja linariaefolia	28	19	11	9	.05	.12

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	<i>Calochortus nuttallii</i>	2	6	1	3	.00	.01
F	<i>Chaenactis douglasii</i>	3	-	1	-	.00	-
F	<i>Cirsium</i> spp.	1	-	1	-	.00	-
F	<i>Crepis acuminata</i>	40	*-	18	-	.14	-
F	<i>Eriogonum alatum</i>	-	3	-	2	-	.03
F	<i>Erigeron eatonii</i>	44	*16	19	9	.12	.09
F	<i>Eriogonum racemosum</i>	44	38	22	16	.14	.41
F	<i>Eriogonum umbellatum</i>	38	23	12	10	.40	.51
F	<i>Linum lewisii</i>	-	*6	-	3	-	.04
F	<i>Lomatium</i> spp.	-	1	-	1	-	.00
F	<i>Lupinus argenteus</i>	1	10	1	4	.01	.25
F	<i>Lygodesmia</i> spp.	-	1	-	1	-	.03
F	<i>Machaeranthera canescens</i>	6	9	2	3	.03	.04
F	<i>Machaeranthera grindelioides</i>	-	1	-	1	-	.03
F	<i>Mertensia</i> spp.	8	-	4	-	.09	-
F	<i>Penstemon carnosus</i>	1	1	1	1	.03	.01
F	<i>Penstemon</i> spp.	-	*8	-	4	-	.19
F	<i>Senecio multilobatus</i>	-	2	-	1	-	.03
F	<i>Taraxacum officinale</i>	-	3	-	2	-	.01
F	<i>Zigadenus paniculatus</i>	4	-	1	-	.00	.00
Total for Annual Forbs		0	0	0	0	0	0
Total for Perennial Forbs		291	226	128	108	2.00	3.91
Total for Forbs		291	226	128	108	2.00	3.91

* Indicates significant difference at $\alpha = 0.10$

BROWSE TRENDS --
Herd unit 16C, Study no: 35

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Amelanchier utahensis	1	2	1.76	2.29
B	Artemisia frigida	1	1	-	-
B	Artemisia nova	58	67	3.20	6.18
B	Artemisia tridentata vaseyana	56	55	4.34	6.98
B	Chrysothamnus depressus	80	5	2.73	-
B	Chrysothamnus nauseosus	2	0	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	13	88	.41	3.90
B	Eriogonum corymbosum	4	5	.03	-
B	Opuntia spp.	3	0	.18	.00
B	Purshia tridentata	1	0	.63	.38
B	Rosa woodsii	0	2	.00	.06
B	Symphoricarpos oreophilus	6	1	.60	.15
B	Tetradymia canescens	4	4	.03	-
Total for Browse		229	230	13.94	19.96

CANOPY COVER --
Herd unit 16C, Study no: 35

Species	Percent Cover '99
Amelanchier utahensis	3

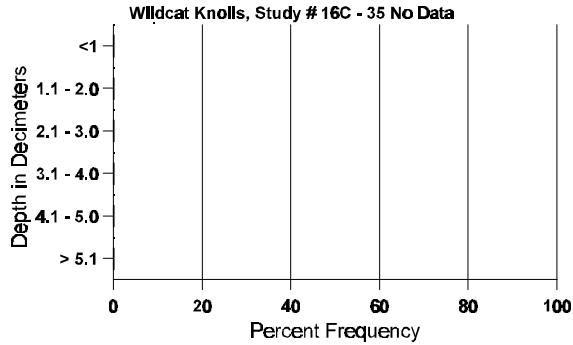
BASIC COVER --
Herd unit 16C, Study no: 35

Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	437	439	33.81	43.76
Rock	55	9	.26	.04
Pavement	65	50	.12	.13
Litter	490	465	47.01	45.68
Cryptogams	1	-	.00	0
Bare Ground	397	309	30.31	24.97

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 35, Study Name: Wildcat Knolls

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.4	55.6 (14.5)	6.4	60.0	15.4	24.6	2.7	10.9	182.4	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16C, Study no: 35

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) '99
	'94	'99	
Rabbit	10	4	n/a
Elk	65	51	109(269)
Deer	24	5	9 (22)
Cattle	7	3	29 (72)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 35

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	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0			
	99	1	-	-	2	-	-	-	-	-	-	-	-	3	-	-	-	60	3		
M	94	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	20	74	88	1
	99	-	-	1	-	-	-	-	1	-	-	-	-	2	-	-	-	40	93	115	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>										
'94		100%			00%			00%			+50%										
'99		00%			50%			00%													
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-						
												'99	40		-						
Artemisia frigida																					
M	94	4	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4
	99	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>										
'94		00%			00%			00%			-50%										
'99		00%			00%			00%													
Total Plants/Acre (excluding Dead & Seedlings)												'94	80	Dec:	-						
												'99	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				
Artemisia nova																		
S	94	34	-	-	-	-	-	-	-	-	34	-	-	-	680		34	
	99	4	1	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	61	58	2	-	-	-	-	-	-	121	-	-	-	2420		121	
M	94	81	114	-	8	-	-	-	-	-	203	-	-	-	4060	10	16	
	99	28	119	63	-	-	2	-	-	-	207	5	-	-	4240	8	15	
D	94	9	23	-	-	-	-	-	-	-	18	-	-	14	640		32	
	99	7	35	21	-	-	5	-	-	-	63	-	-	5	1360		68	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	340		17	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	260		13	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		58%			00%			06%			+41%							
'99		53%			23%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	4740	Dec:	14%			
												'99	8020		17%			
Artemisia tridentata vaseyana																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	20	-	-	-	-	-	-	-	-	20	-	-	-	400		20	
Y	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	39	36	-	-	-	-	-	-	-	73	2	-	-	1500		75	
M	94	44	158	-	1	-	-	-	-	-	203	-	-	-	4060	34	36	
	99	61	63	1	-	-	-	-	-	-	125	-	-	-	2500	19	29	
D	94	3	17	-	-	-	-	-	-	-	17	-	-	3	400		20	
	99	16	7	4	1	-	-	-	-	-	20	-	-	8	560		28	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	580		29	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	380		19	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		77%			00%			01%			+ 1%							
'99		46%			02%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	4520	Dec:	9%			
												'99	4560		12%			

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 depressus												
S	94	3	-	-	-	-	-	-	3	60		3
	99	-	-	-	-	-	-	-	-	0		0
Y	94	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	1	20		1
M	94	549	-	-	-	-	-	-	549	10980	3 7	549
	99	5	-	-	-	-	-	-	5	100	4 7	5
D	94	9	-	-	-	-	-	-	9	180		9
	99	-	-	-	-	-	-	-	-	0		0
X	94	-	-	-	-	-	-	-	-	20		1
	99	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'94		00%		00%		00%		-99%				
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'94	11160	Dec:	2%			
						'99	120		0%			
Chrysothamnus nauseosus												
M	94	3	-	-	-	-	-	-	3	60	18 18	3
	99	-	-	-	-	-	-	-	-	0	- -	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'94		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'94	60	Dec:	-			
						'99	0		-			
Chrysothamnus viscidiflorus viscidiflorus												
S	94	-	-	-	-	-	-	-	-	0		0
	99	9	-	-	-	-	-	-	9	180		9
Y	94	-	-	-	-	-	-	-	-	0		0
	99	80	11	-	-	-	-	-	91	1820		91
M	94	62	-	-	-	-	-	-	62	1240	7 8	62
	99	478	89	-	-	-	-	-	567	11340	5 9	567
D	94	1	-	-	-	-	-	-	1	20		1
	99	12	-	-	-	-	-	-	12	240		12
X	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'94		00%		00%		00%		+91%				
'99		15%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)						'94	1260	Dec:	2%			
						'99	13400		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>Eriogonum corymbosum</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	11	16	5
	99	3	1	-	-	-	-	-	-	-	4	-	-	-	80	14	18	4
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+38%							
'99		13%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	100	Dec:	0%			
												'99	160		13%			
<i>Opuntia spp.</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	3	10	4
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	100	Dec:	-			
												'99	0		-			
<i>Purshia tridentata</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	23	26	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	69	0
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		100%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	100%			
												'99	0		0%			
<i>Rosa woodsii</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	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				
<i>Symphoricarpos oreophilus</i>																		
M	94	10	4	-	1	-	-	-	-	-	15	-	-	-	300	13	23	15
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	20	39	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		27%			00%			00%			-93%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	300	Dec:	-			
												'99	20		-			
<i>Tetradymia canescens</i>																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
M	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	7	9	6
	99	-	-	2	-	-	-	-	-	-	2	-	-	-	40	6	7	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-14%							
'99		00%			33%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	140	Dec:	-			
												'99	120		-			

Trend Study 16C-36-99

Study site name: Danish Bench .

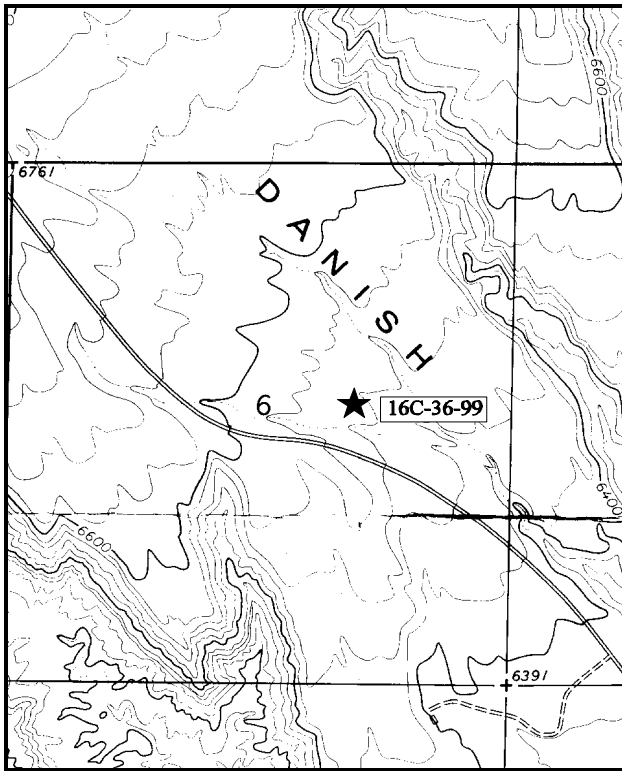
Range type: Chained, Seeded P-J .

Compass bearing: frequency baseline 95°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

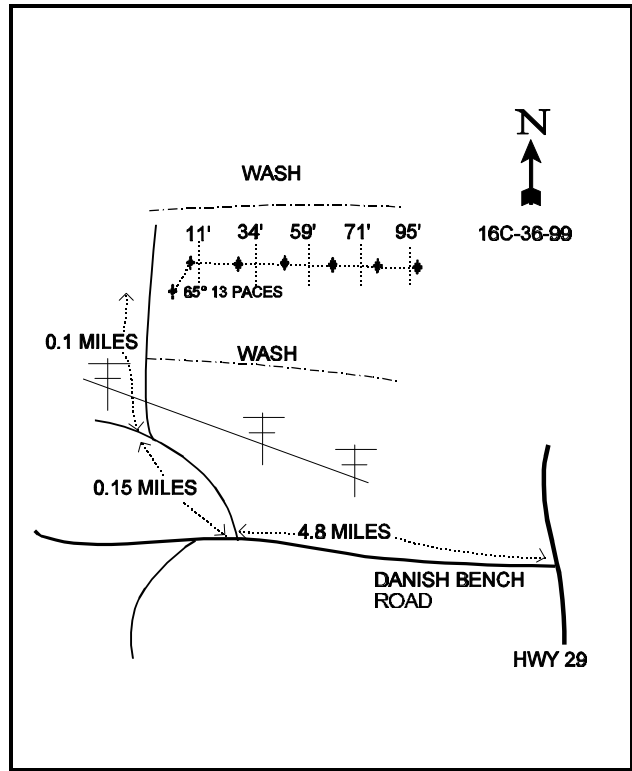
LOCATION DESCRIPTION

From Highway 29 between Orangeville and Castle Dale, travel up Danish Bench Road (550 West) 4.8 miles. Turn right and proceed 0.15 miles to a fork in the road. Take the right fork and travel 0.1 mile to a witness post on the right hand side of the road. From the witness post to the 0-foot baseline stake, walk 13 paces at 65°M.



Map Name: Red Point

Township 18S , Range 8E , Section 6



Diagrammatic Sketch

UTM 4348599.102 N, 494385.104 E

DISCUSSION

Trend Study No. 16C-36 (31-34)

This is a new study at Danish Bench was established in 1994, replacing study 16C-16 (31-14), Church Mine Road, which has shown little wildlife use over the past several years. The new site is about ½ mile north and is more representative of important big game winter range in the area. This study also samples a seeded pinyon-juniper chaining similar to the Church Mine road study. The aspect is south with a gentle slope of 5%. Elevation is approximately 6,530 feet. Pellet group data from 1999 estimates 17 deer, 76 elk and 12 cow days use/acre (42 ddu/ha, 188 edu/ha, 30 cdu/ha). The area is on land administered by the BLM and lies within the Wilberg allotment which allows 89 cows to graze from November 1 to December 15 and again from April 16 to June 15 on two pastures.

The soil is moderately shallow and rocky with some large rocks on the surface and within the soil profile. Effective rooting depth is estimated at almost 13 inches. Soil texture is a sandy clay loam with a slightly alkaline pH (7.5). Percent organic matter is limited at only 1.8%. Phosphorus is also marginal at 7.8 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Rock and pavement cover are high at 25% in 1994 and 30% in 1999. Litter cover is relatively low at 24% in 1994 and 21% in 1999, leaving a considerable amount of unprotected bare soil. Total vegetation cover is low at only 17% to 18%. There is some localized soil movement noticeable, yet erosion is minimal due to the gentle terrain and adequate protective ground cover.

The dominant browse on the site consists of a moderately low population of black sagebrush. There was an estimated 1,540 mostly mature plants/acre in 1994. No decadent plants were encountered and utilization was light. By 1999 the population had increased slightly to 1,700 plants/acre. Utilization is moderate to heavy, but vigor is normal and percent decadence is low at 13%. Small numbers of other desirable shrubs occur on the site. These include true mountain mahogany, green ephedra, and antelope bitterbrush. Juniper and pinyon trees are regrowing on the site. They provided 37% of the browse cover in 1994 and 41% in 1999. Point quarter data from 1994 and 1999 estimated an average of 110 juniper and 56 pinyon trees/acre. Average diameter of the juniper is currently 2.6 inches, while pinyon averages 2 inches. Most of the released trees were in the 4 to 6 foot height class.

The herbaceous understory makes up only 9% cover on the site and is dominated by crested wheatgrass which provided 66% of the grass cover in 1994 and 92% in 1999. Indian rice grass was also fairly abundant in 1994, but has since declined significantly in nested frequency. Forbs are insignificant. They make up just over 1% total cover and are dominated by native, golden cryptantha and pingue hymenoxys.

1994 APPARENT TREND ASSESSMENT

Protective ground cover seems well distributed and erosion is currently minimal. Further increases in tree density will come at the cost of herbaceous plants. This will eventually increase the erosion problems on this site. The browse component contains several preferred species of shrubs yet none are very abundant. Black sagebrush is the only abundant shrub and the trend for this species appears stable due to a good reproductive potential (14%), low decadency, and light utilization. The herbaceous understory is diverse but not very abundant.

1999 TREND ASSESSMENT

Trend for soil is stable due to similar ground cover characteristics compared to 1994. There is some localized erosion occurring but it is not serious due to the gentle terrain combined with the well distributed protective ground cover. Trend for browse is also stable. Black sagebrush has increased slightly in density, while showing heavier use. Green ephedra provides some additional browse forage on the site. It has increased

from 60 to 340 plants/acre since 1994. Use is moderate to heavy with vigor poor on 35% of the plants sampled. There are several other shrub species on the site yet they occur in very small numbers. Trend for the herbaceous understory is stable but poor. Total cover of grasses and forbs provide only 9% cover. Sum of nested frequency of perennial grasses has declined slightly while frequency of forbs has increased. Crested wheatgrass is still dominant and currently provides 92% of the grass cover and 78% of the herbaceous cover. Indian ricegrass was moderately abundant in 1994, although it has since declined significantly in nested frequency. Forbs are insignificant and currently provide only about 1% cover. Several new species were encountered in 1999.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable but poor

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 36

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	Agropyron cristatum	279	299	91	90	5.41	6.72
G	Agropyron intermedium	3	-	1	-	.00	-
G	Elymus junceus	5	3	1	1	.00	.15
G	Elymus salina	2	-	1	-	.06	-
G	Oryzopsis hymenoides	54	*29	19	13	2.64	.41
G	Sitanion hystrix	5	-	2	-	.01	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		348	331	115	104	8.14	7.28
Total for Grasses		348	331	115	104	8.14	7.28
F	Caulanthus crassicaulis	12	2	3	2	.04	.01
F	Cryptantha confertiflora	53	*15	25	7	1.23	.28
F	Eriogonum alatum	9	11	5	8	.03	.12
F	Euphorbia fendleri	21	15	9	8	.04	.04
F	Gilia spp. (a)	-	1	-	1	-	.00
F	Hymenoxys acaulis	23	*35	11	19	.08	.32
F	Hymenoxys richardsonii	-	*16	-	6	-	.08
F	Leucelene ericoides	-	4	-	2	-	.06
F	Machaeranthera grindelioides	-	3	-	1	-	.03
F	Penstemon spp.	-	*20	-	10	-	.07
F	Penstemon pachyphyllus	8	2	2	1	.03	.00
F	Schoenrambe linifolia	-	2	-	1	-	.00
F	Thlaspi montanum	-	3	-	1	-	.00
F	Thelesperma subnudum	7	*-	3	-	.01	-
F	Townsendia spp.	-	*68	-	28	-	.26

Type	Species	Nest Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	Unknown forb-perennial	4	-	2	-	.01	-
Total for Annual Forbs		0	1	0	1	0	0.00
Total for Perennial Forbs		137	196	60	94	1.48	1.30
Total for Forbs		137	197	60	95	1.48	1.30

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 16C, Study no: 36

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Artemisia nova	18	21	1.16	1.79
B	Cercocarpus montanus	1	1	1.08	.78
B	Cowania mexicana stansburiana	0	0	-	-
B	Echinocereus spp.	0	0	-	-
B	Ephedra viridis	2	9	2.01	1.77
B	Eriogonum microthecum	29	26	.09	.07
B	Gutierrezia sarothrae	0	5	-	.04
B	Juniperus osteosperma	0	5	2.76	2.77
B	Opuntia spp.	0	0	-	-
B	Pinus edulis	0	2	.15	.38
B	Purshia tridentata	3	1	.00	.15
B	Yucca harrimaniae	2	2	.63	-
Total for Browse		55	72	7.92	7.77

CANOPY COVER --

Herd unit 16C, Study no: 36

Species	Percent Cover '99
Juniperus osteosperma	.80

BASIC COVER --

Herd unit 16C, Study no: 36

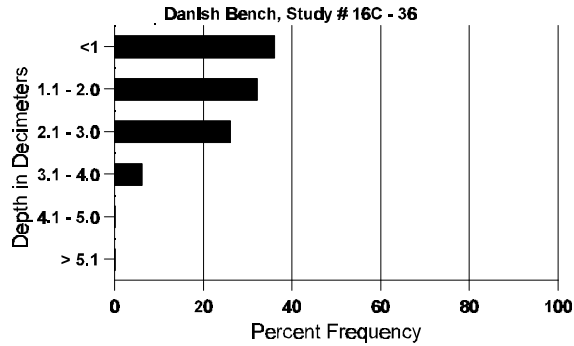
Cover Type	Nest Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	331	350	16.53	17.78
Rock	399	291	16.90	13.17
Pavement	412	400	7.61	16.29
Litter	455	402	23.86	20.95
Cryptogams	16	83	.06	1.53
Bare Ground	398	412	29.31	30.11

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 36, Study Name: Danish Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.8	55.4 (14.3)	7.5	56.0	21.4	22.6	1.8	7.8	140.8	0.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16C, Study no: 36

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) '99
	'94	'99	
Rabbit	36	29	n/a
Elk	22	57	76 (188)
Deer	19	10	17 (42)
Cattle	-	3	12 (30)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 36

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 nova</i>																		
S	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	94	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
	99	18	-	1	-	-	-	-	-	-	19	-	-	-	380		19	
M	94	64	2	-	-	-	-	-	-	-	66	-	-	-	1320	11	19	
	99	15	31	9	-	-	-	-	-	-	55	-	-	-	1100	6	16	
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	6	5	-	-	-	-	-	-	-	10	-	-	1	220		11	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		03%			00%			00%			+ 9%							
'99		42%			12%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1540	Dec:	0%			
												'99	1700		13%			
<i>Cercocarpus montanus</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	-	-	1	-	-	-	-	-	-	1	-	-	-	20	46	55	
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20	50	55	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			100%			00%			+ 0%							
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	20	Dec:	-			
												'99	20		-			
<i>Cowania mexicana stansburiana</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	23	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	0		-			
<i>Echinocereus spp.</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	17	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	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										
<i>Ephedra viridis</i>															
Y	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	-	-	40		2
M	94	3	-	-	-	-	-	-	-	-	-	-	60	31 46	3
	99	3	5	5	-	-	-	-	-	-	-	-	260	32 42	13
D	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	-	-	40		2
X	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>				
'94		00%			00%			00%			+82%				
'99		29%			29%			35%							
Total Plants/Acre (excluding Dead & Seedlings)										'94	60	Dec:	0%		
										'99	340		12%		
<i>Eriogonum microthecum</i>															
S	94	3	-	-	-	-	-	-	-	-	-	-	60		3
	99	2	-	-	-	-	-	-	-	-	-	-	40		2
Y	94	5	-	-	-	-	-	-	-	-	-	-	100		5
	99	3	1	3	-	-	-	-	-	-	-	-	140		7
M	94	78	-	-	9	-	-	-	-	-	-	-	1740	2 4	87
	99	45	3	1	-	-	-	-	-	-	-	-	980	1 3	49
D	94	1	-	-	-	-	-	-	-	-	-	-	40		2
	99	2	-	-	-	-	-	-	-	-	-	-	40		2
X	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>				
'94		00%			00%			00%			-38%				
'99		07%			07%			02%							
Total Plants/Acre (excluding Dead & Seedlings)										'94	1880	Dec:	2%		
										'99	1160		3%		
<i>Gutierrezia sarothrae</i>															
S	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	7	-	-	-	-	-	-	-	-	-	-	140		7
Y	94	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	17	-	-	-	-	-	-	-	-	-	-	340		17
M	94	-	-	-	-	-	-	-	-	-	-	-	0	7 9	0
	99	6	-	-	-	-	-	-	-	-	-	-	120	4 4	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>				
'94		00%			00%			00%							
'99		00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)										'94	0	Dec:	-		
										'99	460		-		

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 osteosperma</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	2	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	120		-			
<i>Opuntia spp.</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	12	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	16	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	0		-			
<i>Pinus edulis</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	1	-	1	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			50%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	40		-			
<i>Purshia tridentata</i>																		
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	19	22	3
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20	19	22	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-67%							
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	60	Dec:	-			
												'99	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				
Yucca harrimaniae																		
M	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	14	25	4
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	9	12	2
X	94	-	-	-	-	-	-	-	-	-	-	-	-	0				0
	99	-	-	-	-	-	-	-	-	-	-	-	-	100				5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-50%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	80	Dec:	-			
												'99	40		-			

Trend Study 16C-37-99

Study site name: Joes Valley Overlook .

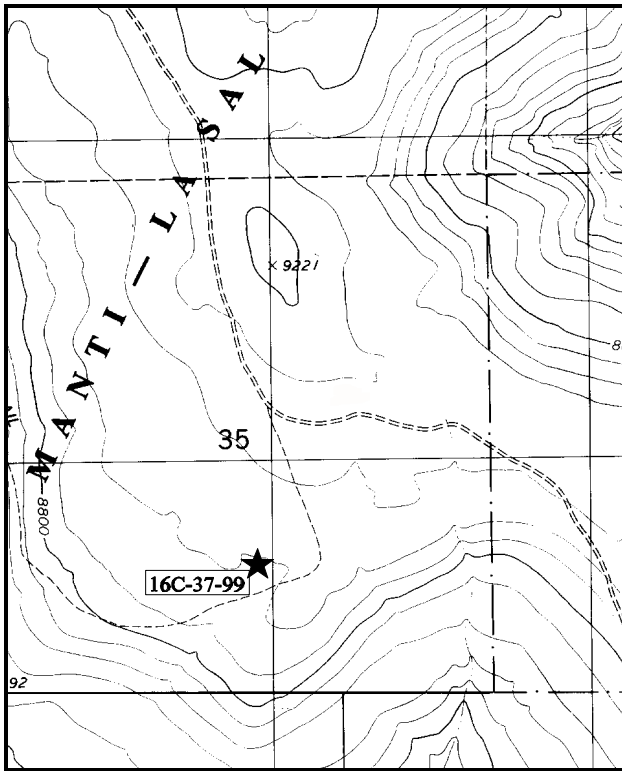
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 285°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft).

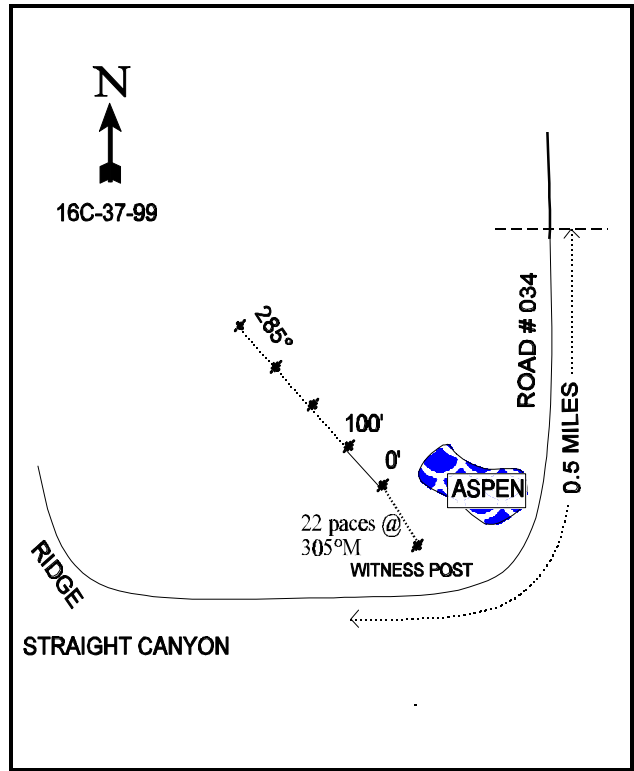
LOCATION DESCRIPTION

From the intersection of Cottonwood Canyon (#040) road and Trail Mountain road, travel south 10.1 miles to a cattleguard. From the cattleguard continue 0.5 miles to a witness post. From the witness post to the 0-foot baseline stake, walk 22 paces at a bearing of 305°M. The stake has browse tag #28 attached. The witness post is a tall post on a dirt mound near the end of a contour trench.



Map Name: Mahogany Point

Township 17S , Range 6E , Section 35



Diagrammatic Sketch

UTM 4349532.535 N, 481706.803 E

DISCUSSION

Trend Study No. 16C-37 (31-35)

The Joe's Valley Overlook is a new site established in 1994 which monitors a mixed mountain brush community on a ridge east of Joe's valley reservoir and above Cottonwood creek. The area is administered by the Forest Service. The site has a slope of about 13% with a west-southwest aspect. Elevation is approximately 8,950 feet. The area has been contour trenched in the past and seeded. The area has been closed to cattle grazing since the contour treatment, but some trespass is occurring. Deer and elk use this site during the spring and summer. Pellet group data from 1999 estimate 9 deer, 83 elk and 20 cow days use/acre (22 ddu/ha, 205 edu/ha, 49 cdu/ha). Most of the cattle pats are from last season but there are cows currently grazing in the area. Most of the elk and deer pellet groups appear to be several months old.

Soil on the site is moderate deep with an effective rooting depth estimated at just over 16 inches. Texture is a clay with a slightly alkaline pH (7.4). Phosphorus is limited at only 5.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Rock and pavement are not abundant on the surface or in the profile. Percent bare ground is relatively high, currently ('99) at 32%. There is some erosion occurring but it is limited to the areas between contoured terraces.

A variety of browse species occur on the site including serviceberry, mountain big sagebrush, low rabbitbrush, and snowberry. This site was chosen in part, to monitor a sparse and perceived declining population of mountain mahogany. This is a marginal site for mountain mahogany because it is above its normal elevation range. A few scattered individuals in the 4 to 6 foot range grow in the area, but none were hit in the nested frequency belts or in the shrub density strips. The key browse species on the site consist of a moderately dense stand of mountain big sagebrush. This mostly mature population currently ('99) has adequate numbers of seedlings and young, a low decadency rate, and moderate to heavy utilization. Snowberry is also abundant. The mostly mature population was moderately utilized in 1994 but only lightly used in 1999. A small population of three foot tall moderate to heavily hedged serviceberry also grow on the site.

Due to the elevation and heavy elk and cattle use, the herbaceous understory is considered the key element of this site. Grasses and forbs combined account for 52% of the vegetative cover. This site was apparently seeded in the past. Seeded grasses, crested wheatgrass, intermediate wheatgrass and smooth brome, occur on the site but the most abundant grass is Salina wildrye which provided 67% of the grass cover in 1994 and 44% in 1999. Smooth brome is the most common seeded species. It grows in thick patches along the contoured trenches. Use of the grasses is heavy in places, especially within the contoured trenches. Forbs are diverse and contain several desirable species, yet many of the common forbs are low growing species like mat penstemon. Alfalfa, a seeded forb, was found in small numbers during both readings.

1994 APPARENT TREND ASSESSMENT

Ground cover characteristics are adequate to protect the soil. Vegetation cover appears low for a mountain brush site, but herbaceous vegetation which is more effective at holding the soil in place, accounts for over half of that cover. The browse trend appears stable for all species due to adequate reproductive potentials, low decadency rates, and light to moderate utilization. The herbaceous composition is dominated by the less desirable Salina wildrye which makes up 67% of the grass cover. Continuous heavy grazing on the more preferred species will only increase the dominance of this grass.

1999 TREND ASSESSMENT

Trend for soil is stable. Relative percent cover of bare ground and litter have remained similar to 1994 estimates. There is some localized erosion occurring but the trenches on contour have minimized its effects.

Trend for browse is stable. Use of the key mountain big sagebrush is heavier but vigor remains normal, recruitment has improved, and percent decadence is relatively low at 25%. Snowberry displays lighter use. Density has declined yet cover has increased and strip frequency has remained similar to 1994 estimates. The change in density may be due to the difficulty in identifying individual plants of this rhizomatous shrub. Trend for the herbaceous understory is up slightly. Sum of nested frequency for perennial grasses and forbs increased. Composition also improved since 1994. Nested frequency of the less desirable Salina wildrye declined significantly while frequency of crested wheatgrass, smooth brome, and pinewoods needlegrass increased significantly. Forbs are diverse with a few desirable species represented, but many of the common forbs are low in value and low growing.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 37

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	Agropyron cristatum	31	*59	11	20	.46	.81
G	Agropyron intermedium	5	11	4	4	.02	.04
G	Agropyron spicatum	16	22	7	8	.40	.31
G	Bromus inermis	49	*83	18	24	.93	2.54
G	Carex spp.	9	7	3	3	.21	.33
G	Elymus cinereus	6	5	2	1	.15	.15
G	Elymus salina	239	*185	71	56	8.26	5.36
G	Poa fendleriana	114	96	42	33	1.50	1.75
G	Poa secunda	5	-	3	-	.04	-
G	Stipa pinetorum	24	*58	10	21	.34	.86
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		498	526	171	170	12.35	12.18
Total for Grasses		498	526	171	170	12.35	12.18
F	Androsace septentrionalis (a)	-	38	-	18	-	.11
F	Arenaria fendleri	24	31	11	14	.15	.44
F	Astragalus convallarius	3	-	1	-	.00	-
F	Astragalus miser	10	11	4	4	.31	.33
F	Astragalus tenellus	8	6	3	2	.04	.15
F	Astragalus spp.	-	3	-	1	-	.15
F	Chaenactis douglasii	-	*7	-	3	-	.04
F	Erigeron eatonii	2	3	1	3	.00	.01
F	Eriogonum umbellatum	12	17	5	6	.12	.25
F	Hymenoxys richardsonii	33	41	14	18	.58	.78

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	Lesquerella spp.	-	4	-	2	-	.03
F	Lomatium spp.	-	4	-	2	-	.01
F	Lupinus argenteus	8	5	2	1	.15	.15
F	Medicago sativa	13	7	5	3	.02	.18
F	Penstemon caespitosus	41	*79	16	33	.52	2.25
F	Penstemon spp.	3	-	1	-	.03	-
F	Phlox austromontana	48	41	18	15	.51	.27
F	Potentilla spp.	3	*11	1	8	.00	.11
F	Schoenocrambe linifolia	-	2	-	1	-	.00
F	Senecio multilobatus	-	2	-	1	-	.00
F	Unknown forb-annual (a)	1	-	1	-	.03	-
F	Unknown forb-perennial	7	*-	4	-	.04	-
Total for Annual Forbs		1	38	1	18	0.03	0.11
Total for Perennial Forbs		215	274	86	117	2.51	5.20
Total for Forbs		216	312	87	135	2.54	5.32

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 16C, Study no: 37

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	Amelanchier utahensis	11	8	.56	.67
B	Artemisia nova	0	2	-	.38
B	Artemisia tridentata vaseyana	65	69	8.76	8.75
B	Chrysothamnus depressus	20	14	.07	.39
B	Chrysothamnus viscidiflorus	26	33	.43	.29
B	Gutierrezia sarothrae	0	1	-	.01
B	Pinus flexilis	-	-	-	.38
B	Symphoricarpos oreophilus	51	50	3.55	5.61
B	Tetradymia canescens	2	3	.03	.15
Total for Browse		175	180	13.42	16.64

CANOPY COVER --

Herd unit 16C, Study no: 37

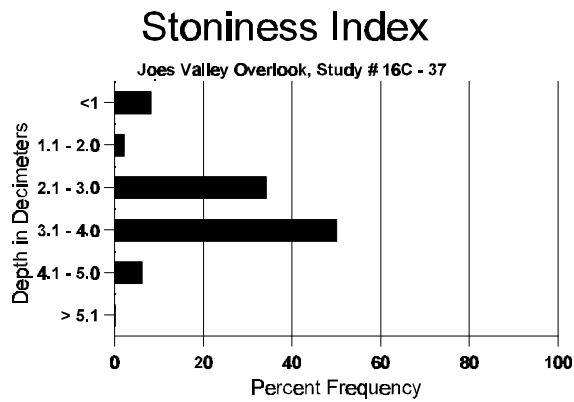
Species	Percent Cover '99
Pinus flexilis	3

BASIC COVER --
Herd unit 16C, Study no: 37

Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	371	413	28.10	35.87
Rock	286	78	4.41	1.75
Pavement	190	266	.48	7.40
Litter	480	438	31.17	35.45
Cryptogams	-	1	0	.00
Bare Ground	361	346	25.37	32.34

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 37, Study Name: Joes Valley Overlook

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.2	51.2 (17.3)	7.4	26.0	29.4	44.6	2.8	5.5	108.8	0.6



PELLET GROUP FREQUENCY --
Herd unit 16C, Study no: 37

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) 09
	'94	'99	
Rabbit	25	14	n/a
Elk	40	40	83 (205)
Deer	19	7	9 (22)
Cattle	1	3	20 (49)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 37

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																		
Y	94	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	3	5	3	1	-	-	-	-	-	12	-	-	-	240	31	39	12
	99	-	6	-	-	1	2	-	-	-	9	-	-	-	180	30	35	9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		36%			21%			00%			-36%							
'99		78%			22%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	280	Dec:	-			
												'99	180		-			
Artemisia nova																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40	7	15	2
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		50%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	40		-			
Artemisia tridentata vaseyana																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
Y	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	99	15	6	2	-	-	-	-	-	-	23	-	-	-	460			23
M	94	67	26	-	-	-	-	1	-	-	94	-	-	-	1880	17	32	94
	99	24	33	24	2	4	1	-	-	-	88	-	-	-	1760	17	29	88
D	94	12	11	-	2	-	-	-	-	-	21	-	-	4	500			25
	99	12	12	9	1	3	-	-	-	-	28	1	-	8	740			37
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	780			39
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	620			31
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		30%			00%			03%			+17%							
'99		39%			24%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2460	Dec:	20%			
												'99	2960		25%			

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	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	34	-	-	1	-	-	1	-	-	36	-	-	-	720	4	8	36
	99	9	7	4	1	-	2	-	-	-	22	1	-	-	460	2	7	23
D	94	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	-	2	-	-	-	2	-	-	-	2	-	-	2	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		03%			00%			00%			-30%							
'99		32%			29%			07%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	800	Dec:	5%				
											'99	560		14%				
Chrysothamnus viscidiflorus																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	94	44	5	4	5	-	-	1	-	-	58	-	-	1	1180	6	10	59
	99	41	12	1	-	-	2	-	-	-	56	-	-	-	1120	7	10	56
D	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	5	-	-	-	-	-	-	-	-	3	-	-	2	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		08%			06%			02%			+ 5%							
'99		18%			05%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	1240	Dec:	3%				
											'99	1300		8%				
Gutierrezia sarothrae																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	0	Dec:	-				
											'99	40		-				
Symphoricarpos oreophilus																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	11	-	-	-	-	-	-	-	-	10	-	1	-	220		11	
M	94	78	56	5	6	8	-	-	-	-	153	-	-	-	3060	13	25	153
	99	94	5	-	5	-	-	-	-	-	98	4	2	-	2080	13	28	104
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		41%			03%			00%			-26%							
'99		04%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	3120	Dec:	1%				
											'99	2300		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				
Tetradymia canescens																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	9	7	1
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40	4	7	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+33%							
'99		33%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	-			
												'99	60		-			

Trend Study 16C-40-99

Study site name: Cedar Mountain .

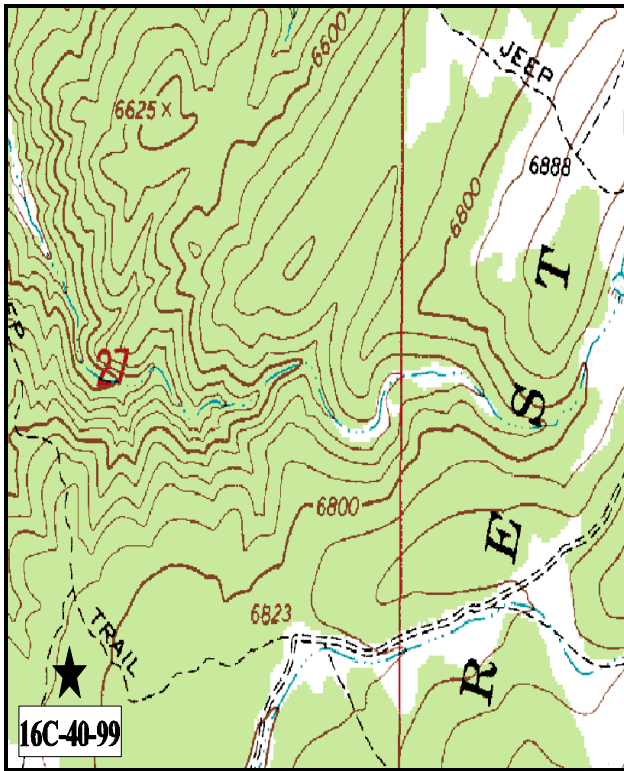
Range type: Chained, Cabled, Seeded, PJ .

Compass bearing: frequency baseline 180°M.

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

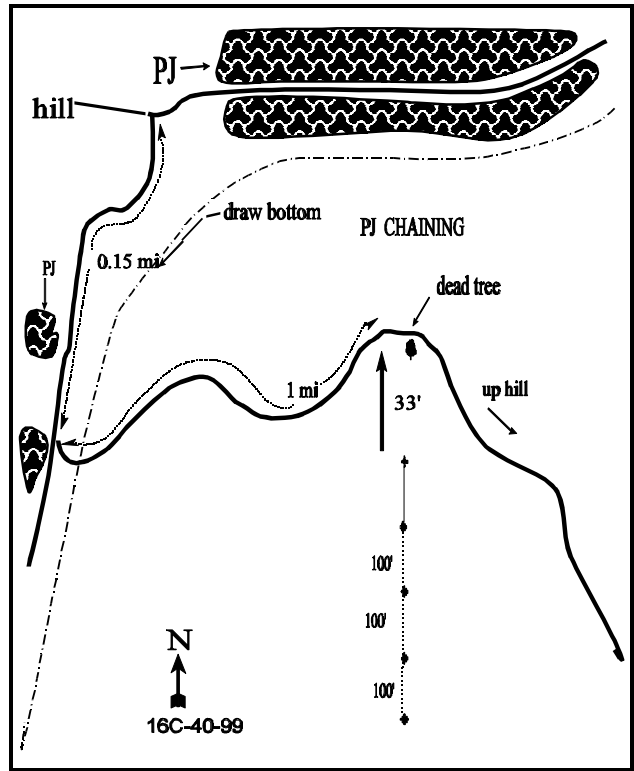
LOCATION DESCRIPTION

From mile marker 198 on U-89 north of Salina, take the Willow Creek Road east for 4.7 miles to a fork near a reservoir. Turn right and go south along the dike. Continue on this road for 5.65 miles up switchbacks to the top of the hill and southwest along the top until the road forks. Take the right fork through some oak and juniper and across a chained area, staying on the main road for 3.6 miles until coming to a fork. Turn left and proceed down the bottom of the draw 0.15 miles southwest to another fork. Turn left and go uphill 0.1 miles to the second bend to the right. The frequency baseline starts 33 feet south of the road beyond a large dead tree. The transect is marked by rebar approximately 2 feet tall. The 0-foot baseline stake has a red browse tag number 7039 attached.



Map Name: Salina, Utah

Township 21S , Range 1E , Section 27



Diagrammatic Sketch

UTM 4310984.067 N, 432579.154 E

DISCUSSION

Trend Study No. 16C-40 (43-6)

The Cedar Mountain study is located on a high plateau east of Salina. Elevation is 6,800 feet with a west aspect and 15% slope. The area was chained in 1979-80 and seeded with a mixture of grasses, forbs, and browse species. These juniper-pinyon slopes were heavily grazed by domestic sheep in the past. Since the chaining, there has been no grazing and the grasses have responded with good forage production. The current management plan is for sheep grazing every third year from May 1 to June 1. Year-round deer use has been insignificant. Pellet group data from 1999 estimate only 10 deer and 34 elk days use/acre (25 ddu/ha, 84 edu/ha). Rabbit pellets are common. Most of the elk pellet groups were from earlier this spring ('99). Good hiding and thermal cover exists in the unchained draw bottoms and islands of pinyon-juniper trees.

The soil is productive and relatively deep. Effective rooting depth is estimated at just over 14 inches. Soil texture is a clay loam with a slightly alkaline pH (7.6). Percent organic matter is relatively high at 5.4%, but phosphorus is limited at only 5.1 ppm. Values for phosphorus less than 10 ppm have been shown to limit normal plant growth and development. Erosion is minimal due to a vigorous stand of sod-forming perennial grasses. Litter is also common and well distributed.

There are few browse species present. Mature juniper and pinyon, averaging 8 to 12 feet in height, dominate the site by providing basically all of the browse cover. They are vigorous, producing seeds, and not utilized. Point quarter data from 1999 estimate 44 pinyon and 90 juniper trees/acre. Average diameter of pinyon is 3.7 inches, while that of juniper is 4.8 inches. About 15% of the juniper trees sampled were tipped-over trees that are still living. There are a few black sagebrush, rabbitbrush, and Gambel oak on the site which all display light use. Nearby, some mature mountain big sagebrush and mountain mahogany also have survived the chaining. These plants are also vigorous and only lightly browsed. Big sagebrush, bitterbrush, and fourwing saltbush were supposedly seeded, but no established plants were observed.

Grasses dominant the site by providing 71% of the total vegetative cover. Intermediate wheatgrass is the most abundant and it produces 61% of the grass cover. Other abundant grasses are smooth brome and crested wheatgrass. There are a few other grass species present, although they occur in very small numbers. Forbs are scarce. Alfalfa and small burnet were not found on the transect in 1985 or 1991, but a few were observed nearby indicating spotty establishment of forbs. Some alfalfa was encountered in 1999.

1985 APPARENT TREND ASSESSMENT

The soil has stabilized and trend appears upward for herbaceous species since the chaining. The seeding was successful in establishing a vigorous stand of grasses. Big game use could be enhanced by interseeding more browse and forb species.

1991 TREND ASSESSMENT

The data indicates a continued upward trend for the herbaceous species. Respectively, intermediate wheatgrass, crested wheatgrass, and smooth brome have the following quadrat frequency values; 91%, 51%, and 52%. Shrubs are still in very low numbers, but will increase in time. The soil trend is stable.

TREND ASSESSMENT

soil - stable

browse - up, but still in very low numbers, will improve with time

herbaceous understory - up, due mostly to seeded grasses

1999 TREND ASSESSMENT

Trend for soil is considered stable. Percent cover of bare ground has declined from 18% to 10%, however litter cover has also declined. Overall, erosion is minimal. Trend for browse is stable but useful shrubs are nearly absent on the site. The only common browse are released pinyon and juniper trees which are currently about 8 to 10 foot tall. There are only a few black sagebrush and Gambel oak sampled on the site. Shrubs will never be abundant on the site unless they are seeded or planted. Pinyon and juniper trees will continue to increase in size and density until they regain dominance. The abundant herbaceous understory will slow this transition, but the only thing that will reverse it is a burn or some other treatment to control the trees. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses is down slightly. The most abundant species, crested and intermediate wheatgrass, and smooth brome, have remained at similar levels compared to 1991. Forbs are lacking and have declined in sum of nested frequency. Some seeded alfalfa was encountered. The more abundant species are annuals or low value, low growing species.

TREND ASSESSMENT

soil - stable

browse - stable but severely lacking

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 40

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	111	116	144	49	51	56	3.20
G	Agropyron intermedium	248	274	235	82	91	82	7.69
G	Agropyron spicatum	a-	c34	b8	-	15	3	.21
G	Bromus inermis	a113	ab137	b161	46	52	59	1.31
G	Elymus junceus	-	1	2	-	1	1	.03
G	Elymus salina	3	-	-	1	-	-	-
G	Festuca ovina	4	-	-	2	-	-	-
G	Hordeum jubatum jubatum	b6	a-	a-	3	-	-	-
G	Koeleria cristata	b7	a-	a-	3	-	-	.00
G	Oryzopsis hymenoides	b6	ab6	a-	4	2	-	-
G	Poa fendleriana	-	2	7	-	1	3	.02
G	Poa secunda	-	1	6	-	1	2	.02
G	Sitanion hystrix	a-	b22	a1	-	10	1	.00
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		498	593	564	190	224	207	12.51
Total for Grasses		498	593	564	190	224	207	12.51
F	Alyssum alyssoides (a)	-	-	49	-	-	19	.09
F	Arabis spp.	5	2	-	2	1	-	-
F	Astragalus marianus	3	5	-	2	4	-	-
F	Castilleja chromosa	a-	b9	a-	-	5	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	<i>Carduus nutans</i> (a)	1	2	-	1	2	-	-
F	<i>Calochortus nuttallii</i>	a-	b9	a-	-	4	-	-
F	<i>Chaenactis douglasii</i>	a-	b13	ab1	-	8	1	.00
F	<i>Crepis acuminata</i>	-	1	-	-	1	-	-
F	<i>Cryptantha</i> spp.	a7	b30	a9	3	15	4	.04
F	<i>Cynoglossum officinale</i>	-	3	3	-	1	1	.03
F	<i>Erigeron</i> spp.	-	3	-	-	1	-	-
F	<i>Eriogonum umbellatum</i>	b11	a-	b6	4	-	3	.01
F	<i>Gilia</i> spp. (a)	a1	b30	a3	1	19	2	.01
F	<i>Lomatium</i> spp.	-	2	-	-	2	-	-
F	<i>Medicago sativa</i>	-	-	7	-	-	2	.53
F	<i>Penstemon pachyphyllus</i>	ab3	b9	a-	1	5	-	-
F	<i>Physaria acutifolia</i>	a-	b36	b12	-	15	7	.06
F	<i>Phlox austromontana</i>	19	23	11	8	13	6	.05
F	<i>Senecio multilobatus</i>	a-	b12	a-	-	5	-	-
F	<i>Taraxacum officinale</i>	-	4	-	-	2	-	-
F	<i>Tragopogon dubius</i>	4	-	3	2	-	3	.01
F	Unknown forb-perennial	-	3	-	-	1	-	-
Total for Annual Forbs		2	32	52	2	21	21	0.10
Total for Perennial Forbs		52	164	52	22	83	27	0.75
Total for Forbs		54	196	104	24	104	48	0.86

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

BROWSE TRENDS --

Herd unit 16C, Study no: 40

Type	Species	Strip Frequency 09	Average Cover % 09
B	<i>Artemisia nova</i>	1	-
B	<i>Artemisia tridentata vaseyana</i>	0	-
B	<i>Chrysothamnus depressus</i>	-	-
B	<i>Chrysothamnus viscidiflorus</i>	0	-
B	<i>Juniperus osteosperma</i>	11	2.36
B	<i>Pinus edulis</i>	2	1.87
B	<i>Quercus gambelii</i>	1	-
Total for Browse		15	4.24

CANOPY COVER --
Herd unit 16C, Study no: 40

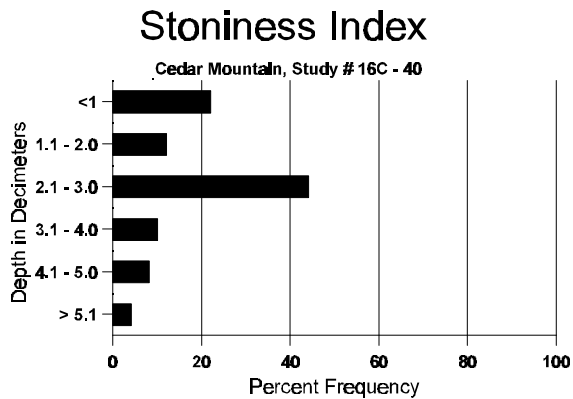
Species	Percent Cover 09
Juniperus osteosperma	1

BASIC COVER --
Herd unit 16C, Study no: 40

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	326	7.25	7.25	22.26
Rock	165	5.50	6.75	6.38
Pavement	216	9.25	6.75	6.41
Litter	373	63.25	61.00	49.76
Cryptogams	14	.25	0	.19
Bare Ground	191	14.50	18.25	9.80

SOIL ANALYSIS DATA --
Herd Unit 16C, Study # 40, Study Name: Cedar Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.2	55.0 (15.1)	n/a	31.3	32.2	36.6	5.4	5.1	217.6	0.7



PELLET GROUP FREQUENCY --
Herd unit 16C, Study no: 40

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	27	n/a
Elk	15	34 (84)
Deer	18	10 (25)
Cattle	1	0

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 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			
<i>Artemisia nova</i>																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6	14
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	60		-		
<i>Artemisia tridentata vaseyana</i>																	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	0		-		
<i>Chrysothamnus viscidiflorus</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9	11
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	66		-		
												'99	0		-		

AGE	YGR	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	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	47	43	1
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66	69	67	1
	99	9	-	-	-	-	-	-	1	-	10	-	-	-	200	-	-	10
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+ 0%							
'91		00%			00%			00%			+56%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	132	Dec:	50%				
											'91	132		0%				
											'99	300		0%				
Pinus edulis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			-39%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	66		-				
											'99	40		-				
Quercus gambelii																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	0		-				
											'99	40		-				

Trend Study 16C-41-99

Study site name: Trough Hollow .

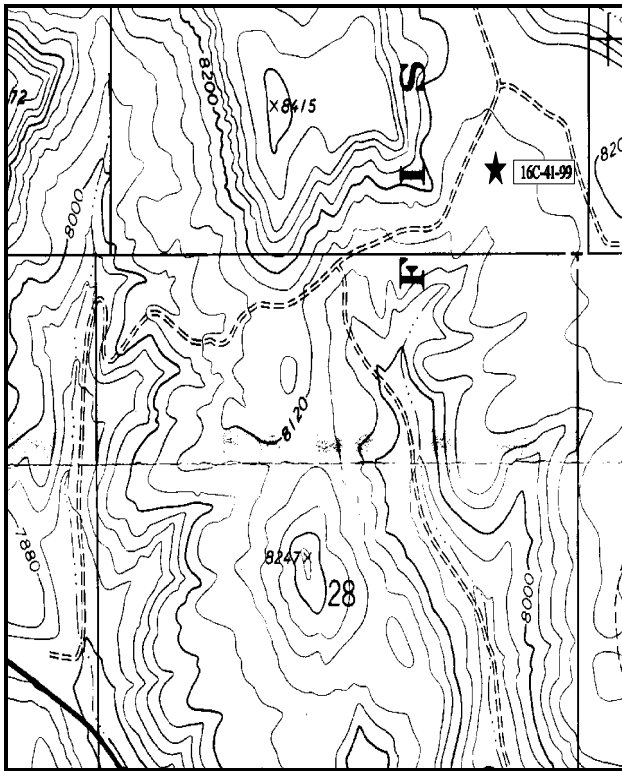
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

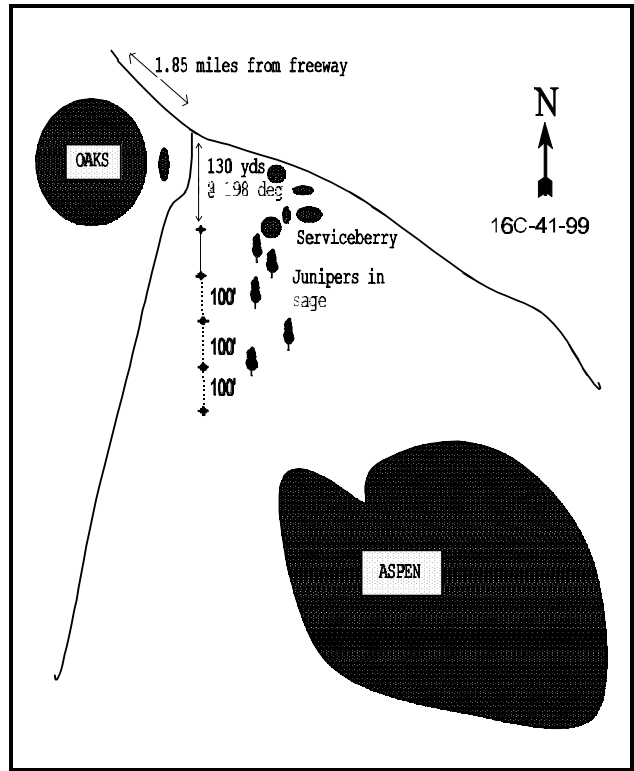
LOCATION DESCRIPTION

From Salina drive about 37.5 miles east on I-70 to a rest area exit. From the exit turn right and come back west on the frontage road paralleling the freeway for 4.1 miles to an intersection. Turn right on F.S. Road #011 and drive 0.25 miles to cross under the freeway. From the tunnel proceed 1.85 miles up and around a hill, then on to a major intersection. Stop here and look back at a bearing of 198 degrees to the largest juniper close to the road. It is about 130 yards from the intersection. Go back to this juniper to find the 0-foot baseline stake, 10 feet south of the tree out in the sagebrush flat. The stake is marked with browse tag #7192.



Map Name: Old Woman Plateau, Utah

Township 23S , Range 4E , Section 21



Diagrammatic Sketch

UTM 4293330.843 N, 459813.400 E

DISCUSSION

Trend Study No. 16C-41 (45-1)

This trend study, Trough Hollow, is found on the south end of the Old Woman Plateau at an elevation of 8,200 feet. The site is on a slight slope with a southern exposure. It samples an open area dominated by mountain big sagebrush. The range type is described as mixed mountain brush because of the great variety of desirable browse species. The area provides good year long habitat for deer, especially in spring and fall. Deer were seen near the study site in July of 1985, and fresh tracks crossed the transect. Pellet group data from 1999 estimate 31 deer, 53 elk and 38 cow days use/acre. Most of the deer and elk pellet groups appeared to be several months old, but about 20% of the elk pellet groups were from this spring. The area is quite popular for deer hunting and access is good on this part of the plateau. Grazing pressure is moderate and a deferred grazing system is used on the allotment. It is grazed June through October.

The soil is moderately deep and appears well developed. Effective rooting depth is estimated at almost 17 inches. Soil texture is a sandy clay loam with a neutral pH (6.9). There is very little rock in the soil profile or on the surface. Stoniness measurements are more a reflection of soil compaction since no rock was hit. A compacted clay horizon was encountered at a depth of about 10 to 12 inches. This does not appear to be a rooting barrier however. The ground is covered with a high percent of litter and vegetation with little bare soil exposed.

Mountain big sagebrush and bitterbrush are the key browse species on the site. Mountain big sagebrush currently ('99) provides 59% of the browse cover, while bitterbrush accounts for 31%. The sagebrush population appears stable with good recruitment, light use, and good vigor. Percent decadence was high in 1985 at 45%, but it has steadily declined to only 19% in 1999. Bitterbrush has shown consistent moderate to heavy use since 1985. Most of the population was classified as decadent in 1991, now these plants have since regained their health. Use is currently ('99) mostly heavy but vigor is good and only 1% of the population is considered decadent. These plants display a spreading prostrate growth form, forming a secondary cover under the sagebrush.

Additional browse forage is provided by small numbers of serviceberry, rabbitbrush, woods rose, snowberry, and gray horsebrush. Serviceberry has a stable population of about 600 plants/acre. They show moderate to heavy use and normal vigor. There are scattered clones of oak in the area, but they do not appear to be spreading.

There are many species of perennial grasses growing under and between the sagebrush, creating a fairly dense ground cover. The grasses were all vigorous with use appearing to be light to moderate when the study was established. The most common grasses are mutton and Kentucky bluegrass, letterman needlegrass, and western and slender wheatgrass. Use of the grasses growing in the open was moderate to heavy in 1999. Forbs are diverse and fairly abundant. Some provide highly palatable and preferred forage for deer, such as redroot eriogonum, penstemon, fleabanes, legumes, and dandelion. Utilization of forbs is generally light.

1985 APPARENT TREND ASSESSMENT

The soil is stable and improving as litter and dense vegetation give protection, add to the organic matter, and help build up the soil. The vegetative community appears stable at present. The great species diversity, and general health and vigor of the desirable species, contributes to the stability of the community. However, the current rate of sagebrush reproduction may be inadequate to maintain the population in the future. Continued light to moderate use by both big game and livestock also tends to promote stability.

1991 TREND ASSESSMENT

Soil appears basically unchanged and stable, which could probably be considered an improvement with the extended length of the drought. There has been a decrease in litter, but with a corresponding increase in vegetative cover. Trend for the key browse species: service berry, mountain big sagebrush, and rabbitbrush are essentially stable with the exception of a slight decrease for bitterbrush. The principal species, mountain big sagebrush, has a slight decrease in its population (3%), but decadency has gone from 45% down to 22%. This slight decrease in density would be expected from the extended drought. About half of the grasses sampled have increased nested and quadrat frequencies, especially western wheatgrass. Nested frequency of perennial forbs have increased slightly.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil continues to be stable. Ground cover characteristics have remained similar to 1991 levels. Trend for the key species, mountain big sagebrush and bitterbrush, is up slightly. Density of sagebrush is up slightly, use is lighter, and percent decadency has declined from 22% to 19%. Recruitment remains good with 21% of the population consisting of young plants. Bitterbrush has also increased slightly in density. Use is heavier but vigor improved and percent decadence has declined from 62% to only 1%. Some of the differences in density of sagebrush and bitterbrush may be due to the much larger sample used in 1999. Trend for the herbaceous understory is down slightly for grasses and down for forbs. Sum of nested frequency for perennial grasses and forbs has declined. Sum of nested frequency of western wheatgrass and mutton bluegrass have declined significantly while frequency of Kentucky bluegrass has increased significantly. Nested frequency of forbs has declined dramatically.

TREND ASSESSMENT

soil - stable

browse - up slightly

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 16C, Study no: 41

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron smithii	a ⁹⁹	b ²¹⁵	a ⁹¹	35	74	36	1.06
G	Agropyron trachycaulum	a ⁻	b ³⁴	b ²⁵	-	13	8	.92
G	Bouteloua gracilis	b ¹²	b ¹⁴	a ⁻	4	5	-	-
G	Bromus ciliatus	b ¹⁶	a ⁻	c ⁶⁶	7	-	29	.71
G	Bromus inermis	ab ⁵	a ⁻	b ⁸	2	-	4	.04
G	Carex spp.	5	12	14	3	4	5	.24
G	Festuca ovina	b ¹³	a ⁻	a ⁻	6	-	-	-
G	Poa fendleriana	b ²²⁷	b ²¹⁴	a ¹⁷⁵	80	76	60	7.59
G	Poa pratensis	a ¹³	b ¹¹⁶	c ¹⁶⁶	5	44	57	6.27

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
G	<i>Poa secunda</i>	-	4	-	-	2	-	-
G	<i>Sitanion hystrix</i>	_b 162	_a 38	_a 13	53	19	6	.20
G	<i>Stipa columbiana</i>	2	3	6	1	1	2	.18
G	<i>Stipa lettermani</i>	119	105	95	41	41	37	2.16
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		673	755	659	237	279	244	19.41
Total for Grasses		673	755	659	237	279	244	19.41
F	<i>Agoseris glauca</i>	_a -	_b 76	_a -	-	33	-	-
F	<i>Antennaria rosea</i>	_a 14	_b 29	_a 12	4	15	6	.62
F	<i>Androsace septentrionalis</i> (a)	-	-	64	-	-	27	.41
F	<i>Arabis</i> spp.	_a -	_{ab} 4	_b 13	-	2	5	.05
F	<i>Astragalus convallarius</i>	_b 113	_a 35	_a 18	49	16	9	.16
F	<i>Aster</i> spp.	_b 4	_a -	_a -	3	-	-	-
F	<i>Astragalus</i> spp.	4	8	12	2	4	5	.22
F	<i>Castilleja chromosa</i>	5	10	3	3	4	3	.06
F	<i>Calochortus nuttallii</i>	_b 90	_c 148	_a -	47	61	-	-
F	<i>Chaenactis douglasii</i>	-	-	2	-	-	1	.00
F	<i>Cirsium wheeleri</i>	3	4	2	3	4	1	.03
F	<i>Collinsia parviflora</i> (a)	-	-	3	-	-	2	.01
F	<i>Crepis acuminata</i>	_b 12	_b 6	_a -	5	3	-	-
F	<i>Erigeron caespitosus</i>	_b 10	_a -	_a -	4	-	-	-
F	<i>Erigeron eatonii</i>	_b 105	_b 96	_a 23	42	42	14	.31
F	<i>Erigeron flagellaris</i>	16	7	16	6	4	7	.13
F	<i>Erigeron pumilus</i>	_a 5	_{ab} 14	_b 18	2	7	8	.50
F	<i>Eriogonum racemosum</i>	_{ab} 112	_b 122	_a 88	54	54	39	1.36
F	<i>Eriogonum umbellatum</i>	9	6	19	5	5	9	.24
F	<i>Gilia aggregata</i>	5	-	-	2	-	-	-
F	<i>Ipomopsis aggregata</i>	-	-	1	-	-	1	.00
F	<i>Lithospermum ruderale</i>	-	3	-	-	2	-	-
F	<i>Lupinus argenteus</i>	8	2	8	3	1	4	.54
F	<i>Lychnis drummondii</i>	-	-	3	-	-	1	.00
F	<i>Machaeranthera canescens</i>	-	-	2	-	-	1	.03
F	<i>Oxybaphus linearis</i>	_b 12	_a -	_a -	5	-	-	-
F	<i>Penstemon palmeri</i>	2	-	-	2	-	-	-
F	<i>Penstemon pachyphyllus</i>	5	11	1	2	4	1	.15
F	<i>Petradoria pumila</i>	-	-	2	-	-	1	.00
F	<i>Penstemon watsonii</i>	_a 5	_b 29	_b 21	3	17	13	.31
F	<i>Polygonum douglasii</i> (a)	-	-	18	-	-	9	.04
F	<i>Senecio multilobatus</i>	-	-	1	-	-	1	.00

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Taraxacum officinale	23	15	26	11	9	11	.08
F	Tragopogon dubius	-	3	-	-	1	-	-
F	Trifolium spp.	6	5	-	2	2	-	-
F	Unknown forb-perennial	_b 34	_a -	_a -	13	-	-	-
F	Vicia americana	_b 18	_b 11	_a -	8	5	-	-
F	Zigadenus paniculatus	_b 6	_b 12	_a -	4	5	-	-
Total for Annual Forbs		0	0	85	0	0	38	0.46
Total for Perennial Forbs		626	656	291	284	300	141	4.86
Total for Forbs		626	656	376	284	300	179	5.32

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

BROWSE TRENDS --

Herd unit 16C, Study no: 41

Type	Species	Strip Frequency 09	Average Cover % 09
B	Amelanchier utahensis	25	.66
B	Artemisia tridentata vaseyana	96	19.40
B	Chrysothamnus viscidiflorus viscidiflorus	37	1.11
B	Juniperus osteosperma	1	.38
B	Juniperus scopulorum	1	-
B	Mahonia repens	13	.18
B	Purshia tridentata	71	10.40
B	Rosa woodsii	7	.49
B	Symphoricarpos oreophilus	11	.45
B	Tetradymia canescens	5	.06
Total for Browse		267	33.16

CANOPY COVER --

Herd unit 16C, Study no: 41

Species	Percent Cover 09
Juniperus scopulorum	1

BASIC COVER --

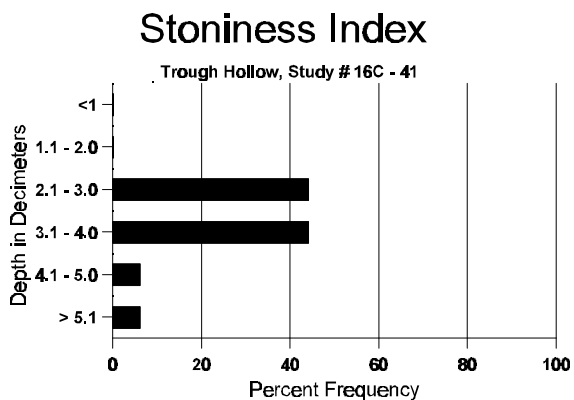
Herd unit 16C, Study no: 41

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	368	13.25	21.25	56.79
Rock	-	0	.50	0
Pavement	25	0	.25	.21
Litter	377	73.00	63.25	59.30
Cryptogams	28	.75	.25	.21
Bare Ground	185	13.00	14.50	13.29

SOIL ANALYSIS DATA --

Herd Unit 16C, Study # 41, Study Name: Trough Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.9	46.0 (15.7)	n/a	48.0	25.4	26.6	2.3	8.5	163.2	0.6



PELLET GROUP FREQUENCY --

Herd unit 16C, Study no: 41

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	5	n/a
Elk	11	53 (131)
Deer	13	31 (77)
Cattle	7	38 (94)

BROWSE CHARACTERISTICS --

Herd unit 16C, Study no: 41

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 utahensis</i>																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	6	2	-	-	-	-	-	-	-	8	-	-	-	533		8	
	91	3	2	-	-	-	-	1	-	-	6	-	-	-	400		6	
	99	11	1	1	-	1	-	-	-	-	14	-	-	-	280		14	
M	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66	10	15	
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66	21	13	
	99	-	4	4	-	2	5	1	-	-	14	1	1	-	320	20	18	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	1	2	-	-	-	133		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		33%			00%			00%			+ 0%							
'91		33%			11%			00%			+ 0%							
'99		27%			33%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	599	Dec:	0%				
											'91	599		22%				
											'99	600		0%				
<i>Artemisia tridentata vaseyana</i>																		
S	85	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	91	1	-	-	1	-	-	-	-	-	2	-	-	-	133		2	
	99	25	-	-	1	-	-	-	-	-	26	-	-	-	520		26	
Y	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	91	12	-	-	-	-	-	-	-	-	12	-	-	-	800		12	
	99	54	1	-	-	-	-	-	-	-	55	-	-	-	1100		55	
M	85	19	11	-	-	-	-	-	-	-	26	-	4	-	2000	26	25	
	91	25	3	-	8	1	-	-	-	-	31	4	2	-	2466	26	32	
	99	153	3	3	-	-	-	-	-	-	159	-	-	-	3180	35	42	
D	85	14	15	-	-	-	-	-	-	-	24	-	5	-	1933		29	
	91	7	5	-	2	-	-	-	-	-	12	1	1	-	933		14	
	99	41	6	-	2	-	-	-	-	-	41	-	-	8	980		49	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	540		27	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		40%			00%			14%			- 3%							
'91		14%			00%			05%			+20%							
'99		04%			01%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	4333	Dec:	45%				
											'91	4199		22%				
											'99	5260		19%				

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 viscidiflorus								
Y	85	9	-	-	-	-	-	9
	91	14	5	-	3	-	5	27
	99	6	-	-	-	-	-	6
M	85	18	-	-	-	-	-	18
	91	3	2	-	2	-	-	7
	99	99	-	-	1	-	-	100
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
	'85	00%		00%		00%		+21%
	'91	21%		00%		03%		- 6%
	'99	00%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'85	1800	Dec: -
						'91	2266	-
						'99	2120	-
Juniperus osteosperma								
Y	85	-	-	-	-	-	-	0
	91	-	-	-	-	-	-	0
	99	1	-	-	-	-	-	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
	'85	00%		00%		00%		
	'91	00%		00%		00%		
	'99	00%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'85	0	Dec: -
						'91	0	-
						'99	20	-
Juniperus scopulorum								
Y	85	-	-	-	-	-	-	0
	91	-	-	-	-	-	-	0
	99	1	-	-	-	-	-	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
	'85	00%		00%		00%		
	'91	00%		00%		00%		
	'99	00%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'85	0	Dec: -
						'91	0	-
						'99	20	-

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				
Mahonia repens																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	4	-	-	1	-	-	-	-	-	5	-	-	-	333		5	
	99	24	-	-	2	-	-	-	-	-	26	-	-	-	520		26	
M	85	21	-	-	-	-	-	-	-	-	21	-	-	-	1400	3	3	21
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	78	-	-	-	-	-	-	-	-	78	-	-	-	1560	2	4	78
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-80%							
'91		00%			00%			00%			+84%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	1666	Dec:	-			
												'91	333		-			
												'99	2080		-			
Purshia tridentata																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	85	5	1	-	-	-	-	-	-	-	6	-	-	-	400		6	
	91	1	3	-	-	1	-	1	-	-	6	-	-	-	400		6	
	99	17	2	9	3	-	2	-	-	-	33	-	-	-	660		33	
M	85	5	12	5	-	-	-	-	-	-	22	-	-	-	1466	19	28	22
	91	1	1	1	-	1	-	-	-	-	4	-	-	-	266	9	19	4
	99	4	8	53	-	9	25	-	-	-	99	-	-	-	1980	21	38	99
D	85	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	91	1	-	1	1	-	1	7	2	3	10	-	-	6	1066		16	
	99	-	-	2	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		45%			21%			00%			-10%							
'91		23%			23%			23%			+35%							
'99		14%			68%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	1932	Dec:	3%			
												'91	1732		62%			
												'99	2680		1%			

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>Rosa woodsii</i>																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	10	-	-	7	-	-	-	-	-	17	-	-	-	340	11	8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	620		-			
<i>Symphoricarpos oreophilus</i>																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	91	4	2	-	-	-	-	-	-	-	6	-	-	-	400		6	
	99	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	9	10	
	91	1	-	-	2	2	-	2	-	-	7	-	-	-	466	9	14	
	99	14	1	-	-	-	-	-	-	-	15	-	-	-	300	18	22	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	1	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+21%							
'91		36%			00%			00%			-38%							
'99		03%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	733	Dec:	0%			
												'91	932		7%			
												'99	580		0%			
<i>Tetradymia canescens</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	4	-	-	1	-	-	-	-	-	5	-	-	-	100	8	7	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	0		0%			
												'99	120		17%			

SUMMARY

WILDLIFE MANAGEMENT UNIT - 16C (31) - MANTI - NEBO, MANTI SOUTH

The 26 trend studies on unit 16C are difficult to group and categorize due to the extensive diversity. Eight sites sample pinyon-juniper chainings, seven sites sampled mountain big sagebrush, six sites sample mixed mountain brush, two sites sampled black sagebrush, two sites sampled curlleaf mountain mahogany, and one site sampled Wyoming big sagebrush. All sites sample deer or elk winter range except Joe's Valley overlook #37 and Trough Hollow #41.

Pinyon-juniper chainings make up a large portion of the studies that sample winter range for big game on this unit. These transects include Red Point (#14), Howard Forest Service Chaining (#15), Middle Mountain (#17), Dry Mountain (#26), Birch Creek Chaining (#27), South of Dry Wash (#28), Danish Bench (#36) and Cedar Mountain (#40). Soil trend on these chaining study sites are all stable or slightly improved. Browse trends are stable at Red Point, Howard Forest Service Chaining, Birch Creek Chaining, Danish Bench, and Cedar Mountain, and slightly up for the other three sites. Herbaceous trends are stable or slightly up for all sites but in poor condition at Red Point, Howard Forest Service Chaining, South of Dry Wash, and Danish Bench.

Another important component of the winter ranges sampled on this unit are the mountain big sagebrush flats. These studies include East Mountain (#18), Miles Point (#20), North Horn-Rock Canyon (#22), Black Dragon (#23), South Horn 1/4 Corner (#25), Muddy Creek (#32), and Wildcat Knolls (#35). Soil trends on all of these sites are stable except for Muddy Creek which is up slightly. However, soil conditions are very poor on Muddy Creek and accelerated erosion is still occurring. Browse trends are stable at East Mountain, Miles Point, North Horn Rock Canyon, and Black Dragon. An upward browse trend is found at South Horn 1/4 corner and a slightly upward browse trend at Wildcat Knolls. The only downward browse trend occurs at Muddy Creek which has a slightly downward trend.

Six studies sample mixed mountain brush which are all at elevations above 8,300 feet. These studies include Trail Mountain Exclosure (#19), North Horn Cap (#21), South Horn Exclosure (#24), Upper Hole Trail (#30), Joe's Valley Overlook (#37), and Trough Hollow (#41). Soil trends are stable at Trail Mountain Exclosure, Joe's Valley Overlook, and Trough Hollow and up or slightly up on the other three sites. North Horn Cap displays an upward soil trend, although conditions are poor with abundant bare ground exposed on the steep slope. Erosion is still a problem between the contoured terraces. Browse trends are stable at Trail Mountain Exclosure, Upper Hole Trail, and Joe's Valley Overlook. Browse trends are slightly upward at South Horn Exclosure and Trough Hollow. North Horn Cap has displayed a slightly downward browse trend since 1994. Herbaceous trends are slightly improved at Trail Mountain Exclosure, North Horn Cap, and Joe's Valley Overlook. They are stable at South Horn Exclosure and Upper Hole Trail. Trough Hollow displays a slightly downward herbaceous trend.

Black sagebrush is sampled by the Box Canyon Knolls (#31) and South Sage Flat (#34) studies. South Sage Flat was established in 1994 to monitor elk use. This site shows stable soil, browse, and herbaceous trends. Box Canyon Knolls has a stable soil and browse trend but the herbaceous trend is slightly down.

Curlleaf mountain mahogany is sampled on two sites, West Huntington Canyon (#13) and Scab Hollow (#29). West Huntington Canyon has stable soil, browse, and herbaceous trends while Scab Hollow has a stable browse trend and a slightly upward soil and herbaceous trend.

Little Nelson Mountain samples an opening of Wyoming big sagebrush along Ferron Creek. This was a new study established in 1994. It displays an upward soil and herbaceous trend and a slightly upward browse trend.

TREND SUMMARY

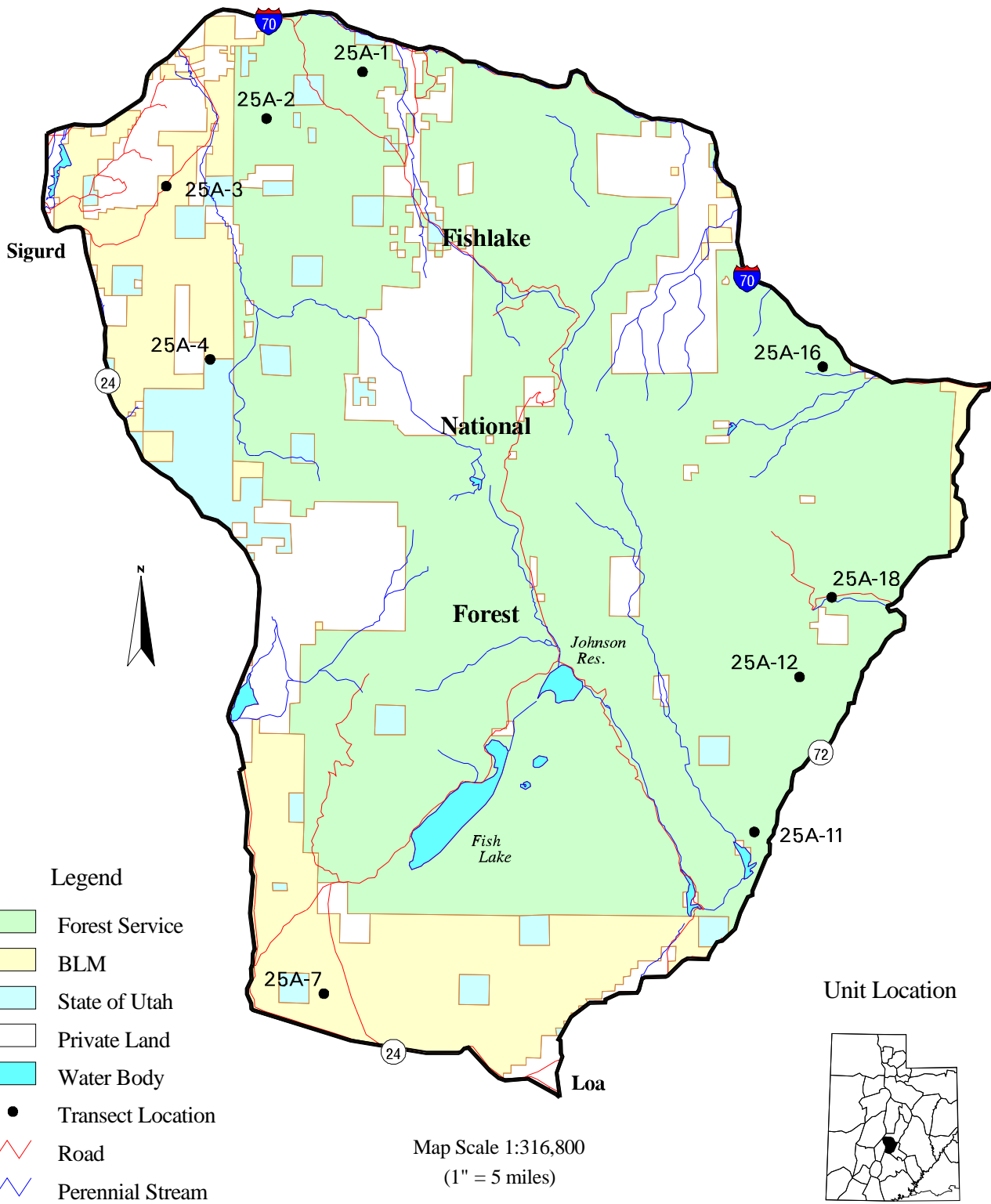
Site	Category	1994	1999
16C-13 West Huntington Canyon	soil	0	0
	browse	-	0
	herbaceous understory	0	0
16C-14 Red Point	soil	+	0
	browse	0	0
	herbaceous understory	-	0
16C- 15 Howard Forest Service Chaining	soil	0	0
	browse	-	0
	herbaceous understory	-	+
16C-17 Middle Mountain	soil	-	+
	browse	0	+
	herbaceous understory	0	0
16C-18 East Mountain	soil	0	0
	browse	0	0
	herbaceous understory	-	0
16C-19 Trail Mountain Exclosure	soil	0	0
	browse	0	0
	herbaceous understory	-	+
16C-20 Miles Point	soil	0	0
	browse	0	0
	herbaceous understory	0	0
16C-21 North Horn Cap	soil	-	+
	browse	0	-
	herbaceous understory	0	+
16C-22 North Horn Rock Canyon	soil	-	0
	browse	-	0
	herbaceous understory	-	+
16C-23 Black Dragon	soil	0	0
	browse	0	0
	herbaceous understory	-	0

Site	Category	1994	1999
16C-24 South Horn Exclosure	soil	0	+
	browse	-	+
	herbaceous understory	-	0
16C-25 South Horn 1/4 Corner	soil	0	0
	browse	-	+
	herbaceous understory	-	0
16C-26 Dry Mountain	soil	-	0
	browse	0	+
	herbaceous understory	-	0
16C-27 Birch Creek Chaining	soil	0	+
	browse	0	0
	herbaceous understory	-	+
16C-28 South of Dry Wash	soil	0	+
	browse	0	+
	herbaceous understory	0	+
16C-29 Scab Hollow	soil	-	+
	browse	0	0
	herbaceous understory	-	+
16C-30 Upper Hole Trail	soil	+	+
	browse	0	0
	herbaceous understory	+	0
16C-31 Box Canyon Knolls	soil	+	0
	browse	+	0
	herbaceous understory	0	-
16C-32 Muddy Creek	soil	+	+
	browse	0	-
	herbaceous understory	+	0
16C-33 Little Nelson Mountain	soil	est	+
	browse	est	+
	herbaceous understory	est	+

Site	Category	1994	1999
16C-34 South Sage Flat	soil	est	0
	browse	est	0
	herbaceous understory	est	0
16C-35 Wildcat Knolls	soil	est	0
	browse	est	+
	herbaceous understory	est	-
16C-36 Danish Bench	soil	est	0
	browse	est	0
	herbaceous understory	est	0
16C-37 Joe's Valley Overlook	soil	est	0
	browse	est	0
	herbaceous understory	est	+
Site	Category	1991	1999
16C-40 Cedar Mountain	soil	0	0
	browse	+	0
	herbaceous understory	+	0
16C-41 Trough Hollow	soil	0	0
	browse	0	+
	herbaceous understory	0	-

(0) = stable, (+) = upward, (-) = downward, (0/-) = stable to slightly downward, (0/+) = stable to slightly upward

Management Unit 25A



WILDLIFE MANAGEMENT UNIT 25A - PLATEAU, FISH LAKE

Boundary Description

Sevier, Wayne and Piute Counties - Boundary begins at Highway SR-24 and Highway SR-72; west and north on SR-24 to Highway US-89; north on US-89 to Interstate 70; east on I-70 to SR-72; south on SR-72 to SR-24 and beginning point.

Unit Description

Prior to 1998, the Fish Lake unit was called deer herd unit 44. In the spring of 1998 this unit was enlarged, now it is a subunit within the large Wildlife Management Unit 25 - Plateau. This wildlife management unit now incorporates the Boulder Mountains (25C), Thousand Lake Mountains (25B), and the Fish Lake Mountains (25A).

The Fish Lake unit includes Fish Lake Mountain and drainages; Otter Creek to the west and the Fremont River with its major tributaries, 7-mile Creek and UM Creek to the east. Some steep, relatively rough areas exist in the drainage heads along the northwestern side, but most of the unit is an inclined, rolling plateau. Elevation ranges from 11,599 feet on Mt. Marvine to 7,040 feet at Loa. The northern two-thirds of the unit includes the higher elevations of the Fish Lake Mountains and constitutes summer range for deer and elk. Winter range is primarily confined to the lower elevations of the southern third of the unit and the sagebrush benches on the west side above Highway 24. Antelope are present and are normally found in the more open areas of the deer and elk winter range. Sage grouse are found near water in the same areas as those used by antelope. Fish Lake, Johnson Reservoir, Mill Meadow Reservoir, and Forsyth Reservoir are all popular summer fishing and camping areas. The higher portions of the unit are also popular elk and deer hunting areas. Another major public land use of the area is livestock grazing.

Huff and Blotter (1964) identified four dominant vegetation types on the winter range. Sagebrush was the most prevalent type. Black sagebrush (*Artemisia nova*) was the dominant species with islands of big sagebrush (*A. tridentata*) scattered throughout. Pinyon-juniper was the second most common vegetation type. Pinyon-juniper occupies primarily southern slopes at higher elevations and is dispersed in patches throughout the lower elevations. Mountain brush can be found along the upper limits of the winter range. The mixed types occur in localized areas throughout the winter range.

The normal winter range can be found between 7,200 and 9,000 feet (Huff and Blotter 1964). Excessive accumulations of snow during severe winters confine deer below the 8,600-foot contour. Pinyon-juniper on both normal and severe wintering areas provide extremely important protective cover for elk and deer, while the closely associated sagebrush type produces the bulk of the required forage. In an update on winter range needs in the state, Mann (1985) considered the public land on the unit adequate to meet the wintering needs of deer without acquiring additional land from the private sector. The percent of the winter range that is administered by the BLM and USFS is respectively 30% and 47%. The Forest Service is responsible for managing almost all of the summer range (83%).

A history of heavy overgrazing by sheep and cattle is largely responsible for the present composition of most of the vegetative communities. Grazing began in the 1860's when the first settlers arrived in the Fremont Valley. Cattle, horses, and sheep grazed unregulated and range conditions deteriorated as herds increased. The result was overuse of the valuable cool-season grasses and forbs and degradation of the range in general. Even after the inception of the Forest Reserve (the predecessor to the Forest Service) in 1906, the situation worsened until livestock numbers peaked in 1924. Although overgrazing still occurs in many areas, grazing restrictions and management plans have been implemented on both Forest Service and BLM lands. Range conditions are improving in most areas.

Browse species increased as the competition from grasses and forbs was reduced by the heavy grazing. The result was large areas of deer winter range with abundant browse forage. However, good spring-fall deer range or transition range is lacking. During these seasons, deer seek succulent green grasses and forbs. Because the herbaceous component is inadequate, depredation occurs on private croplands, especially alfalfa fields. The DWR is working with the other agencies to improve spring-fall ranges with chaining, spraying, harrowing, and/or seeding projects.

Mining activities are nonexistent on the area, but gas and oil exploration and road building are current land management concerns. There is presently a moderately high density of roads on the area. Although off-road use of vehicles is prohibited, ORV's and four-wheel drive vehicles can go almost anywhere and new roads are being created each year. Winter traffic and the increase of unregulated winter recreation will have a negative impact on big game.

Wildlife Management Unit Objectives

The current wildlife management objectives are to achieve a target winter herd size of 6,200 deer (stabilize the west side of the unit and increase the east side). A post season herd composition 15 bucks to 100 does with 30% of the bucks being 3 point or better will be maintained. The target winter herd size for elk is 4,800 for subunits 25A Fish Lake and 25B Thousand Lake. A herd composition of a minimum 8 bulls to 100 cows with 4 of those bulls being 2 ½ years of age or older will be maintained.

The Fish Lake deer unit is part of the Parker Mountain antelope unit. One hundred and twenty-nine pronghorns were transplanted to the Parker unit from Montana in 1964 and 1965. Because this antelope unit has done so well, antelope from this expanding herd have been transplanted to other areas of the state. Additionally, the yearly harvest has increased from 36 in 1974 to 133 in 1984 ???need data after 1984??? with an average hunter success rate of 93%. The Fish Lake part of the Parker Mountain antelope unit supports a modest portion of the total herd, but will likely become more important if the herd continues to expand.

Trend Study Site Description

Twelve trend study sites were placed within the Fish Lake unit in 1985. Eleven of the 12 study sites occur on deer and elk winter range and one on summer range. In 1991, all sites were reread and 3 additional summer or transitional range sites were established at East Tidwell #25A-12, Ox Spring #25A-13, and Row of Pines Exclosure #25A-14. These 15 trend studies were read again in 1999. Two additional study sites were established in 1999, within the Row of Pines exclosure. One samples the livestock exclosure (#25A-19) and the other samples the total exclosure (#25A-20). Data from these sites can be compared with the Row of Pines exclosure trend study site #25A-14, which samples the area outside of the exclosure.

Trend Study 25A-1-99

Study site name: Triangle Mountain .

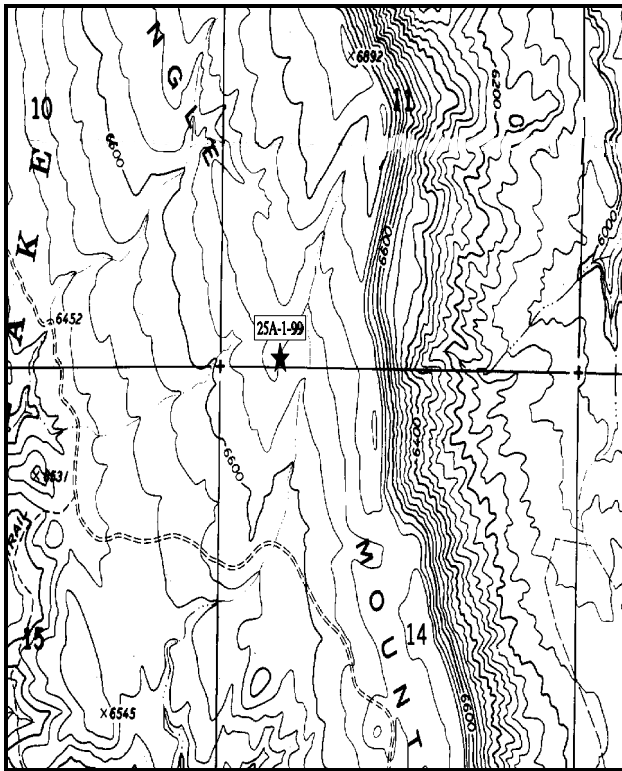
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

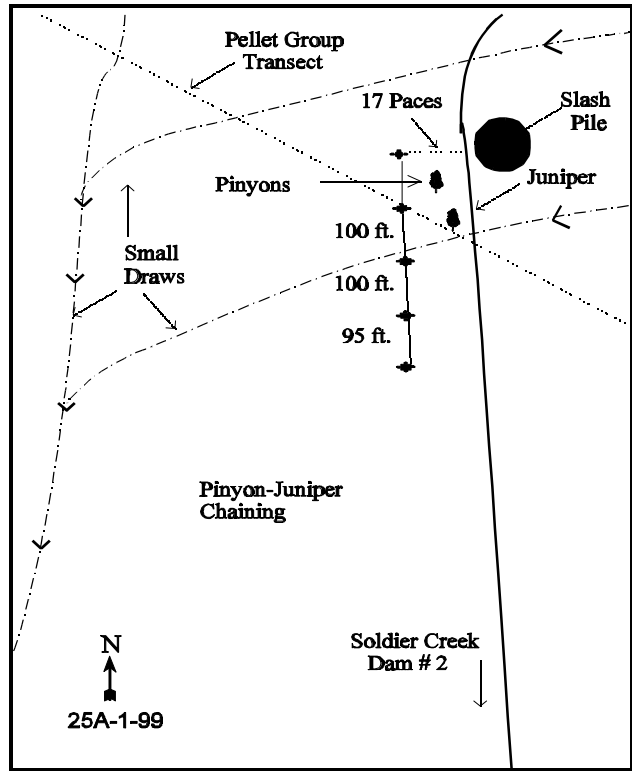
LOCATION DESCRIPTION

From the Gooseberry Creek Road outside Salina, take the Soldier Canyon Road west approximately 2.5 miles to Soldier Creek Dam #2. At the dam, turn right up the road to Triangle Mountain. Go 1.55 miles to a fork. Take the right fork 0.6 miles to the top of a low rise between 2 small draws. Walk 17 paces due west of the road to the 0-foot baseline stake, which is a 4-foot rebar with a red browse tag, #7030, attached. A pellet group transect crosses the frequency baseline at the 100-foot mark.



Map Name: Salina, Utah

Township 22S , Range 1E , Section 11



Diagrammatic Sketch

UTM 4306249.677 N, 433224.714 E

DISCUSSION

Trend Study No. 25A-1 (43-1)

The Triangle Mountain study is located on the gently sloping (5%-10%) southwest side of Triangle Mountain in the Fish Lake National Forest at an elevation of 6,700 feet. The area was formerly dominated by pinyon-juniper, and was chained and seeded in 1970. It is presently occupied by evenly scattered young pinyon and juniper trees that escaped the chain, and seeded perennial grasses. Cattle use the area in early summer and the grazing is heavy. The area is within the Brown's Hole allotment which allows grazing for approximately a two week period from June 1st to June 15 depending on conditions. In 1985, deer use, at a nearby pellet group transect, was low (31 deer days use/hectare) when compared to the figures shown by other pellet group transects on the herd unit (average 69 deer days use/hectare) (Jense et al. 1985). In 1991, elk use averaged only 7 days use/acre (18 days use/hectare). Pellet group transect data taken along the study site baseline in 1999 estimate 21 deer days use/acre (53 ddu/ha), 66 elk days use/acre (162 edu/ha), and 49 cow days use/acre (120 cdu/ha).

The soil is a light-colored, loam soil that is relatively shallow due to the prevalence of rock on the surface and throughout the profile. The estimated effective rooting depth is just under 12 inches. It is derived from a limestone parent material, and has a slightly alkaline pH (7.6). The amount of phosphorus is low and could be a limiting factor at 6.5 ppm where 10 ppm is considered minimal for normal plant growth and development. Organic matter is high at 5.8%, with a good amount of litter on the surface. Erosion is not severe due to the gentle slope and adequate cover from herbaceous vegetation and litter. The area itself is quite dry with an average of about 10 inches of precipitation per year measured in Salina (5 miles away to the northwest and 1,600 feet lower).

Browse is infrequent at the site, resulting in light use by deer. Black sagebrush is the most important species, but has a very low density, currently ('99) estimated at 480 plant/acre. Use is mostly light on this species, recruitment is high (38%), with a moderate biotic potential (7%). No plants were classified as decadent in 1999. White-stemmed rubber rabbitbrush is scattered throughout the site in low numbers. The young pinyons and junipers average 5 feet in height and are evenly disbursed and vigorous. Densities for these species are currently ('99) estimated at 43 pinyon trees/acre and 35 juniper trees/acre. Some junipers are lightly hedged. Nearby, more dense stands of pinyon-juniper provide good cover.

Herbaceous vegetation makes up the majority of the vegetation cover at the site. Currently, grasses and forbs respectively provide 68% and 29% of the total vegetation cover. Seeded perennial species dominate the understory. The major species present are: crested wheatgrass, intermediate wheatgrass, and Russian wildrye. Crested wheatgrass is the dominate species overall, occurring in over 80% of the sampling quadrats in all years. It currently provides 42% of the total vegetation cover at the site. This species is lower in stature (an indication of poor site potential) and shows moderate to heavy utilization. Intermediate wheatgrass also shows utilization on the larger plants. Russian wildrye is scattered throughout the site in clumps that display a halo effect. Cheatgrass was sampled in 1999, however, it is infrequent occurring in only 4 quadrats. Seeded alfalfa, the most valuable forb, is stunted and heavily utilized. It has a stable frequency over all sampling periods. The annual, pale alyssum, is abundant and provides 28% of the forb cover. Other forbs are infrequent and unimportant.

1985 APPARENT TREND ASSESSMENT

Juniper and pinyon are regaining their former dominance in the chained areas with good vigor and virtually no competition. Other browse species are sporadic but may be slowly increasing. The grasses are well-established. The soil condition is poor, but relatively stable considering the relatively high amount of bare soil.

1991 TREND ASSESSMENT

It appears that the juniper and pinyon trees, on the site, are those that escaped the chaining treatment and have been released from competing with the older adult trees. Density for the key browse species, black sagebrush, has increased by 67%, but is still low at about 200 plants per acre. This increase in density for black sagebrush would be expected to continue. All major seeded grasses have increased sum of nested frequency and quadrat frequency values. Another plus is that alfalfa has also increased since 1985, at which time it was questioned if it would survive. It has a 49% quadrat frequency, which is excellent for a 20 year old chaining. Bare ground has also decreased substantially.

TREND ASSESSMENT

soil - up

browse - up

herbaceous understory - up

1999 TREND ASSESSMENT

Trend for soil is stable. Erosion is minimal due to adequate protective cover from herbaceous vegetation and litter. Percent cover from bare ground has stayed nearly the same as the previous reading. Trend for browse is stable, but insignificant on this site. Black sagebrush is the most abundant species, but it occurs at a very low density. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses decreased slightly, but the most abundant species, crested wheatgrass and Russian wildrye, have remained stable while nested frequency of intermediate wheatgrass has increased slightly. Sum of nested frequency for perennial forbs remained stable. Herbaceous plants are low in stature and moderately to heavily utilized.

TREND ASSESSMENT

soil - stable

browse - stable, but insignificant

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '89
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	267	293	242	91	94	81	7.19
G	Agropyron intermedium	_a 109	_b 158	_b 180	48	63	68	2.45
G	Agropyron smithii	_a 1	_b 18	_a -	1	6	-	-
G	Agropyron spicatum	7	7	2	3	4	1	.00
G	Bromus tectorum (a)	-	-	6	-	-	4	.02
G	Elymus junceus	79	99	95	37	42	43	1.76
G	Festuca ovina	_b 9	_c 25	_a -	6	12	-	-
G	Oryzopsis hymenoides	-	-	1	-	-	1	.00
G	Poa secunda	_a -	_a -	_b 29	-	-	15	.20
G	Sitanion hystrix	3	-	-	1	-	-	-
Total for Annual Grasses		0	0	6	0	0	4	0.01
Total for Perennial Grasses		475	600	549	187	221	209	11.62

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
	Total for Grasses	475	600	555	187	221	213	11.64
F	<i>Alyssum alyssoides</i> (a)	-	-	260	-	-	88	1.41
F	<i>Antennaria rosea</i>	_b 18	_a -	_b 7	10	-	4	.04
F	<i>Aster</i> spp.	5	-	1	2	-	1	.00
F	<i>Astragalus</i> spp.	1	11	6	1	6	4	.21
F	<i>Chaenactis douglasii</i>	-	2	-	-	1	-	-
F	<i>Cryptantha</i> spp.	_a -	_b 19	_c 52	-	10	18	.92
F	<i>Hymenoxys acaulis</i>	_a -	_b 8	_a -	-	4	-	-
F	<i>Lithospermum ruderale</i>	1	1	3	1	1	1	.03
F	<i>Medicago sativa</i>	74	110	99	36	49	50	2.43
F	<i>Phlox austromontana</i>	_{ab} 4	_b 13	_a 1	2	6	1	.00
F	<i>Ranunculus testiculatus</i> (a)	-	-	3	-	-	1	.00
F	<i>Townsendia</i> spp.	-	6	-	-	2	-	-
	Total for Annual Forbs	0	0	263	0	0	89	1.41
	Total for Perennial Forbs	103	170	169	52	79	79	3.65
	Total for Forbs	103	170	432	52	79	168	5.07

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

BROWSE TRENDS --

Herd unit 25A, Study no: 1

Type	Species	Strip Frequency 09	Average Cover % 09
B	<i>Artemisia nova</i>	15	.01
B	<i>Chrysothamnus nauseosus</i>	2	-
B	<i>Chrysothamnus viscidiflorus</i>	2	-
B	<i>Gutierrezia sarothrae</i>	1	-
B	<i>Leptodactylon pungens</i>	2	-
B	<i>Pinus edulis</i>	3	.48
	Total for Browse	25	0.49

CANOPY COVER --

Herd unit 25A, Study no: 1

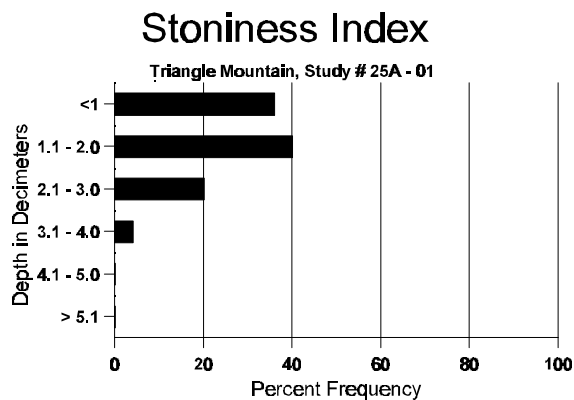
Species	Percent Cover 09
<i>Pinus edulis</i>	3

BASIC COVER --
Herd unit 25A, Study no: 1

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	348	10.50	12.50	19.34
Rock	179	4.50	4.75	4.50
Pavement	295	19.50	13.50	10.88
Litter	340	30.75	48.00	26.33
Cryptogams	40	0	.50	1.20
Bare Ground	284	34.75	20.75	18.20

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 01, Study Name: Triangle Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.7	54.8 (12.7)	7.6	40.0	34.7	25.3	5.8	6.5	243.2	0.7



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 1

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	27	n/a
Elk	18	66(163)
Deer	18	21(52)
Cattle	10	49(121)

BROWSE CHARACTERISTICS --
Herd unit 25A, 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				
Artemisia nova																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	99	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	12	20	1
	91	-	1	-	-	-	-	-	-	-	-	1	-	-	66	19	36	1
	99	8	7	-	-	-	-	-	-	-	14	1	-	-	300	15	23	15
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+67%							
'91		33%			00%			00%			+59%							
'99		29%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	66	Dec:	-				
											'91	199		-				
											'99	480		-				
Chrysothamnus nauseosus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	5	-	-	-	-	-	-	-	-	4	-	1	-	333		5	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	14	9	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	18	16	1
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	1	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+83%							
'91		17%			00%			17%			-90%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	66	Dec:	0%				
											'91	399		17%				
											'99	40		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>Chrysothamnus viscidiflorus</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	-	-	-	40	8	8	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	40		-		
<i>Gutierrezia sarothrae</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	-	-	20	9	7	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	20		-		
<i>Leptodactylon pungens</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	-	-	-	60	4	13	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	60		-		
<i>Pinus edulis</i>																	
M	85	1	-	-	-	-	-	-	-	-	1	-	-	66	51	31	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	66	72	75	1
	99	3	-	-	-	-	-	-	-	-	3	-	-	60	-	-	3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+ 0%						
'91		00%			00%			00%			- 9%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-		
												'91	66		-		
												'99	60		-		

Trend Study 25A-2-99

Study site name: Black Mountain .

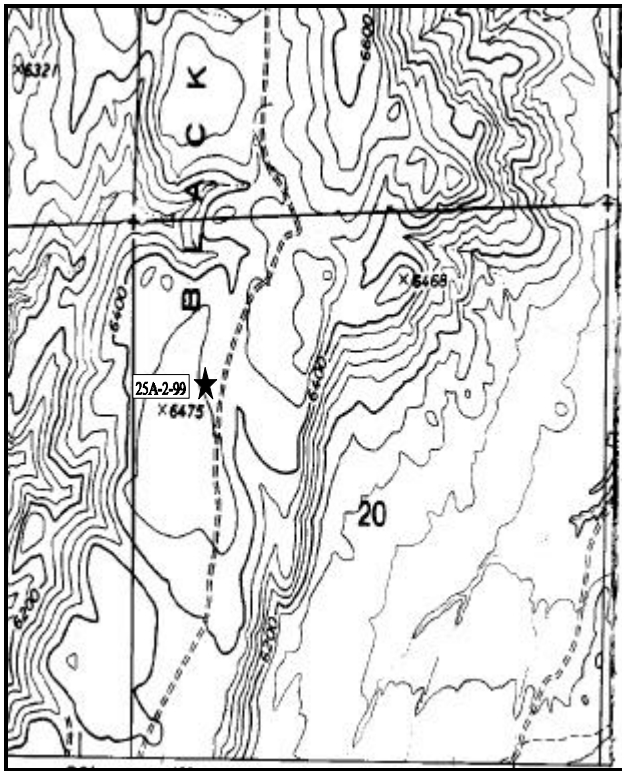
Range type: Chained, Cabled, Seeded P-J .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

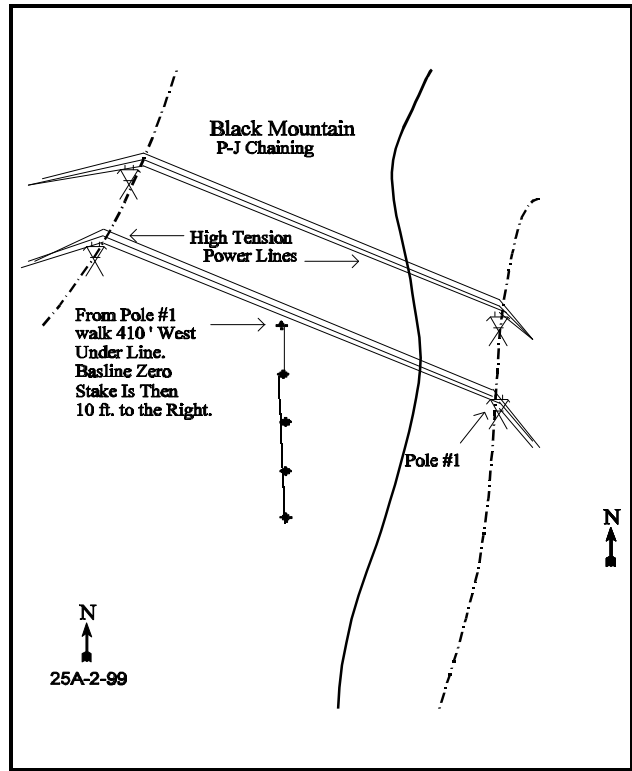
LOCATION DESCRIPTION

From Soldier Canyon Dam #2, proceed 1.85 miles west on the Soldier Canyon Road to the Black Mountain Road. Make a sharp left turn onto this road and travel south-southeast 0.95 miles to a junction. Take the right fork 0.85 miles to the double high-tension powerlines. The transect starts under these lines on the mesa to the right. Continue 1.1 miles beyond the powerlines to a 90-degree fork to the right. Turn right and go 0.55 miles to another fork. Stay to the right and proceed 1.15 miles up the hill and across a chaining until you are between the powerlines. Starting from the pole (#1) east of the road, pace off 410 feet west directly under the lines to the start of the frequency baseline. The 0 foot post is marked with browse tag #7028.



Map Name: Salina, Utah

Township 22S , Range 1E , Section 20



Diagrammatic Sketch

UTM 4303753.249 N, 428084.544 E

DISCUSSION

Trend Study No. 25A-2 (43-2)

The Black Mountain trend study was Ely chained and seeded in 1984. Slope is less than 5% with a slight southern aspect and an elevation of 6,400 feet. The distance to free water (at least 1.5 to 2 miles) has limited livestock use of the area. Cattle have grazed the area for the past 30 or more years, but historically it has had only light to moderate use. Before then, there was heavy pressure from sheep and deer. Cattle now use the area in late spring for about 2 weeks on their way to summer range as part of the Browns Hole allotment. Pellet group data from the site in 1999 estimate 24 cow days use/acre (59 cdu/ha). About half of the cattle pats encountered were recent while the other half were from last season. Use by wildlife is moderate to heavy. Deer use averaged 27 deer days use/acre (68 dd/ha) from 1985 to 1991 on a nearby pellet group transect. Use by deer at the site is currently estimated at 78 deer days use/acre (192 ddu/ha). In the past, elk use has been light most years with three elk days use/hectare being reported in the winter of 1983-84 (Jense et al. 1985). Use by elk is increasing with pellet group transect data in 1999 estimating 38 elk days use/acre (93 edu/ha).

The soil has a sandy clay loam texture with a slightly alkaline pH (7.6). It is moderately shallow with an estimated effective rooting depth under 12 inches. A gravelly layer is present approximately 12 inches below the surface. Organic matter is higher than expected at this site, currently 3.5%. Phosphorus is low at 5.7 ppm where 10 ppm has been shown to be minimal for normal plant growth and development. Bare ground is currently ('99) at 30% cover, which is not excessive for a characteristically dry area that was chained.

The chaining effectively removed the dominant overstory of mature juniper-pinyon and reduced it to widely scattered young trees. Density for juniper is currently ('99) estimated at 72 trees/acre, and pinyon at 23 trees/acre. Browse is more abundant on this site compared to the chaining at Triangle Mountain (#25A-1), but preferred species are still relatively low in density. Black sagebrush is present, which is expected with the shallow soils. The population has remained fairly stable over all sampling years, currently estimated at 860 plants/acre, a 30% increase from 1991. Recruitment from young plants is high at 21%, and percent decadency is low at 5%. Use is light to moderate at the present time. A few mountain big sagebrush plants were sampled in 1999 due to the much larger (more than three times larger) sample now used. This species was included in the seed mix, however this is a marginally dry site for this species. Plants are low in stature and moderately hedged. Stickyleaf low rabbitbrush is the most numerous shrub on the site, currently estimated at 2,200 plants/acre. The current density represents nearly a 4-fold increase since 1991. This species is mostly mature, but has high recruitment at 25% in 1999. This could indicate a possible continued expansion of its population. Use is moderate on this species with 20% displaying moderate use, and an additional 16% showing heavy use. Sixteen percent were classified with poor vigor. It appears that dwarf rabbitbrush (*Chrysothamnus depressus*) was misidentified in 1985 and 1991. All of the rabbitbrush encountered in 1999 were stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*).

Grass composition is dominated by a variety of seeded and native perennial species. Indian ricegrass and bottlebrush squirreltail were the most abundant native perennial grasses. Seeded species such as crested and intermediate wheatgrass, smooth brome, Russian wildrye, and sheep fescue are present, although less abundant than the natives. Most of the perennial species displayed moderate to heavy use in 1999. Cheatgrass, an annual, is now the most common herbaceous species, occurring in 54% of the quadrats and having a sum of nested frequency of 133. It mainly occurs in scattered patches throughout the site.

Forb density and diversity is low. Increasers, annuals or biennials such as Russian thistle and prickly lettuce were most common immediately after the chaining. Since then however, forbs have nearly disappeared from the understory altogether. In 1999, only 4 species were sampled, with pale alyssum, an annual, being the most abundant in cover and frequency. The seeded forbs, alfalfa, small burnet, and yellow sweet clover were not encountered in 1999.

1985 APPARENT TREND ASSESSMENT

Trend will depend upon the success of the Seeding. Any assessment this soon would be tentative at best. However, it would appear that trend of both soils and vegetative composition can only be up.

1991 TREND ASSESSMENT

This site is dryer than the Triangle Mountain site (25A-1) and is evidenced by the slow recovery for most species on this chained site. Most of the seeded grasses are increasing in sum of nested and quadrat frequency values, but it has been slow because of the prolonged drought. The major three native grasses are also increasing in numbers and distribution (bluebunch wheatgrass, Indian ricegrass, and bottlebrush squirreltail). The alfalfa that was seeded has almost disappeared now. The black sagebrush is also showing the effects of the extended drought. It's population has decreased by 40% and percent decadency has increased to 33%. These are not good signs, but with a change in the weather patterns, we would expect the grasses and black sagebrush to recover. Because of these decreases in vegetation, percent bare ground has increased dramatically from 20% to 38%. However, litter cover has remained similar and nested frequency of grasses and forbs have increased.

TREND ASSESSMENT

soil - down slightly, because of the increase in bare ground

browse - down

herbaceous understory - up slightly

1999 TREND ASSESSMENT

Trend for soil is stable, but still in poor condition. Herbaceous vegetation and litter are low for a chained and seeded site due to the shallow soils and extended drought during the mid-90's. Bare ground cover is moderately high at 30% cover, but the gentle slope holds erosion to minimal levels. Trend for browse is stable overall. Black sagebrush, the most numerous preferred species, shows a 30% increase in density, and has high recruitment from young plants at 21%. Percent decadency is low at 5%, with use light to moderate. On a negative note, stickyleaf low rabbitbrush is the most numerous species on the site, increasing by 73% since 1991. It appears that this species will continue to increase with the young age class making up 25% of the population. The herbaceous understory shows a stable trend for grasses, while forbs continue to decline. Perennial forbs are nearly non-existent and annual grasses and forbs are increasing. Perennial forbs, primarily the seeded species, have disappeared from the understory altogether. Perennial grasses have remained stable in their sum of nested frequency overall, but show moderate to heavy use.

TREND ASSESSMENT

soil - stable, but in poor condition

browse - stable overall, but poor composition

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 2

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '09
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	a14	b57	b41	5	29	19	.75
G	Agropyron intermedium	a9	b88	a42	6	36	17	.89
G	Agropyron smithii	b4	a-	a-	3	-	-	-
G	Agropyron spicatum	a5	b45	a6	2	16	3	.09
G	Bromus inermis	a4	a6	b73	2	5	29	1.20
G	Bromus tectorum (a)	-	-	133	-	-	54	1.31
G	Elymus junceus	a-	b9	b12	-	3	6	.11
G	Festuca ovina	a-	b10	b27	-	6	11	.37
G	Oryzopsis hymenoides	68	77	95	34	36	38	2.92
G	Poa fendleriana	2	-	6	1	-	2	.06
G	Poa secunda	a-	a-	b5	-	-	3	.06
G	Sitanion hystrix	a49	b89	ab80	28	41	39	1.58
Total for Annual Grasses		0	0	133	0	0	54	1.31
Total for Perennial Grasses		155	381	387	81	172	167	8.06
Total for Grasses		155	381	520	81	172	221	9.38
F	Alyssum alyssoides (a)	-	-	189	-	-	69	.62
F	Antennaria rosea	b6	a-	a-	4	-	-	-
F	Astragalus spp.	a4	b30	a14	3	16	7	.11
F	Castilleja spp.	-	2	-	-	1	-	-
F	Chaenactis douglasii	a-	b12	a-	-	6	-	-
F	Cryptantha spp.	-	-	1	-	-	1	.00
F	Erigeron engelmannii	-	2	-	-	1	-	-
F	Eriogonum ovalifolium	a-	b14	a-	-	6	-	-
F	Lactuca serriola	a-	b7	a-	-	5	-	-
F	Machaeranthera canescens	-	4	-	-	2	-	-
F	Medicago sativa	b14	a1	a-	8	1	-	-
F	Phlox longifolia	a-	b12	a-	-	6	-	-
F	Salsola iberica (a)	a1	b19	a-	1	7	-	-
F	Sanguisorba minor	b29	a1	a-	14	1	-	-
F	Senecio multilobatus	3	-	-	1	-	-	-
F	Streptanthus cordatus	2	2	-	1	2	-	-
F	Taraxacum officinale	-	1	-	-	1	-	-
F	Tragopogon dubius	a-	ab3	b10	-	1	4	.02
F	Unknown forb-perennial	-	2	-	-	1	-	-
Total for Annual Forbs		1	19	189	1	7	69	0.62
Total for Perennial Forbs		58	93	25	31	50	12	0.13
Total for Forbs		59	112	214	32	57	81	0.75

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

BROWSE TRENDS --
Herd unit 25A, Study no: 2

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia nova	26	1.70
B	Artemisia tridentata vaseyana	1	-
B	Chrysothamnus depressus	0	-
B	Chrysothamnus viscidiflorus viscidiflorus	42	2.12
B	Juniperus osteosperma	8	1.83
B	Pinus edulis	1	.03
Total for Browse		78	5.70

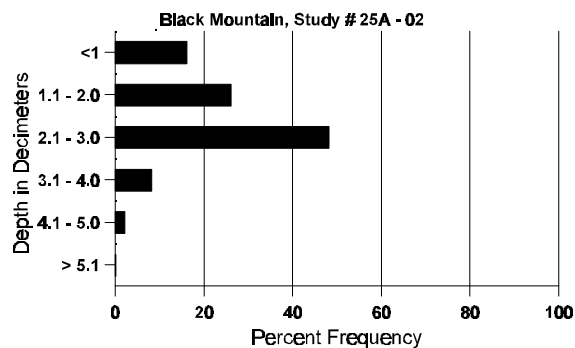
BASIC COVER --
Herd unit 25A, Study no: 2

Cover Type	Nested Frequency '99	Average Cover %		
		'85	'91	'99
Vegetation	319	1.50	3.00	18.36
Rock	150	1.75	3.25	4.71
Pavement	311	30.25	14.00	11.60
Litter	312	46.50	42.00	21.79
Cryptogams	7	0	0	.05
Bare Ground	311	20.00	37.75	29.98

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 02, Study Name: Black Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.7	56.0 (11.0)	7.6	50.0	25.1	24.9	3.5	5.7	316.8	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 2

Type	Quadrat Frequency '89	Pellet Transect Days Use/Acre (ha) '89
Rabbit	18	n/a
Elk	15	38(94)
Deer	24	78(193)
Cattle	16	24(59)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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				
Artemisia nova																		
S	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Y	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	2	7	-	-	-	-	-	-	-	9	-	-	-	180			9
M	'85	13	-	-	-	-	-	-	-	-	13	-	-	-	866	6	7	13
	'91	6	-	-	-	-	-	-	-	-	6	-	-	-	400	8	11	6
	'99	23	8	-	1	-	-	-	-	-	32	-	-	-	640	11	18	32
D	'85	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	'91	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	'99	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2
X	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		07%			00%			00%			-40%							
'91		00%			00%			00%			+30%							
'99		40%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	999	Dec:	13%			
												'91	600		33%			
												'99	860		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>																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	16	0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
<i>Chrysothamnus depressus</i>																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400	7	7	6
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200	13	14	3
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-50%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	533	Dec:	25%			
												'91	266		0%			
												'99	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	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	-	-	-	66			1
	99	-	2	-	-	-	-	-	-	-	-	-	-	40			2
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	4	-	-	-	-	-	-	-	-	-	-	-	266			4
	99	15	12	-	-	-	-	-	-	-	-	-	-	540			27
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	5	-	-	-	-	-	-	-	-	-	-	-	333	15	19	5
	99	52	10	18	-	-	-	-	-	-	-	-	-	1600	14	22	80
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	-	-	-	-	60			3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%			+73%						
'99		20%			16%			16%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%		
												'91	599		0%		
												'99	2200		3%		
Juniperus osteosperma																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	-	-	-	20			1
Y	85	1	-	-	-	-	-	-	-	-	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	-	-	-	66			1
	99	6	-	-	-	-	-	-	-	-	-	-	-	120			6
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	2	-	-	-	-	40	-	-	2
D	85	1	-	-	-	-	-	-	-	-	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	160			8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			-50%						
'91		00%			00%			00%			+59%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	132	Dec:	50%		
												'91	66		0%		
												'99	160		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								
Pinus edulis													
Y	85	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	20		1	
X	85	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'85		00%			00%			00%					
'91		00%			00%			00%					
'99		00%			00%			100%					
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-
										'91	0		-
										'99	20		-

Trend Study 25A-3-99

Study site name: Sage Flat .

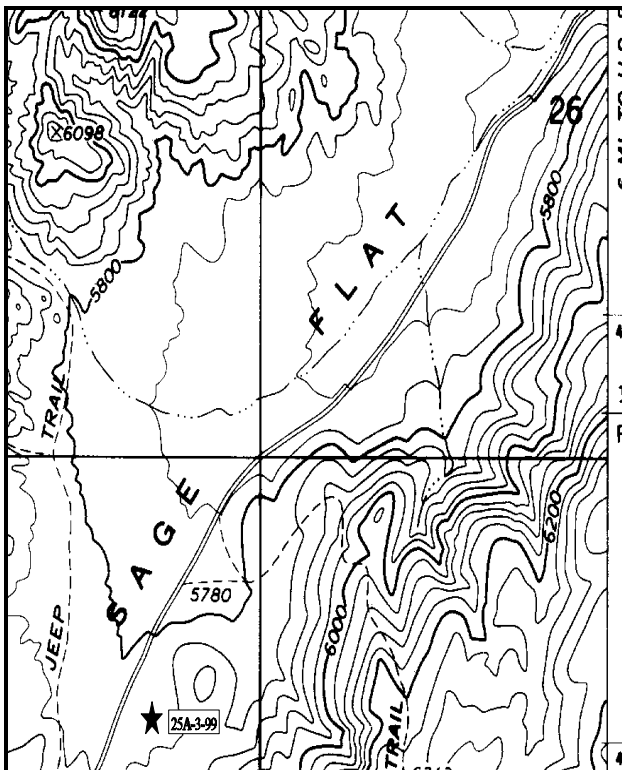
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

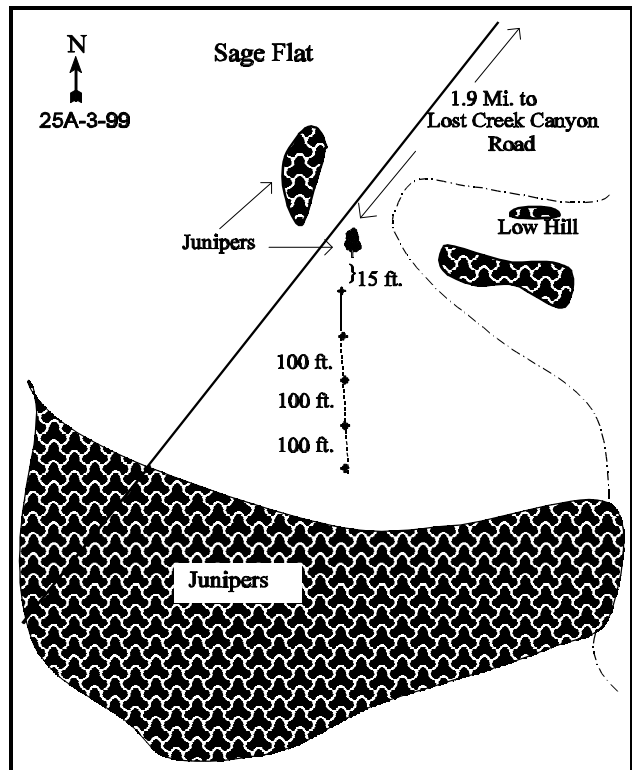
LOCATION DESCRIPTION

Beginning at the point where the Lost Creek Road passes under I-70 east of Aurora, proceed southeast up the Lost Creek Road 1.2 miles to a truck crossing. Continue past the truck crossing 1.65 miles to a bridge, then 1.05 miles beyond the bridge to a road turning off to the right. Turn right here onto the Sage Flat Road. Drive along this road for 1.9 miles to a slight bend with 5 junipers on the right side. Stop the vehicle 20-30 yards beyond these trees. On the left side of the road is a lone juniper. The baseline begins 15 feet south of this tree.



Map Name: Sigurd, Utah

Township 22S , Range 1W , Section 34



Diagrammatic Sketch

UTM 4300134.972 N, 422719.643 E

DISCUSSION

Trend Study No. 25A-3 (43-3)

The Sage Flat trend study is located in a sagebrush flat surrounded by sagebrush and juniper covered hills. The flat is dominated by Wyoming big sagebrush with a thick understory of cheatgrass at an elevation of 5,800 feet. The area is used by wintering deer, especially in severe winters when there is heavy snow at higher elevations. The BLM allows sheep grazing in the winter, with both cattle and sheep use it in the spring. However, the area is not currently used by sheep and there is little use by cows on the site. The road through the flat is well-used, and possible adverse impacts could come from off-road vehicle use. Pellet group transect data from the site in 1999 indicate heavy use by deer with an estimated 125 deer days use/acre (308 ddu/ha). Use by elk and livestock is currently light.

Soils are a fine-textured, loam to sandy loam with a slightly alkaline pH (7.7). Soil depth is moderately deep with an estimated effective rooting depth of just over 15 inches. The soil is not overly rocky on the surface or within the profile, although a gravelly layer is present at about 16 inches. Organic matter is relatively low at 1.3%, with phosphorus (5.8 ppm) also being lower than the 10 ppm. Where 10 ppm has been shown to be what is minimally necessary for normal plant growth and development. Soil movement is noticeable in a few active gullies on the site, especially along the bottom of the flat. Slight pedestaling is occurring around base of big sagebrush. However, the gentle slope of the area limits erosion to minimal levels. Bare ground slightly decreased between 1991 and 1999, due to the increase in cheatgrass cover.

The vegetation of the site is comprised primarily of two species: Wyoming big sagebrush in the overstory, and cheatgrass in the understory. Each species provides 46% of the total vegetative cover, together they provide 92% of the total vegetative cover. Wyoming big sagebrush is the only browse species sampled directly on the site. The density of this species between sampling periods has varied somewhat. The baseline was lengthened to 400 feet following the 1991 reading, and this would account for some of the differences. Density was estimated at 2,399 plants/acre in 1985, 5,199 plants/acre in 1991, and 3,500 plants/acre in 1999. The higher density in 1991 can also be attributed in part to the very large number of young plants estimated in the population that year (2,866 plant/acre). The population appears to be stable at the present time with 58% mature, 31% decadent, and 11% young. The level of decadency has remained similar since the site was established in 1985. Most of the population displays good vigor, and use is light to moderate on the majority of the population even with seemingly high use from deer estimated from pellet group transect data. Leader growth on several plants was measured at 8 inches in 1999. A greater diversity of browse species is found in the flat, with saltbush (*Atriplex spp.*), greasewood (*Sarcobatus vermiculatus*), and winterfat (*Ceratoides lanata*) occurring along the washes. Junipers are abundant and vigorous on the area surrounding the transect, but are not spreading into the flat.

The herbaceous vegetation is completely dominated by annual cheatgrass. This species presents a major fire hazard to the big sagebrush population which is not tolerant of fire. If this site were to burn in the future, the area's importance as deer winter range would most likely be greatly reduced and maybe lost altogether. Cheatgrass currently provides 99% of the grass cover, 86% of the herbaceous cover, and 46% of the total vegetation cover at the site. It occurs in 98% of the sampling quadrats at the present time, and is prohibitive to the emergence and establishment of shrub seedlings. Perennial grasses are represented by only 2 species, bottlebrush squirreltail and sand dropseed. Both species were sampled in a single quadrat in 1999. Forbs are insignificant, and made up totally of annual species.

1985 APPARENT TREND ASSESSMENT

Soil and vegetative trends appear to be downward. Continuous heavy spring grazing pressure from livestock is most responsible for the poor vegetative composition (lack of cool season herbaceous species). Although it provides important early green forage, the shallow rooted cheatgrass provides little erosion control and is a

fire hazard. In order to replace this plant with more desirable perennial grasses and forbs and reverse present trends, this site needs a rest from spring livestock grazing and may require seeding.

1991 TREND ASSESSMENT

The key browse species, Wyoming sagebrush, has increased in density by 54% without including the estimated 8,000 seedlings per acre, however 72% of the population is currently made up of young plants, which can be lost quickly with continued drought and competition with cheatgrass. It appears that the cheatgrass has increased from last time, but there is no quantifiable data for they disregarded the inventory of annual species before 1992. Very few perennial forbs or grasses were encountered on the site. Site understory composition was considered poor for it is mostly annuals.

TREND ASSESSMENT

soil - stable

browse - up, however most of the population (72%) was made up of young plants

herbaceous understory - downward, composed almost entirely of annuals, mostly cheatgrass

1999 TREND ASSESSMENT

Soil trend is stable, but in very poor condition because it depends almost entirely on cheatgrass for protective herbaceous cover. Perennial vegetation has almost entirely disappeared from the site. Herbaceous and litter cover are provided by cheatgrass which is not as good as perennial cover at holding soils in place. Soil movement is noticeable with pedestaling around the base of sagebrush and some gullies occurring on site. Browse trend is stable. Although deer use is moderately high, Wyoming big sagebrush shows a relatively stable density of mature (actually increased 50%) and decadent plants, good vigor, and mostly light to moderate use. Biotic potential is low, but recruitment from young plants is fairly good at 11%. Percent decadency has remained at similar levels between readings, currently it is at 31%. Average height and crown measurements increased between 1991 and 1999. The herbaceous understory trend is down, and in seriously poor condition. Perennial species are almost non-existent, with cheatgrass dominating the herbaceous composition. This composition creates a major fire hazard for this winter range site, where the sagebrush population could be lost if it were to burn in the future.

TREND ASSESSMENT

soil - stable, but very poor condition

browse - stable

herbaceous understory - down and in very poor condition

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 3

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Bromus tectorum (a)	-	-	349	-	-	98	15.05
G	Poa secunda	3	-	-	2	-	-	-
G	Sitanion hystrix	_b 38	_b 19	_a 3	18	10	1	.03
G	Sporobolus cryptandrus	-	-	1	-	-	1	.18
Total for Annual Grasses		0	0	349	0	0	98	15.05
Total for Perennial Grasses		41	19	4	20	10	2	0.21
Total for Grasses		41	19	353	20	10	100	15.26
F	Alyssum alyssoides (a)	-	-	23	-	-	9	.17
F	Ranunculus testiculatus (a)	-	-	143	-	-	49	.88
F	Sisymbrium altissimum (a)	-	-	18	-	-	9	1.20
F	Tragopogon dubius	-	1	-	-	1	-	-
F	Unknown forb-perennial	-	1	-	-	1	-	-
Total for Annual Forbs		0	0	184	0	0	67	2.25
Total for Perennial Forbs		0	2	0	0	2	0	0
Total for Forbs		0	2	184	0	2	67	2.25

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

BROWSE TRENDS --
Herd unit 25A, Study no: 3

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia tridentata wyomingensis	84	14.90
B	Opuntia spp.	1	-
Total for Browse		85	14.90

BASIC COVER --
Herd unit 25A, Study no: 3

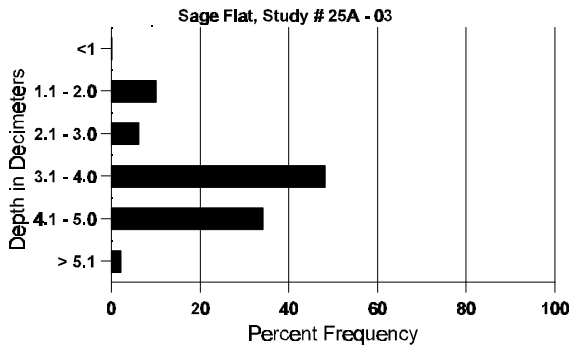
Cover Type	Nested Frequency '99	Average Cover %		
		'85	'91	'99
Vegetation	371	8.50	1.25	30.59
Rock	90	1.50	1.75	1.32
Pavement	233	7.75	19.25	10.25
Litter	343	54.25	55.25	37.05
Cryptogams	10	0	0	.09
Bare Ground	239	28.00	22.50	20.09

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 03, Study Name: Sage Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.2	60.4 (16.8)	7.7	52.0	28.7	19.3	1.3	5.8	147.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 3

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	35	n/a
Elk	0	4(10)
Deer	53	125(309)
Cattle	2	6(15)

BROWSE CHARACTERISTICS --
Herd unit 25A, Study no: 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				
Artemisia tridentata wyomingensis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	102	-	-	-	-	-	18	-	-	120	-	-	-	8000			120
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	34	9	-	-	-	-	-	-	-	42	1	-	-	2866			43
	99	19	1	-	-	-	-	-	-	-	20	-	-	-	400			20
M	85	22	-	-	-	-	-	-	-	-	22	-	-	-	1466	24	26	22
	91	6	6	-	3	-	-	-	-	-	15	-	-	-	1000	21	19	15
	99	74	24	3	-	-	-	-	-	-	100	1	-	-	2020	26	34	101
D	85	11	1	-	-	-	-	-	-	-	10	-	1	1	800			12
	91	9	3	-	7	1	-	-	-	-	15	1	-	4	1333			20
	99	30	21	3	-	-	-	-	-	-	52	-	-	2	1080			54
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	540			27
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		03%			00%			06%			+54%							
'91		24%			00%			05%			-33%							
'99		26%			03%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	2399	Dec:	33%			
												'91	5199		26%			
												'99	3500		31%			
Opuntia spp.																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	6	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	13	1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+ 0%							
'91		00%			00%			00%			-70%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	66		-			
												'99	20		-			

Trend Study 25A-4-99

Study site name: Durfee Homestead .

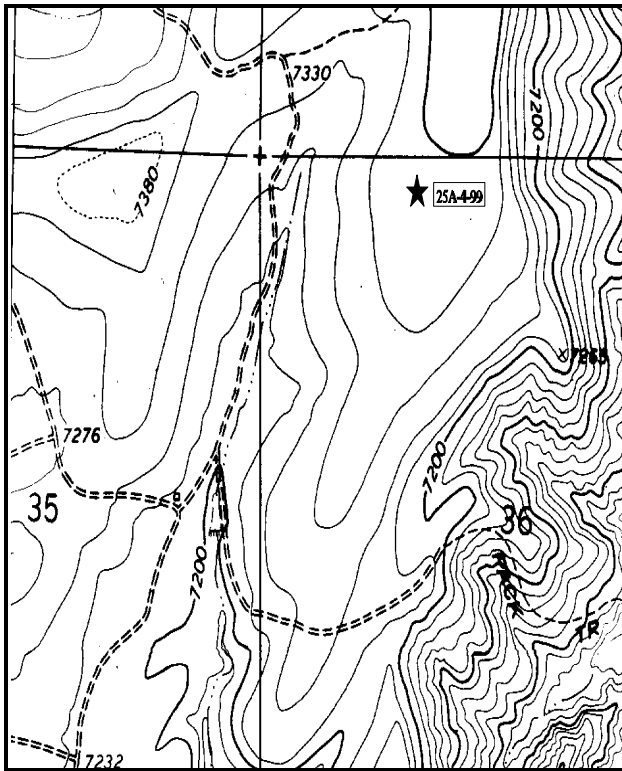
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

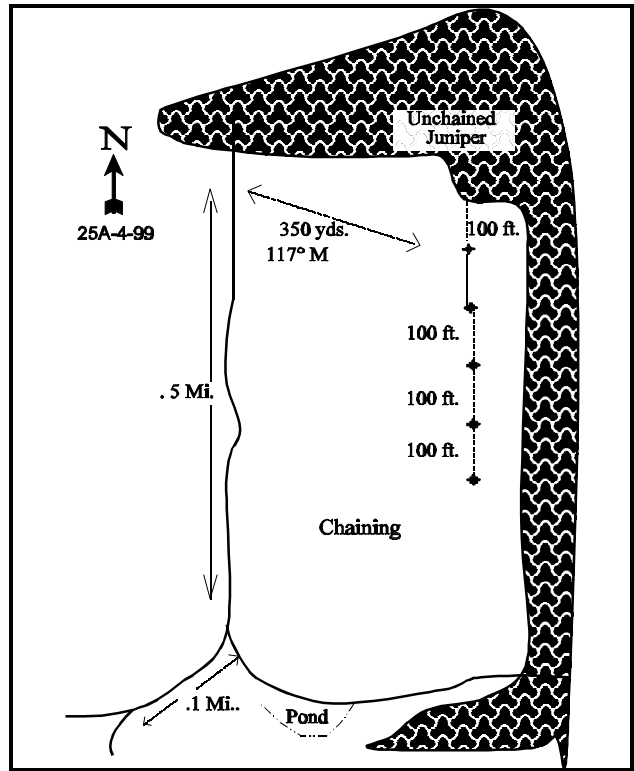
LOCATION DESCRIPTION

From Sigurd, drive east on U-24 to mile marker 21. Turn left (north) on the Sand Ledge Road and drive northeast for 1.6 miles. Turn left at the intersection and proceed north 3.1 miles to an intersection with a trough and pond. Continue 0.1 miles to a road that goes up the draw bottom. Drive up this road for 0.5 miles. Stop at the witness post (1/2" red rebar 2' tall on east side of road) and walk out 350 yards at a bearing of 132 degrees. The baseline starts out in the chaining about 100 feet from the edge of the PJ. The 0-foot baseline stake has a red browse tag #7194 attached.



Map Name: Rex Reservoir, Utah

Township 23S , Range 1W , Section 36



Diagrammatic Sketch

UTM 4290868.154 N, 425072.891 E

DISCUSSION

Trend Study No. 25A-4 (43-4)

The Durfee Homestead trend study lies on BLM administered land, in an area that was chained and seeded in 1983. The transect is on a west aspect with a 10% slope at an elevation of 7,300 feet. Scattered patches of pinyon-juniper were left as protective cover. The transect is located within 100 feet of a dense pinyon-juniper border of unchained, mature trees. Evidence of deer use in the form of pellet groups, hedging on browse species, and antler drops has been noted in the past. The area is also used in the late spring by cattle as part of the Sand Ledge allotment which is administered by the BLM. In 1999, pellet group transect data from the site indicates current use by wildlife and livestock is moderate. Deer use is estimated at 15 days use/acre (38 ddu/ha), elk use at 33 days use/acre (82 edu/ha), and livestock at 16 cow days use/acre (40 cdu/ha).

The soil is a loam to clay loam in texture, and has a slightly alkaline pH (7.5). Organic matter is moderately high at 4.3%. Rock is prevalent on the surface and throughout the profile, resulting in an estimated effective rooting depth of just under 12 inches. Currently ('99) rock and pavement together provide nearly 40% of the surface cover, with bare ground relatively low at about 20%. Litter and slash from the chaining made up 72% of the ground cover in 1985, dropping to only 21% by 1991. It appears that litter was greatly overestimated in 1985. Litter was estimated at just over 18% in 1999 with the new methods, which is close to the 1991 estimate. Erosion is minimal due to the heavily armored surface from pavement and rock.

The chaining was very effective in removing the overstory of juniper and pinyon. However, preferred browse species are almost non-existent following the chaining and seeding. The key browse species are Wyoming big sagebrush and antelope bitterbrush. Together, these species provide less than 5% of the browse cover. Wyoming big sagebrush is currently estimated at only 20 plants/acre, the population being greatly reduced following a fire previous to the 1991 reading. Bitterbrush is currently estimated at 40 plants/acre, down from an estimated 532 plants/acre when the site was first read in 1985. The sagebrush shows light use, while bitterbrush displays heavy use. Both species show good vigor, with no decadent plants being sampled in 1999. The sagebrush population shows the deleterious effects from the fire as well as the prolonged drought throughout much of the 1980's and 1990's. Slenderbush eriogonum was the most abundant browse plant and was lightly utilized in 1985, but this species currently numbers only 60 plants/acre, also with numbers being reduced by fire. These plants are small and do not produce much forage, but currently display moderate use.

The increaser, stickyleaf low rabbitbrush, currently dominates the browse component. This species has increased during each sampling period, especially since the fire, and is currently estimated at 3,660 plant/acre. The population which was all young plants in 1991, now is mostly mature and appears to have a stable population with low recruitment (5%) and low biotic potential (0%). The average height and crown measurements for low rabbitbrush have more than doubled since 1985. Broom snakeweed is now the second most abundant browse, currently estimated at 1,700 plants/acre. Small clumps of Gambel oak clones occur on the site.

Herbaceous vegetation is diverse, moderately dense, and composed mainly of native species. Several seeded grasses are present, but occur infrequently. These species include: smooth brome, crested wheatgrass, and intermediate wheatgrass. Native grasses are the most abundant with bluebunch wheatgrass, Sandberg bluegrass, mutton bluegrass, and bottlebrush squirreltail all present. Cheatgrass is present at the site and currently occurs in 44% of the quadrats. Forbs are sparse, but fairly diverse and include a few valuable species such as sulfur and redroot eriogonum, tapertip hawksbeard, and hoary aster. The area has been rested from livestock grazing since the chaining.

1985 APPARENT TREND ASSESSMENT

Current soil condition is fairly good and appears stable. Vegetative trend appears upward as the browse recovers from the chaining.

1991 TREND ASSESSMENT

A fire occurred on the area since the 1985 survey. The data showed a loss of almost all the bitterbrush, slenderbush eriogonum, and dwarf rabbitbrush, while low rabbitbrush increased by 63%, and Wyoming big sagebrush decreased by almost 95%. These spectacular changes can all be attributed to the effect of a fire on two species that are especially not tolerant of fire. Almost all grasses have decreased values for both sum of nested and quadrat frequency. Most forbs did have increased sum of nested and quadrat frequency values, but the ones with the highest quadrat frequencies are increasers (fire related), e.g. pale agoseris, thistle, prickly lettuce, and hoary aster. Percent rock cover increased by 68% and percent pavement increased by 56%. Litter cover decreased by 71%. Percent bare ground increased from 9% to 26%. All these findings indicate a downward trend. This trend was surely aggravated by the extended drought, slope, and west aspect.

TREND ASSESSMENT

soil - down

browse - down

herbaceous understory - down

1999 TREND ASSESSMENT

Trend for soil is considered stable to improving. Rock and pavement provide nearly 40% of the surface cover at the present time which armors the surface from heavy erosion. Bare ground and litter cover both decreased in 1999, with vegetative cover increasing. Trend for browse is down. The preferred species, Wyoming big sagebrush and bitterbrush, provide less than 5% of the browse cover, and have not recovered from the fire prior to the 1991 reading. These species have very low densities and recruitment and biotic potential are currently zero. Stickyleaf low rabbitbrush is the dominant species in the chaining. It continues to increase in density and stature. Average height crown measurements have more than doubled since 1985. Broom snakeweed, another increaser, is the second most abundant browse species. Trend for the herbaceous understory is stable. Perennial grasses are the dominate group in the understory providing 35% of the vegetation cover. Sum of nested frequency for perennial grasses and forbs combined increased in 1999.

TREND ASSESSMENT

soil - stable to improving

browse - down

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 4

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	<i>Agropyron cristatum</i>	_b 22	_b 20	_a 3	9	9	1	.03
G	<i>Agropyron intermedium</i>	_b 46	_a 10	_a 20	23	7	9	.43
G	<i>Agropyron spicatum</i>	_a 68	_a 48	_b 124	28	21	46	3.56
G	<i>Bromus inermis</i>	_a 18	_a 12	_b 80	8	6	28	2.65
G	<i>Bromus tectorum</i> (a)	-	-	110	-	-	44	.90
G	<i>Carex</i> spp.	_b 12	_a -	_{ab} 2	5	-	2	.03
G	<i>Oryzopsis hymenoides</i>	-	-	-	-	-	-	.00
G	<i>Poa fendleriana</i>	58	46	33	28	18	16	.28
G	<i>Poa secunda</i>	_a 9	_a 20	_b 79	3	9	35	1.32
G	<i>Sitanion hystrix</i>	_b 76	_{ab} 42	_a 25	33	22	11	.20
Total for Annual Grasses		0	0	110	0	0	44	0.90
Total for Perennial Grasses		309	198	366	137	92	148	8.53
Total for Grasses		309	198	476	137	92	192	9.44
F	<i>Agoseris glauca</i>	_a 7	_b 29	_{ab} 18	4	15	9	.17
F	<i>Allium</i> spp.	_b 4	_{ab} 5	_a -	3	2	-	-
F	<i>Arabis</i> spp.	-	5	3	-	2	2	.01
F	<i>Astragalus beckwithii</i>	3	8	-	1	4	-	-
F	<i>Astragalus</i> spp.	3	2	3	2	1	1	.00
F	<i>Chaenactis douglasii</i>	4	1	11	3	1	6	.03
F	<i>Cirsium</i> spp.	-	21	40	-	12	18	1.23
F	<i>Collomia linearis</i> (a)	-	-	1	-	-	1	.00
F	<i>Comandra pallida</i>	_{ab} 3	_b 13	_a 1	1	6	1	.00
F	<i>Collinsia parviflora</i> (a)	-	-	9	-	-	3	.01
F	<i>Crepis acuminata</i>	2	4	-	1	2	-	-
F	<i>Cymopterus longipes</i>	3	2	-	2	1	-	-
F	<i>Draba</i> spp. (a)	-	-	6	-	-	3	.04
F	<i>Epilobium brachycarpum</i> (a)	-	-	39	-	-	19	.13
F	<i>Erodium cicutarium</i> (a)	-	3	-	-	1	-	-
F	<i>Erigeron eatonii</i>	-	2	6	-	1	3	.04
F	<i>Erigeron pumilus</i>	_a 8	_{ab} 9	_b 21	4	5	12	.42
F	<i>Eriogonum racemosum</i>	9	15	6	5	8	3	.04
F	<i>Eriogonum umbellatum</i>	_b 19	_a 1	_a 4	10	1	2	.01
F	<i>Gayophytum ramosissimum</i> (a)	-	-	21	-	-	10	.17
F	<i>Lactuca serriola</i>	_a -	_b 64	_a -	-	32	-	-
F	<i>Machaeranthera canescens</i>	_b 50	_b 46	_a 16	20	24	9	.12
F	<i>Microsteris gracilis</i> (a)	-	-	24	-	-	12	.06
F	<i>Petradoria pumila</i>	_a -	_a -	_b 6	-	-	4	.60
F	<i>Phlox longifolia</i>	_a -	_b 35	_a 3	-	16	1	.00

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Polygonum douglasii (a)	-	-	7	-	-	4	.02
F	Ranunculus testiculatus (a)	-	-	8	-	-	3	.01
F	Sphaeralcea coccinea	-	-	3	-	-	2	.03
F	Tragopogon dubius	_a 4	_a 18	_b 61	3	11	29	.67
F	Trifolium spp.	_a 4	_b 21	_a -	2	9	-	-
F	Unknown forb-perennial	-	3	-	-	1	-	-
Total for Annual Forbs		0	3	115	0	1	55	0.46
Total for Perennial Forbs		123	304	202	61	154	102	3.40
Total for Forbs		123	307	317	61	155	157	3.87

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

BROWSE TRENDS --

Herd unit 25A, Study no: 4

Type	Species	Strip Frequency 09	Average Cover % 09
B	Amelanchier utahensis	0	.00
B	Artemisia tridentata wyomingensis	1	.15
B	Atriplex canescens	0	-
B	Chrysothamnus depressus	3	.03
B	Chrysothamnus nauseosus	3	.18
B	Chrysothamnus viscidiflorus viscidiflorus	55	6.44
B	Echinocereus triglochidatus	0	-
B	Eriogonum microthecum	2	-
B	Gutierrezia sarothrae	33	1.37
B	Pinus edulis	0	-
B	Purshia tridentata	2	.30
B	Quercus gambelii	1	2.03
B	Sambucus cerulea	1	.38
B	Tetradymia canescens	4	.03
Total for Browse		105	10.92

CANOPY COVER --

Herd unit 25A, Study no: 4

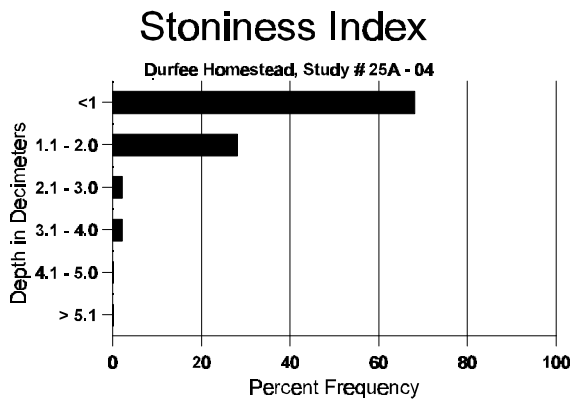
Species	Percent Cover 09
Quercus gambelii	1

BASIC COVER --
Herd unit 25A, Study no: 4

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	313	2.75	6.00	23.77
Rock	315	12.25	38.00	22.90
Pavement	297	3.75	9.00	15.65
Litter	345	72.00	21.00	18.27
Cryptogams	6	.25	0	.01
Bare Ground	297	9.00	26.00	19.98

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 04, Study Name: Durfee Homestead

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.9	58.8 (12.8)	7.5	34.0	38.7	27.3	4.3	38.1	214.4	0.7



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 4

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	8	n/a
Elk	9	33(82)
Deer	7	15(37)
Cattle	9	16(40)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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					
Amelanchier utahensis										
S	85	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	0	-	0
	99	-	-	1	-	-	-	20	1	1
M	85	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	0	20 28	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'85		00%		00%		00%				
'91		00%		00%		00%				
'99		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)							'85	0	Dec:	-
							'91	0		-
							'99	0		-
Artemisia tridentata wyomingensis										
S	85	2	-	-	-	-	-	133	-	2
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	0	-	0
Y	85	1	-	-	-	-	-	66	-	1
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	0	-	0
M	85	2	2	-	-	-	-	266	13 14	4
	91	1	-	-	-	-	-	66	11 7	1
	99	1	-	-	-	-	-	20	35 53	1
D	85	6	6	1	-	-	-	866	-	13
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	0	-	0
X	85	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>		
'85		44%		06%		28%		-94%		
'91		00%		00%		00%		-70%		
'99		00%		00%		00%				
Total Plants/Acre (excluding Dead & Seedlings)							'85	1198	Dec:	72%
							'91	66		0%
							'99	20		0%

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>Atriplex canescens</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	27	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
<i>Chrysothamnus depressus</i>																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	10	-	-	-	-	-	-	-	-	10	-	-	-	666	5	8	10
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	5	2	-	-	-	-	-	-	-	7	-	-	-	140	5	7	7
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		29%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	932	Dec:	14%			
												'91	0		0%			
												'99	140		0%			
<i>Chrysothamnus nauseosus</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	22	32	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	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>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	29	2	3	-	-	-	1	-	-	35	-	-	-	2333		35	
	99	10	-	-	-	-	-	-	-	-	9	-	1	-	200		10	
M	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600	6	7	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-		
	99	142	-	-	-	-	-	-	-	-	142	-	-	-	2840	15	22	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	25	2	-	4	-	-	-	-	-	18	-	-	13	620		31	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+63%							
'91		06%			09%			00%			+36%							
'99		01%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	866	Dec:	0%				
											'91	2333		0%				
											'99	3660		17%				
<i>Echinocereus triglochidatus</i>																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	66	Dec:	-				
											'91	0		-				
											'99	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>Eriogonum microthecum</i>																		
Y	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	13	2	1	-	-	-	-	-	-	14	2	-	-	1066	7	7	16
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	3	-	-	-	-	-	-	-	3	-	-	-	60	3	13	3
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		08%			04%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	1732	Dec:	4%			
												'91	0		0%			
												'99	60		0%			
<i>Gutierrezia sarothrae</i>																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	4	-	-	-	-	1	-	-	-	5	-	-	-	100		5	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	80	-	-	-	-	-	-	-	-	80	-	-	-	1600	8	11	80
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			01%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	1700		-			

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					
Pinus edulis																		
Y	85	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
D	85	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			100%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	132	Dec:	50%			
												'91	0		0%			
												'99	0		0%			
Purshia tridentata																		
Y	85	1	1	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	85	2	2	1	-	-	-	-	-	-	-	5	-	-	-	333	15 25	5
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	-	1	-	-	1	-	-	-	-	2	-	-	-	40	20 48	2
D	85	-	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		50%			13%			00%										
'91		00%			00%			00%										
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	532	Dec:	12%			
												'91	0		0%			
												'99	40		0%			
Quercus gambelii																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	13	-	-	-	-	-	-	-	-	-	13	-	-	-	260	69 69	13
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	260		-			

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				
Sambucus cerulea																		
M	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	43	52	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Tetradymia canescens																		
M	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	4	1	-	-	-	-	-	-	-	5	-	-	-	100	6	14	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		20%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	100		-			

Trend Study 25A-5-99

Study site name: Praetor Slope .

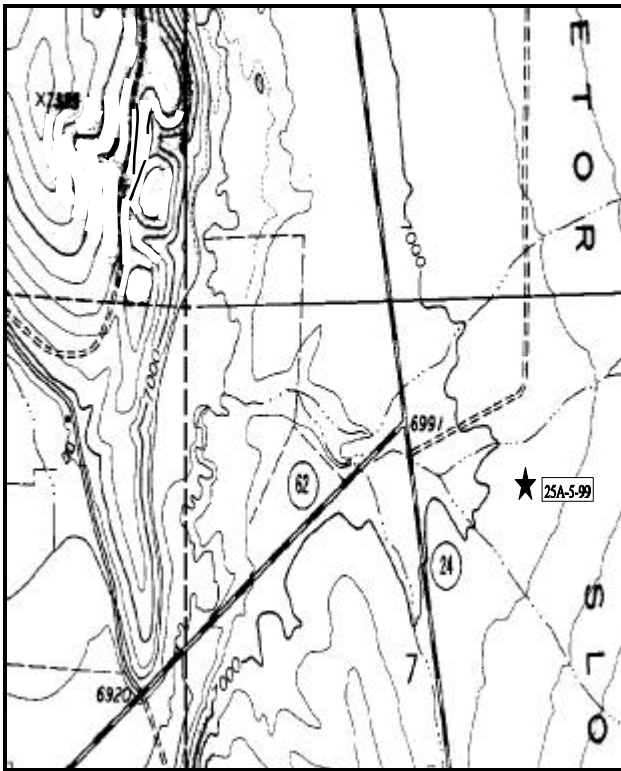
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 163°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

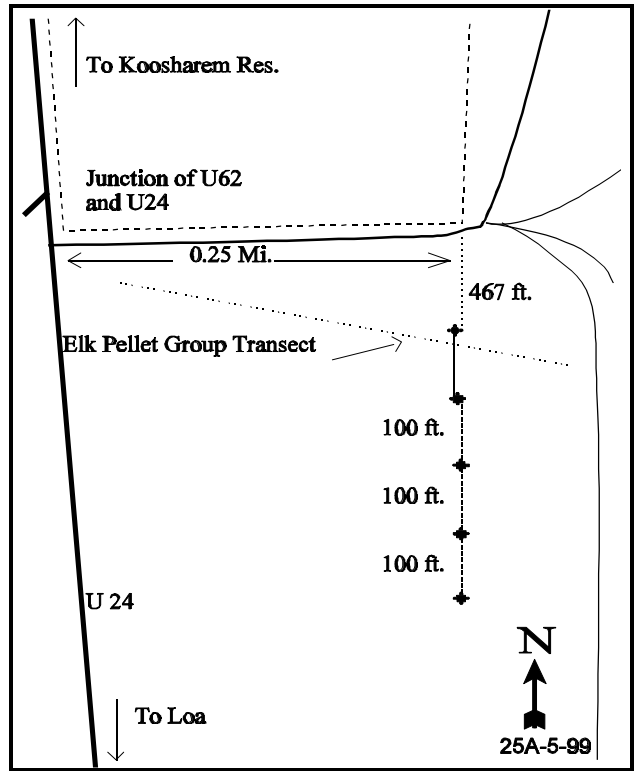
LOCATION DESCRIPTION

From the junction of U-62 and U-24 south of Koosharem Reservoir, proceed south for 25 yards and turn left onto a dirt road. Go through the gate and up the road 0.25 miles to where the road turns at the fence corner. Walk 467 feet due south from the fence corner to the top of a small rise. The baseline starts here, and is marked by a 5' steel rebar.



Map Name: Burrville, Utah

Township 26S , Range 1E , Section 7



Diagrammatic Sketch

UTM 4268970.250 N, 427256.874 E

DISCUSSION

Trend Study No. 25A-5 (43-5)

The Praetor Slope trend study surveys deer and elk winter range on BLM land south of Koosharem Reservoir. This is an area of 1,440 acres that was chained and seeded in 1964. The study is located at an elevation of about 7,000 feet on the east side of Plateau Valley. The aspect is west with a gentle slope of 1-2%. Average yearly precipitation is low, with just over 9 inches measured at Koosharem (elevation 6,900 feet, 3 miles southwest). The transect is 300 yards from state highway U-24. The area is a sheep allotment with use scheduled from either June 1 to June 30 (600 sheep) or October 25 through November 15 (1,400 sheep) on a rotating basis. Animal use is currently low with an estimated 12 deer days use/acre (30 ddu/ha) and 22 sheep days use/acre (56 sdu/ha) from pellet transect data taken in 1999. Elk do not appear to be using the area at the present time with only 1 pellet group sampled in 1999.

Although rocky throughout the profile, the soil is fairly deep with an estimated effective rooting depth of nearly 18 inches. The soil is a loam in texture and has a slightly alkaline pH (7.6). Organic matter is relatively low at 1.7%, with most of the litter present under the sagebrush crowns. Bare ground is currently ('99) low at 11%, while pavement and rock cover combined are high at 42%. Erosion is not severe with the gentle slope and relatively high cover from crested wheatgrass.

Wyoming big sagebrush dominates the site. It currently provides all of the browse cover, and 42% of the total vegetation cover. With the extension of the baseline in 1999, the population density is currently estimated at 4,420 plants/acre. The plants are short in stature, with the majority of the plants being moderate to heavily hedged in all 3 sampling years. Plants were noted as having poor leader growth in 1991. Vigor improved in 1999, with those plants displaying poor vigor decreasing from 24% to 11%. Percent decadency which was high in 1991 (52%), has since then decreased to 30% in 1999, which is average for most big sagebrush. The proportion of the decadent plants that are classified as dying decreased from 43% in 1991, to 36% in 1999. The population appears stable as 68% of the plants are mature, although recruitment is poor. The only other browse species present in the area are a few pricklypear cactus, and a population of rubber rabbitbrush in the bottom of a wash. There is no protective cover for wildlife near the transect.

Crested wheatgrass makes up almost all of the understory on the Praetor Slope transect. It is found in all of the quadrats, and provides over half of all the vegetation cover at the site. The only other grass sampled in 1999 was Letterman needle grass which was found in only a single quadrat. Crested wheatgrass is vigorous and showed some utilization in 1999. Forbs are scarce with the annual bur buttercup the only species sampled in 1999.

1985 APPARENT TREND ASSESSMENT

Overall range trend appears stable. Erosion of the top soil and along trails has occurred, but appears to have stabilized with a high percentage of pavement on the surface. Continuous spring grazing pressure has most likely depleted the desirable native perennial grasses and forbs. At present, the vegetative composition is simple, but both sagebrush and crested wheatgrass are vigorous and producing well. As long as care is taken to protect against overgrazing by livestock in the spring, current management is probably adequate to maintain the range in fair condition.

1991 TREND ASSESSMENT

The trend for soil is stable to slightly down with an increase in percent bare soil and a decrease in percent litter cover. Sagebrush density has gone down (32%) and decadency has increased from 8 to 52%. The high sagebrush densities, competition with itself, and the extended drought have been the main reason for this increase in percent decadency. Another problem with the area is the low average annual precipitation (effect

of a rain shadow) even with a relatively high elevation of 6,900 feet. The herbaceous understory is made up of basically one species, crested wheatgrass which appears to be stable at this time.

TREND ASSESSMENT

soil - stable to slightly downward

browse - declining

herbaceous understory - stable, but poor composition (basically a monoculture)

1999 TREND ASSESSMENT

Trend for soil is stable. Bare ground and litter cover both decreased, with rock and pavement cover increasing. Erosion is minimal at the site due to the gentle slope and high cover from crested wheatgrass. Trend for browse is stable. The population of Wyoming big sagebrush has declined slightly since 1991, however much of the change is because the sample size for browse has more than tripled and now gives significantly better estimates for browse which usually has discontinuous and/or clumped distributions. More importantly, now the population shows a significantly lower percent decadency, lower proportion of decadent plants classified as dying, and improved vigor. Use remains moderate to heavy on the majority of the population. Trend for the herbaceous understory is stable, but lacking in diversity. Crested wheatgrass is overly dominant with other grasses and forbs being scarce.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 5

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % (89)
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	b329	ab316	311	99	100	100	16.31
G	Sitanion hystrix	1	2	-	1	1	-	-
G	Stipa lettermani	-	3	1	-	1	1	.00
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		330	321	312	100	102	101	16.31
Total for Grasses		330	321	312	100	102	101	16.31
F	Antennaria rosea	b5	a-	a-	3	-	-	-
F	Arabis spp.	-	1	-	-	1	-	-
F	Astragalus beckwithii	-	4	-	-	2	-	-
F	Astragalus spp.	ab6	b10	a-	2	4	-	-
F	Erigeron spp.	6	3	-	2	1	-	-
F	Eriogonum spp.	-	1	-	-	1	-	-
F	Phlox longifolia	a-	b57	a-	-	28	-	-
F	Ranunculus testiculatus (a)	-	-	29	-	-	10	.15
F	Trifolium spp.	b18	b33	a-	10	17	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
	Total for Annual Forbs	0	0	29	0	0	10	0.15
	Total for Perennial Forbs	35	109	0	17	54	0	0
	Total for Forbs	35	109	29	17	54	10	0.15

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

BROWSE TRENDS --

Herd unit 25A, Study no: 5

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia tridentata wyomingensis	90	12.08
B	Atriplex canescens	0	-
B	Opuntia spp.	0	-
	Total for Browse	90	12.08

BASIC COVER --

Herd unit 25A, Study no: 5

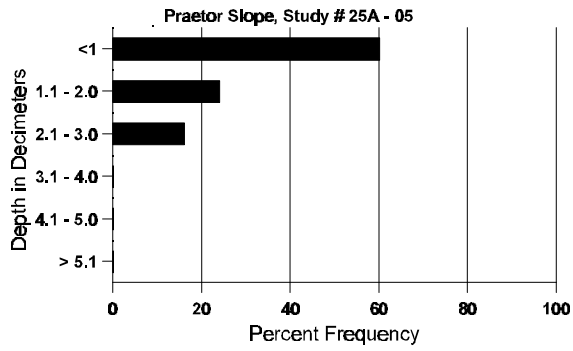
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	314	4.75	4.75	25.31
Rock	286	5.00	13.25	12.26
Pavement	348	24.50	17.75	29.79
Litter	346	44.75	37.00	21.65
Cryptogams	63	0	0	1.10
Bare Ground	272	21.00	27.25	11.23

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 05, Study Name: Praetor Slope

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.8	57.2 (14.9)	7.6	36.0	39.1	24.9	1.7	14.7	361.6	0.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 5

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Sheep	8	21(52)
Rabbit	66	n/a
Elk	1	0
Deer	12	12(30)
Cattle	1	0

BROWSE CHARACTERISTICS --

Herd unit 25A, 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 wyomingensis</i>																		
S	85	11	-	-	-	-	-	-	-	-	11	-	-	-	733			11
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	17	26	10	-	-	-	-	-	-	49	-	4	-	3533			53
	91	2	-	-	1	1	-	-	-	-	3	1	-	-	266			4
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	85	-	20	41	-	-	-	-	-	-	60	-	1	-	4066	17	21	61
	91	4	17	3	4	7	1	-	-	-	34	1	1	-	2400	16	18	36
	99	13	96	35	1	3	3	-	-	-	150	1	-	-	3020	21	28	151
D	85	-	2	8	-	-	-	-	-	-	7	-	3	-	666			10
	91	10	27	3	1	3	-	-	-	-	25	-	-	19	2933			44
	99	16	34	9	-	5	3	-	-	-	43	-	-	24	1340			67
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	540			27
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		39%			48%			06%			-32%							
'91		65%			08%			24%			-21%							
'99		62%			23%			11%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	8265	Dec:	8%			
												'91	5599		52%			
												'99	4420		30%			
<i>Atriplex canescens</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	12	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
<i>Opuntia spp.</i>																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	9	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	2	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+ 0%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	66		-			
												'99	0		-			

Trend Study 25A-7-99

Study site name: Evans Reservoir .

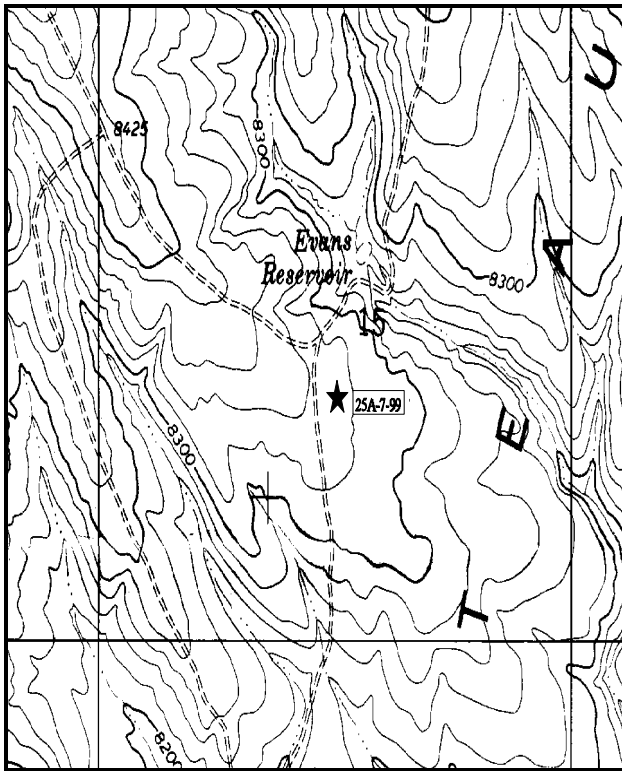
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

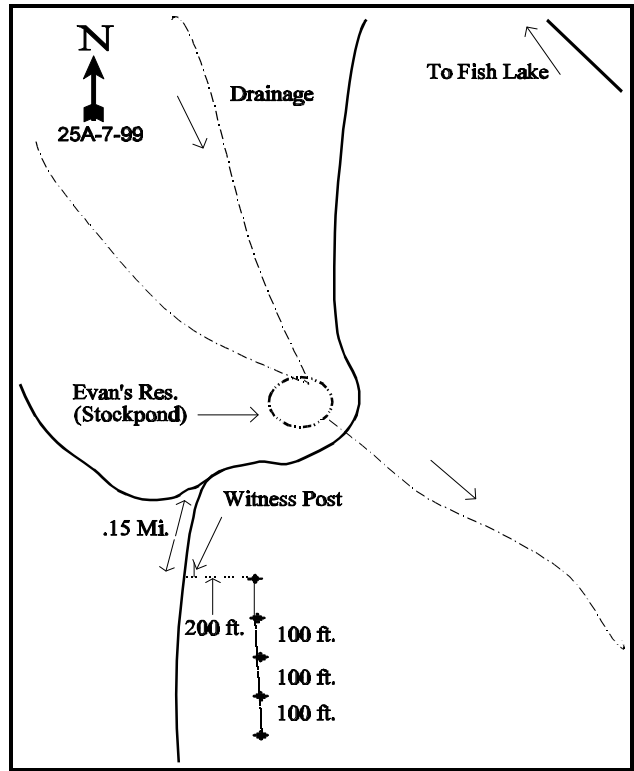
LOCATION DESCRIPTION

Heading northwest out of Loa on U-24, turn right at mile marker 45. Go 3.5 miles to a green and yellow fence post on the left (20 feet off the road). Continue about 0.1 miles past the fence post and turn left. Go 1.55 miles past a stock pond and up to a fork. Turn left at the fork and go 0.15 miles to a steel rebar witness post on the left side of the road. From the witness post, walk 200 feet east to the 0-foot baseline stake, a rebar with browse tag #7122.



Map Name: Abes Knoll, Utah

Township 27S , Range 1E , Section 15



Diagrammatic Sketch

UTM 4256930.133 N, 431156.974 E

DISCUSSION

Trend Study No. 25A-7 (44-1)

The Evans Reservoir study is located on one of the open rolling ridges of the Awapa Plateau at an elevation of 8,300 feet. The transect is on a relatively flat ridge top within a sagebrush-grass community with a slope of about 6% and a northeast aspect. Pipe harrow treatments were done in the past to many large tracks of sagebrush near the site. A portion of the first 100 feet of the transect had been pipe harrowed when the transect was read in 1999. Sheep graze the area in the spring and fall. Wildlife use is predominately pronghorn antelope, although mule deer will use the site during some winters. Both antelope and sage grouse were observed in the area in 1991. Elk use appears to be increasing as 51 elk days use/acre were estimated from the pellet transect data in 1999. Deer and antelope use combined is currently estimated at 16 days use/acre (40 days use/ha) with most of this probably coming from antelope. The pellets from these two species were difficult to distinguish differences. Sage grouse droppings were also encountered in 1999. Rabbit use is high in the area as well with over 200 groups sampled in 1999. Evans Reservoir, a small stock pond located 1/4 mile to the north, is an important water source for the area.

Soils are densely compacted and quite shallow with an estimated effective rooting depth of only 9 inches. Texture is a sandy loam with a neutral pH (7.1). Organic matter is low at 1.7%. Phosphorus (8.8 ppm) is slightly lower than the 10 ppm minimum shown necessary for normal plant growth and development. A calcium carbonate layer is present within the profile at about 10 inches below the surface, which could be restrictive to root development. The vegetation is widely dispersed, with little bare soil sampled in 1985. By 1991, bare soil was estimated at 23% which is probably an overestimation as bare ground dropped to 11% in 1999. Pavement cover has been high in all years, currently estimated at 25%. Vegetation and litter cover together provide 60% of the cover at the site. There is some evidence of wind erosion and wind-scoured depressions, with slight pedestaling occurring around the base of sagebrush.

Browse composition is dominated by a mix of mountain big sagebrush and black sagebrush. Mountain big sagebrush currently contributes to 57% of the browse cover. It had a moderately high density estimated at 6,266 plants/acre in 1985, 4,732 plants/acre in 1991, and 4,360 plants/acre in 1999. The mountain big sagebrush has shown moderate to heavy use in all three sampling years, however vigor has generally been generally good. Percent decadency is high at 53% in 1999, an increase from 28% in 1991. Much of this decadency is due to plants that were pipe harrowed on the first belt of the sampling transect. Presently, 25% of the decadent plants are classified as dying, a decrease from 60% in 1991. The current age structure points to a declining population with high decadency, and more decadent dying plants than young or seedlings to replace them. Leader growth on mountain big sagebrush varied from 4 to 8 inches in 1999. Black sagebrush is second in abundance to mountain big sagebrush, and is currently estimated at 4,140 plants/acre. This represents a 36% increase from the 1991 estimate. Much of this difference would be due to the extension of the baseline in 1999 accompanying the new methods which has increased the sample size for browse by a factor of more than three times. However, this gives significantly more accurate measurements for discontinuous distributions of browse like black sagebrush. Black sagebrush consists mostly of mature (51%) and decadent plants (43%), with 56% of the decadent plants classified as dying. The current decadency rate is actually the lowest since the transect was established in 1985. Use is mostly light to moderate, with poor vigor displayed on 23% and 24% of the population respectively in 1991 and 1999. Recruitment and biotic potential are currently relatively low for black sagebrush.

Perennial native grasses dominate the understory by providing 42% of the total vegetation cover at the site. Currently, muttongrass and bluebunch wheatgrass are the most abundant. Bluebunch wheatgrass significantly increased in sum of nested frequency in 1999, while muttongrass slightly decreased. Other species include: pinewoods needlegrass, blue grama, bottlebrush squirreltail, and a Carex. The grasses had received little use when the site was read in August 1999. Grasses make up a small percentage of the diet of antelope in Utah except during the new flush of growth each spring.

The forbs observed are quite diverse, but with low quadrat frequencies. Antelope are known to utilize some of these in summer, especially *Astragalus sp.*, *Lotus sp.*, *Eriogonum racemosum*, and *Linum lewisii* (Smith and Beale 1980). Smith and Beale (1980) also thought that antelope on the Awapa Plateau may feed on the abundant lichens. The most abundant forbs are timber poisonvetch and desert phlox which currently provide 73% of the forb cover.

1985 APPARENT ASSESSMENT OF TREND

Soil trend appears stable. There is little erosion because of the pavement and litter cover. The data indicate a downward vegetative trend. There are few young or seedlings in the mountain big sagebrush or black sagebrush populations with their form and vigor appearing to decline. Several increaser species, narrowleaf low rabbitbrush, broom snakeweed, pricklypear cactus, and desert phlox are present in rather low numbers, although they could increase with a decline of the sagebrush population. The grasses appear stable.

1991 TREND ASSESSMENT

Soil trend appears to be declining. Pavement and rock cover declined from 55% to 37%, while cover for bare ground increased from 8% to 23%. Litter cover increased slightly. The key browse species, mountain big sagebrush, did decrease in density since 1985 by 24%, while percent decadency decreased from 47% to 28%. However, 60% of the decadent plants (1,333 plants/acre) were classified as dying. The percentage of the population in the young and mature age classes improved respectively from 3% to 10% and 50% to 62%. Another important aspect of this population is that with the decrease in density which was already too high, shrub size for mature plants has increased for both width and height. The effective volume of each plant, on average, has almost doubled. Trend for browse would be considered slightly down. The herbaceous understory trend is improved. Bluebunch wheatgrass was not even recorded in 1985, but it now has a quadrat frequency of 27%. Mutton bluegrass, bottlebrush squirreltail, and pinewoods needlegrass have increased also. They had quadrat frequency changes respectively of 63% to 76%, 28% to 50%, and 39% to 68%. Most of the forbs also had increasing quadrat sum of frequency values.

TREND ASSESSMENT

soil - declining

browse - slightly downward

herbaceous understory - slightly improved

1999 TREND ASSESSMENT

Trend for soil is stable to slightly improved. Vegetation and litter cover combined provide more than 60% of the cover. Bare ground is low at 11%, with pavement is high at 25%. Erosion is minimal with the gentle slope. Trend for the key browse is slightly down. Mountain big sagebrush looks to decrease in the future with a high rate of decadent plants (53%), and more decadent dying plants than young in the population. Use continues to be moderate to heavy. Black sagebrush also shows high decadency at 43%, with 56% of these classified as dying. Nearly one-fourth of the population displays poor vigor. Recruitment and biotic potential of black sagebrush are low. Trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses and forbs decreased by 17% in 1999.

TREND ASSESSMENT

soil - stable to slightly improved

browse - slightly down

herbaceous understory - slightly down

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	<i>Agropyron spicatum</i>	a2	b51	c127	1	27	54	4.24
G	<i>Bouteloua gracilis</i>	37	40	50	18	16	23	.65
G	<i>Carex</i> spp.	ab6	a4	b18	5	2	10	.56
G	<i>Oryzopsis hymenoides</i>	a-	ab2	b7	-	2	3	.33
G	<i>Poa fendleriana</i>	a136	b168	ab139	63	76	60	4.73
G	<i>Poa secunda</i>	b44	a16	a10	20	8	4	.09
G	<i>Sitanion hystrix</i>	b62	c119	a25	28	50	15	.71
G	<i>Stipa comata</i>	a-	a-	b5	-	-	4	.21
G	<i>Stipa pinetorum</i>	a81	b142	a97	39	68	40	1.47
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		368	542	478	174	249	213	13.02
Total for Grasses		368	542	478	174	249	213	13.02
F	<i>Androsace septentrionalis</i> (a)	-	-	29	-	-	13	.19
F	<i>Arabis demissa</i>	b62	a19	a3	30	11	1	.00
F	<i>Astragalus convallarius</i>	a6	a14	b71	4	8	34	2.23
F	<i>Aster</i> spp.	-	1	-	-	1	-	-
F	<i>Astragalus</i> spp.	1	-	-	1	-	-	-
F	<i>Castilleja chromosa</i>	a-	b5	a-	-	3	-	-
F	<i>Chaenactis douglasii</i>	a-	b3	b8	-	3	4	.02
F	<i>Comandra pallida</i>	-	-	4	-	-	2	.06
F	<i>Cryptantha</i> spp.	b58	b68	a17	30	36	7	.25
F	<i>Eriogonum alatum</i>	-	-	2	-	-	1	.00
F	<i>Erigeron pumilus</i>	3	1	5	1	1	2	.01
F	<i>Eriogonum racemosum</i>	-	-	1	-	-	1	.01
F	<i>Eriogonum umbellatum</i>	14	11	10	6	7	4	.21
F	<i>Lactuca serriola</i>	-	3	-	-	1	-	-
F	<i>Linum lewisii</i>	a1	a17	b29	1	7	14	.30
F	<i>Lotus utahensis</i>	c55	a-	b16	26	-	9	.36
F	<i>Phlox austromontana</i>	a67	b130	a101	30	61	44	1.83
F	<i>Phlox longifolia</i>	b9	b19	a-	5	9	-	-
F	<i>Sanguisorba minor</i>	b6	a-	a-	5	-	-	-
F	<i>Senecio multilobatus</i>	a3	b61	a6	1	31	4	.05
F	<i>Streptanthus cordatus</i>	a-	b5	a-	-	3	-	-
F	<i>Trifolium</i> spp.	a-	c13	b5	-	9	3	.01
F	Unknown forb-perennial	b20	a-	a-	10	-	-	-
F	<i>Zigadenus paniculatus</i>	2	-	-	1	-	-	-
Total for Annual Forbs		0	0	29	0	0	13	0.19

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
	Total for Perennial Forbs	307	370	278	151	191	130	5.38
	Total for Forbs	307	370	307	151	191	143	5.57

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

BROWSE TRENDS --

Herd unit 25A, Study no: 7

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia nova	65	6.79
B	Artemisia tridentata vaseyana	85	9.89
B	Chrysothamnus viscidiflorus viscidiflorus	30	.46
B	Coryphantha vivipara	1	-
B	Eriogonum corymbosum	1	.03
B	Eriogonum microthecum	3	.06
B	Gutierrezia sarothrae	1	-
B	Leptodactylon pungens	18	.09
B	Opuntia spp.	1	-
B	Symphoricarpos oreophilus	0	-
	Total for Browse	205	17.33

BASIC COVER --

Herd unit 25A, Study no: 7

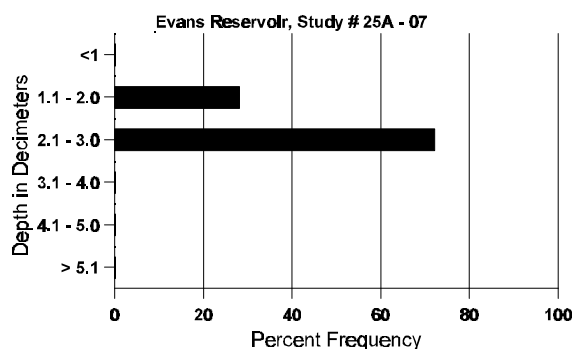
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	306	11.00	8.75	35.34
Rock	96	0	4.00	1.35
Pavement	325	54.75	33.00	25.01
Litter	341	26.25	30.25	25.26
Cryptogams	12	.50	1.00	.08
Bare Ground	245	7.50	23.00	10.93

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 07, Study Name: Evans Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.3	57.0 (9.0)	7.1	59.3	21.4	19.3	1.7	8.8	217.6	1.2

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 7

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	45	n/a
Elk	38	51(126)
Deer	5	16(40)
Antelope	1	0

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 7

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 nova																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	1	-	-	-	-	-	4	-	-	-	80		4	
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	8	3	-	1	-	-	-	-	-	12	-	-	-	240		12	
M	85	4	10	7	-	-	-	-	-	-	21	-	-	-	1400	10	9	21
	91	6	14	-	1	-	-	-	-	-	21	-	-	-	1400	8	16	21
	99	49	51	3	-	2	-	-	-	-	105	-	-	-	2100	11	19	105
D	85	-	10	23	-	-	-	-	-	-	27	-	-	6	2200		33	
	91	3	16	-	-	-	-	-	-	-	10	-	-	9	1266		19	
	99	48	29	-	3	7	-	3	-	-	40	-	-	50	1800		90	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		36%			54%			11%			-29%							
'91		75%			00%			23%			+36%							
'99		44%			01%			24%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	3733	Dec:	59%			
												'91	2666		47%			
												'99	4140		43%			

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>Artemisia tridentata vaseyana</i>																	
S	85	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8
	91	-	-	-	-	-	-	4	-	-	4	-	-	-	266		4
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	91	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7
	99	14	8	-	-	-	-	-	-	-	22	-	-	-	440		22
M	85	11	35	1	-	-	-	-	-	-	44	-	3	-	3133	15 21	47
	91	2	22	20	-	-	-	-	-	-	44	-	-	-	2933	18 26	44
	99	14	54	10	1	1	-	-	-	-	76	2	2	-	1600	17 29	80
D	85	6	29	9	-	-	-	-	-	-	39	-	3	2	2933		44
	91	1	12	4	-	1	-	2	-	-	8	-	-	12	1333		20
	99	29	71	10	2	1	1	2	-	-	86	-	1	29	2320		116
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	580		29
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		68%			11%			09%			-24%						
'91		49%			34%			17%			- 8%						
'99		62%			10%			15%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	6266	Dec:	47%		
												'91	4732		28%		
												'99	4360		53%		
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																	
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	1	-	-	-	-	1	-	-	2	-	-	-	133		2
	99	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5
M	85	11	-	-	-	-	-	-	-	-	11	-	-	-	733	5 4	11
	91	-	-	-	-	-	-	2	-	-	2	-	-	-	133	5 6	2
	99	52	-	-	1	-	-	-	-	-	53	-	-	-	1060	8 10	53
D	85	5	-	-	-	-	-	-	-	-	4	-	1	-	333		5
	91	-	-	1	-	-	-	-	-	-	-	-	-	1	66		1
	99	-	-	-	2	-	-	1	-	-	3	-	-	-	60		3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			06%			-69%						
'91		20%			20%			20%			+73%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	1066	Dec:	31%		
												'91	332		20%		
												'99	1220		5%		

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>Coryphantha vivipara</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20	2	4	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	20		-				
<i>Eriogonum corymbosum</i>																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	1	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20	7	6	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	40		-				
<i>Eriogonum microthecum</i>																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	1	-	-	1	-	-	-	2	-	-	-	133			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	6	-	-	-	-	-	-	-	6	-	-	-	400	7	5	6
	91	-	1	1	-	1	1	1	-	5	-	-	-	333	5	7	5
	99	3	1	-	-	-	-	-	-	4	-	-	-	80	4	4	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+14%						
'91		57%			29%			00%			-83%						
'99		25%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	400	Dec:	-				
										'91	466		-				
										'99	80		-				

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>												
M	85	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	20	3	7	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%						
'91		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-
									'91	0		-
									'99	20		-
<i>Leptodactylon pungens</i>												
Y	85	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	0			0
	99	-	-	-	2	-	-	-	40			2
M	85	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	0	-	-	0
	99	27	-	-	1	-	-	-	560	6	7	28
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%						
'91		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-
									'91	0		-
									'99	600		-
<i>Opuntia spp.</i>												
M	85	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	20	5	13	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%						
'91		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-
									'91	0		-
									'99	20		-
<i>Symphoricarpos oreophilus</i>												
Y	85	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	1	-	66			1
	99	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%						
'91		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-
									'91	66		-
									'99	0		-

Trend Study 25A-8-99

Study site name: Lower Dog Flat .

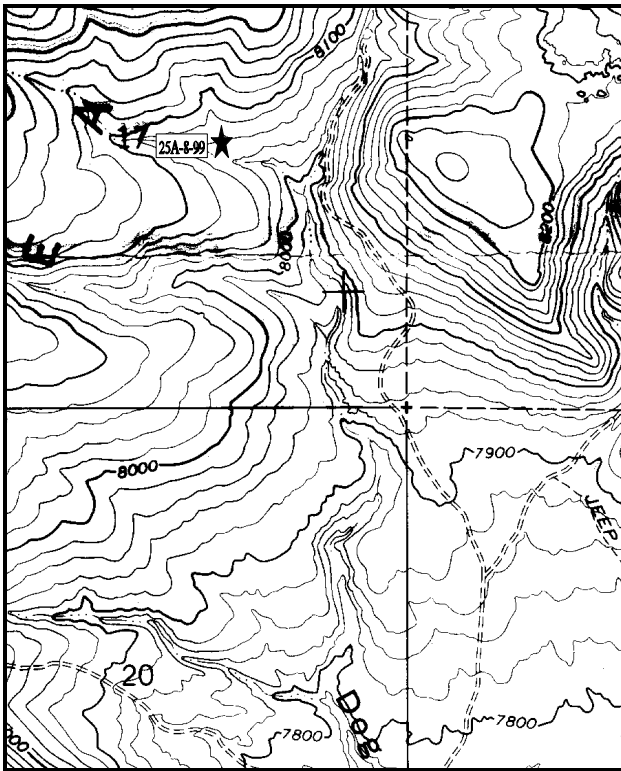
Range type: Chained, Cabled, Seeded P-J .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

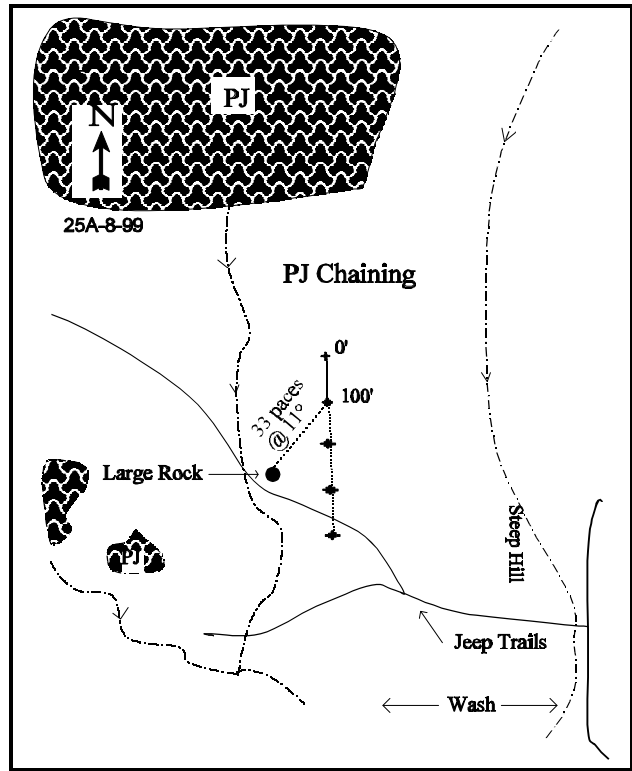
LOCATION DESCRIPTION

From Loa, go 3.8 miles northwest on U-24 (0.9 miles beyond mile marker 49). Turn right (north) on a gravel road and proceed 0.7 miles. Just beyond the cattleguard turn right and go another 0.7 miles. Turn left just before another cattleguard and go 0.9 miles. At the bottom of the hill, a road forks off to the left, through a wash, up a steep hill and west into the chaining. Take this road 0.2 miles and stop at a 3' rebar post on the right side of the road marking the 300' stake of the baseline. The 0-foot baseline stake is marked by browse tag #7188.



Map Name: Loa, Utah

Township 27S , Range 2E , Section 17



Diagrammatic Sketch

UTM 4257278.018 N, 437852.724 E

DISCUSSION

Trend Study No. 25A-8 (44-2)

The Lower Dog Flat study is located on a 2-5% south facing slope at an elevation of 8,100 feet on the eastern side of the Awapa Plateau. The area was once covered by pinyon pine, but was chained in 1980 effectively eliminating the trees. Most of the mountain big sagebrush survived. Sagebrush and broom snakeweed are now the principal species. Establishment of seeded species was erratic and native species are still the most prominent. The land is managed by the BLM as part of the seven mile allotment. Cattle use occurs for approximately 20 days in May under a deferred grazing system. A pellet group transect nearby on Dog Flat indicated 30 deer days use/acre (73 ddu/ha) during the winter of 1984-85. Elk use varies (Jense et al. 1985). Animal use is currently light as indicated by pellet group transect data from the site in 1999. Deer use is currently estimated at 17 days use/acre (43 ddu/ha), elk at 1 day use/acre (3 edu/ha), and cattle use at 8 days use/acre (20 cdu/ha). Antelope could also use the area. Good thermal and escape cover is provided by thick stands of unchained pinyon about 1/10 mile away.

The soil is a very compact clay loam with a loose surface layer. Soil depth is moderately shallow with an estimated effective rooting depth of almost 11 inches. The soil has a neutral pH (7.3) and is low in phosphorus at 6.7 ppm, where 10 ppm has been shown necessary for normal plant growth and development. A dense hardpan is located at a little more than a foot in depth, which could be limiting for roots of shrubs. Pavement and rock combined provide nearly half of the ground cover. Bare ground is low currently at 13%. There is some movement of pavement and soil with pedestaling and puddling apparent, but erosion is not considered serious.

The key browse species is mountain big sagebrush. All of the sagebrush have been classified as mountain big sagebrush, although some of the plants resemble black sagebrush in growth form and foliage color. This population had a stable density estimated at 5,332 plants/acre in 1985, 6,266 plants/acre in 1991, and 6,180 plants/acre in 1999. Biotic potential and recruitment were very high in 1985 and 1991, but dropped to lower levels in 1999. The decadency rate for this population is relatively low at 15%. Currently, vigor is mostly good with light to moderate use on the majority of the population. Seventeen percent of the population displayed heavy use in 1999. Broom snakeweed is the most abundant species on the Lower Dog Flat site, currently estimated at 20,580 plants/acre. The density was much lower in 1991 at 4,333 plants/acre due to drought conditions, but with better precipitation in the past few years, this species is again on the rise. Biotic potential and young recruitment are high at respectively 12% and 68%, which indicates an increasing population in the future. Other browse species include prickly phlox and pricklypear cactus, which are increasers with moderate to heavy cattle grazing.

Grass composition was initially dominated by smooth brome (highest sum of nested frequency), a valuable seeded species in 1985, but because of a new road that went through the baseline, it was relocated in 1991. This relocation especially affected sum of nested frequency values for crested wheatgrass and smooth brome because of the small size of the sampled area. Since then, the sampling design was increased to 500 feet, allowing a much better sampling design for herbaceous species. Currently, blue grama and bottlebrush squirreltail are the dominant species. Blue grama provided 82% of the grass cover in 1999, with bottlebrush squirreltail providing an additional 15%. Both are increasers that have only fair forage value. Forbs are insignificant and infrequently encountered. Seeded forbs, alfalfa, yellow sweet clover, and small burnet, were infrequent the first year the site was read, and were not sampled in 1999.

1985 APPARENT TREND ASSESSMENT

The soil appears stable with the added litter and the seeded grasses. Reestablishment of the key browse species, mountain big sagebrush, is encouraging but the density of broom snakeweed raises some concerns. This chaining must be protected from heavy grazing for a number of years to insure that this undesirable invader further increases its density.

1991 TREND ASSESSMENT

The soil appears to still be stable. Percent rock, pavement, and litter have switched around somewhat, but percent bare ground is still about the same. Typically, broom snakeweed dies off in large numbers during a drought, especially an extended drought. This was no exception on this site with 97% of the population dying off since 1985. The population went from 18,466 to only 4,333 plants/acre. The key species, mountain big sagebrush, increased during this same period by 15%, but much of this could have been because of the relocation of the baseline. The percent of young plants has also improved. It has gone from 27% in 1985 to 40% in 1991. The trend for browse is considered stable. The herbaceous understory is difficult to determine because of the relocation of the baseline which would especially effect nested frequency values for the herbaceous species, but with the examination of the data for the other eight sites, it would still be considered stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable. Erosion is not serious with the gentle slope and adequate vegetation and litter cover. Trend for browse is stable overall. The key species, mountain big sagebrush, shows a stable trend with the population density, percent decadency and vigor all remaining stable. Use has increased somewhat, but is still mostly light to moderate. Recruitment is moderate at 12%. There was an explosion of broom snakeweed population in 1999. It should be recalled how the population crashed in 1991 with drought. This species was greatly reduced due to the extended drought in the late 1980's and early 1990's and competition with the sagebrush. However, with improved precipitation in recent years, this species is again increasing. Trend for the herbaceous understory is stable. Perennial grasses are the most abundant group and have increased slightly in sum of nested frequency in 1999.

TREND ASSESSMENT

soil - stable

browse - stable for the key species mountain big sagebrush, with a significant increase in broom snakeweed which should be monitored closely

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 8

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	c43	a-	b14	19	-	5	.07
G	Agropyron intermedium	b6	a-	ab2	4	-	1	.00
G	Agropyron spp.	-	7	-	-	3	-	-
G	Agropyron spicatum	26	-	-	13	-	-	-
G	Bouteloua gracilis	a115	a166	b215	47	61	75	7.15
G	Bromus inermis	c141	a-	b11	56	-	6	.13
G	Koeleria cristata	-	-	4	-	-	2	.03
G	Poa fendleriana	2	-	3	2	-	1	.00
G	Sitanion hystrix	a41	b149	b137	21	65	57	1.27
G	Stipa comata	-	-	3	-	-	1	.03
G	Stipa pinetorum	b17	ab13	a3	9	6	1	.00
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		391	335	392	171	135	149	8.71
Total for Grasses		391	335	392	171	135	149	8.71
F	Androsace septentrionalis (a)	-	-	27	-	-	14	.14
F	Arabis demissa	b27	b20	a3	14	11	1	.00
F	Astragalus spp.	3	-	-	2	-	-	-
F	Chaenactis douglasii	3	-	-	1	-	-	-
F	Cryptantha spp.	b16	b10	a-	6	6	-	-
F	Descurainia pinnata (a)	-	10	5	-	4	2	.01
F	Eriogonum ovalifolium	6	3	3	4	2	1	.03
F	Erigeron pumilus	a16	ab22	b40	8	13	18	.21
F	Machaeranthera canescens	2	-	-	1	-	-	-
F	Melilotus officinalis	b8	a-	a-	3	-	-	-
F	Medicago sativa	b16	a-	a-	7	-	-	-
F	Penstemon comarrhenus	1	-	-	1	-	-	-
F	Phlox longifolia	a4	b22	a4	2	10	2	.01
F	Sanguisorba minor	3	-	-	1	-	-	-
F	Salsola pestifer (a)	2	-	-	1	-	-	-
F	Unknown forb-perennial	b11	a-	a-	7	-	-	-
Total for Annual Forbs		2	10	32	1	4	16	0.15
Total for Perennial Forbs		116	77	50	57	42	22	0.25
Total for Forbs		118	87	82	58	46	38	0.41

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

BROWSE TRENDS --
Herd unit 25A, Study no: 8

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia nova	1	-
B	Artemisia tridentata vaseyana	93	17.72
B	Gutierrezia sarothrae	84	1.20
B	Leptodactylon pungens	0	-
B	Opuntia spp.	2	-
B	Pinus edulis	0	-
Total for Browse		180	18.93

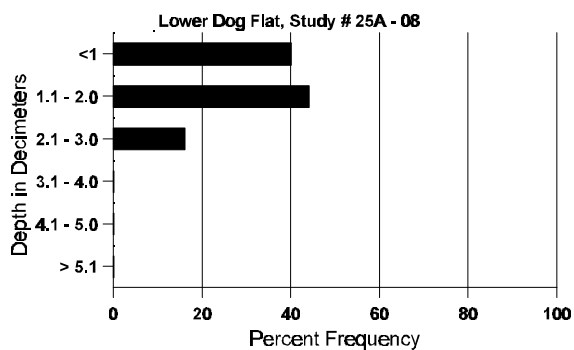
BASIC COVER --
Herd unit 25A, Study no: 8

Cover Type	Nested Frequency '99	Average Cover %		
		'85	'91	'99
Vegetation	303	8.00	7.50	27.16
Rock	323	8.00	29.75	24.86
Pavement	343	33.00	17.25	24.32
Litter	348	37.00	29.75	20.95
Cryptogams	14	0	0	.08
Bare Ground	291	14.00	15.75	13.14

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 08, Study Name: Lower Dog Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.7	52.6 (11.6)	7.3	43.3	29.4	27.3	2.3	6.7	201.6	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 8

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	26	n/a
Elk	3	1(2)
Deer	10	17(42)
Cattle	4	8(20)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 8

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 nova																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20	5	9	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Artemisia tridentata vaseyana																		
S	85	80	-	-	-	-	-	-	-	-	80	-	-	-	5333		80	
	91	5	-	-	-	-	-	8	-	-	13	-	-	-	866		13	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	85	22	-	-	-	-	-	-	-	-	22	-	-	-	1466		22	
	91	38	-	-	-	-	-	-	-	-	38	-	-	-	2533		38	
	99	19	7	11	1	-	-	-	-	-	38	-	-	-	760		38	
M	85	45	1	-	-	-	-	-	-	-	46	-	-	-	3066	18	17	46
	91	36	8	-	-	-	-	-	-	-	42	2	-	-	2933	19	18	44
	99	93	92	37	-	2	-	-	-	-	224	-	-	-	4480	16	26	224
D	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800		12	
	91	12	-	-	-	-	-	-	-	-	7	-	-	5	800		12	
	99	23	12	3	4	1	1	3	-	-	30	-	-	17	940		47	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	300		15	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		01%			00%			00%			+15%							
'91		09%			00%			05%			- 1%							
'99		37%			17%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	5332	Dec:	15%			
												'91	6266		13%			
												'99	6180		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>Gutierrezia sarothrae</i>																		
S	85	194	-	-	-	-	-	-	-	-	194	-	-	-	12933		194	
	91	178	-	-	-	-	-	11	-	-	189	-	-	-	12600		189	
	99	140	-	-	-	-	-	-	-	-	140	-	-	-	2800		140	
Y	85	95	-	-	-	-	-	-	-	-	95	-	-	-	6333		95	
	91	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	99	701	-	-	-	-	-	3	-	-	704	-	-	-	14080		704	
M	85	182	-	-	-	-	-	-	-	-	182	-	-	-	12133	9	9	182
	91	31	4	-	1	-	-	2	-	-	38	-	-	-	2533	2	3	38
	99	321	-	-	-	-	-	-	-	-	321	-	-	-	6420	6	6	321
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	91	8	1	-	-	-	-	-	-	-	6	-	-	3	600		9	
	99	3	-	-	1	-	-	-	-	-	3	-	-	1	80		4	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	100			5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-77%							
'91		08%			00%			05%			+79%							
'99		00%			00%			.09%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	18466	Dec:	0%			
												'91	4333		14%			
												'99	20580		0%			
<i>Leptodactylon pungens</i>																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7	7	2
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	4	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+33%							
'91		33%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	133	Dec:	0%			
												'91	198		33%			
												'99	0		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.																	
Y	'85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	'91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'99	-	-	-	2	-	-	-	-	-	2	-	-	-	40	3	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			-50%						
'91		00%			00%			00%			-39%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	133	Dec:	-			
											'91	66		-			
											'99	40		-			
Pinus edulis																	
S	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-			
											'91	0		-			
											'99	0		-			

Trend Study 25A-9-99

Study site name: Row of Pines .

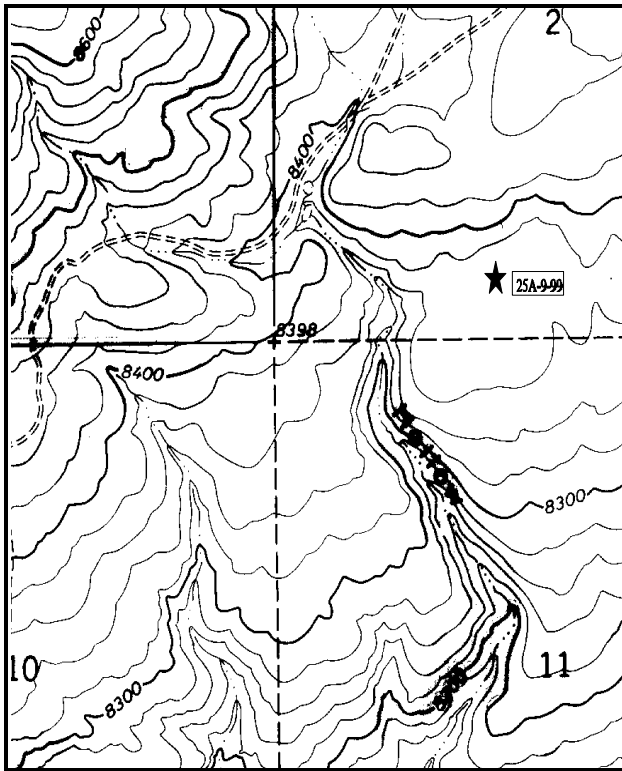
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

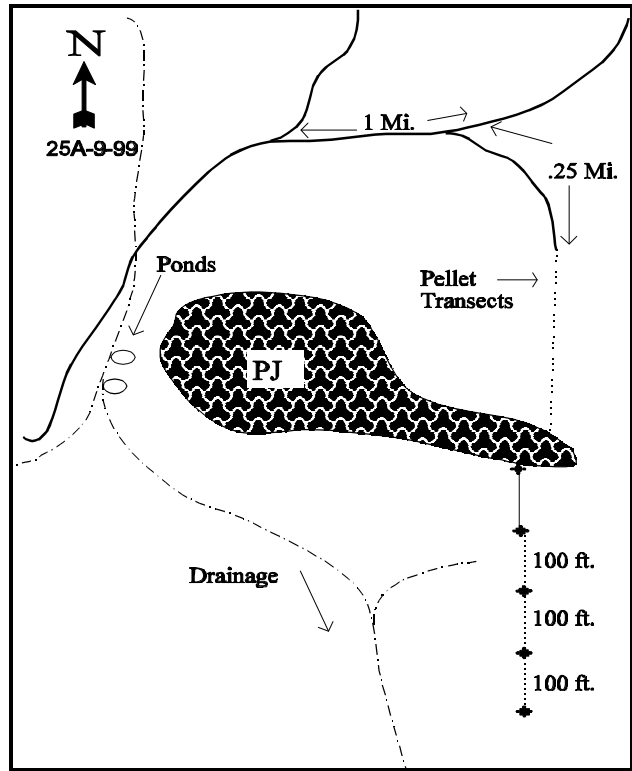
LOCATION DESCRIPTION

From Loa, proceed northwest on U-24 for 3.8 miles (0.9 miles beyond mile marker 49). Turn right and go 0.7 miles to a cattleguard. Just beyond the cattleguard turn right and go another 0.7 miles. Turn right and go across a cattleguard. Proceed 2.7 miles to an intersection, turn right and continue 1.3 miles to a stock pond on the east side of the road. Continue 0.2 miles to a fork, turn right and go 0.05 miles. Turn right and go 0.25 miles to the end of the road, where a pellet group transect begins. On the left side of the road is a gray fence post which marks the north end of the pellet transect. Count 16 stakes south through the belt of pinyon-juniper (the 16th stake is 25 feet from the trees). The beginning of the frequency baseline is 50 feet west of the 16th pellet group stake. Rebar (2-1/2 feet tall) is used to mark the transect, the 0-foot baseline stake has a red browse tag #7064 attached.



Map Name: Loa, Utah

Township 27S , Range 2E , Section 2



Diagrammatic Sketch

UTM 4259722.469 N, 442185.117 E

DISCUSSION

Trend Study No. 25A-9 (44-3)

The Row of Pines trend study is located near the top of a gently sloping bench, north of Loa, near a row of pinyon pines. The bench has a general south aspect, but the site is nearly level. Elevation is 8,400 feet. The study samples a sagebrush-perennial grass type starting near a stand of pinyon and juniper trees. Besides the trees near the 0 foot stake, there are few trees and escape cover on the sagebrush flat. This area is within the seven mile allotment which allows cattle grazing on a deferred rotation system for approximately 20 days in May. Pellet group data from the site in 1999 estimate light use with 13 deer, 1 elk, and 3 cow days use/acre (32 ddu/ha, 3 edu/ha, 7 cdu/ha). Rabbit sign was also moderately abundant. Deer and rabbit pellets were more common near the 0 foot stake which is closer to the escape and thermal cover of the pinyon and juniper trees.

Soil at the site is moderately shallow with abundant gravel sized rocks on the surface and throughout the soil profile. Texture is a sandy clay loam with a neutral pH (6.9). Organic matter is low at only 1.1% and phosphorus is marginal at 9.1 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The majority of protective ground cover comes shrubs and pavement. Litter is low and has steadily declined since 1988, while rock and pavement cover have steadily increased. However, percent cover of bare ground was relatively low at 18% in 1988 and 1999. The protective ground cover and gentle slope appear to preclude serious erosion problems.

The dominant browse is Wyoming big sagebrush which provided 72% of the browse cover in 1999, with a cover value of 25%. These shrubs displayed moderate to heavy hedging in 1988 with lighter use reported in 1991 and 1999. Many of the sagebrush have displayed short leader growth and few seed stalks over the years, indicating poor vigor. Decadent plants are common with percent decadence ranging between 41% and 52% since 1988. In addition, many decadent plants have been classified as dying since 1988, although the population overall has remained relatively stable. Seedlings were common in 1988 yet lacking in 1991 and 1999. Young plants have been moderately abundant on each reading, but not in high enough numbers to replace decadent/dying individuals. Currently 44% of the 2,900 decadent plants are classified as dying (1,276 plants/acre) and there are only 380 young plants/acre available to replace them indicating an apparent decline in the population.

The black sagebrush had a similar age structure to mountain big sagebrush in 1988 and 1991. Utilization was moderate in 1988 and 1999 but mostly light in 1991. Vigor was considered poor on one-third of the population in 1991, although only 8% of the black sagebrush currently display poor vigor. Recruitment is currently poor with no seedlings and few young sampled in 1999. Broom snakeweed is the most numerous browse species, especially on the upper (south) end of the study site. It had a high density of 10,732 plants/acre in 1988, which dropped dramatically to only 1,465 plants/acre in 1991. This was a common occurrence throughout the management area. The much larger sample used in 1999 estimated a similar density compared to 1988 at 11,300 plants/acre. It currently ('99) has a mostly mature population. Other increasers present in low numbers are narrowleaf low rabbitbrush and prickly pear cactus.

The herbaceous understory is dominated by blue grama, a low-growing warm season perennial that provides very little forage. It currently provides 84% of the grass cover and 73% of the herbaceous cover. The only other grass found more than occasionally is bottlebrush squirreltail. Forbs are small and sparse. They provided only about 1% total cover in 1999.

1985 APPARENT TREND ASSESSMENT

Soil trend appears stable and there is no serious erosion evident. The vegetative trend is presently down, as populations of big and black sagebrush appear to be declining.

1991 TREND ASSESSMENT

Soil trend is slightly downward because of lower vegetative cover and increase in bare ground and decrease in litter cover. These are all downward indicators reflective of an extended drought. The two key browse species are also showing a slightly downward trend with population losses of 5% and 2% respectively for black sagebrush and Wyoming big sagebrush. The occurrence of Wyoming big sagebrush on this site instead of mountain big sagebrush, further illustrates the relative dryness of the site. This is additionally compounded by the relatively high density the sagebrush populations contends with on this site. The herbaceous understory trend is stable but in poor condition because the dominant grass is a very low growing warm season grass (blue grama) which is of little value for spring or fall use.

TREND ASSESSMENT

soil - slightly downward, could quickly change with the return of normal precipitation patterns

browse - slightly downward

herbaceous understory - stable but poor

1999 TREND ASSESSMENT

Trend for soil is up. Percent cover of bare ground has declined from 28% to 18%. Litter cover has declined however, and percent cover of rock and pavement has increased slightly. Vegetation cover numbers increased dramatically, but vegetation cover data from 1988 and 1991 measured only basal cover, while aerial cover is estimated now so the numbers are not comparable. There appears to be little erosion due to the levelness of the terrain. Trend for the key species, Wyoming big sagebrush is down slightly. Density has declined since 1991, but some of the change is due to the much larger sample used in 1999. Use is heavier, and percent decadence remains high. In addition, a large portion of the decadent plants sampled (44%) appear to be dying. Recruitment is currently inadequate to replace the dying plants. The less abundant black sagebrush appears to be more stable but only contributes to 13% of the browse cover. Trend for the herbaceous understory is up for grasses and stable for forbs. Overall trend is considered up since grasses provide nearly all of the herbaceous cover. Composition is poor however, with the low growing warm season, blue grama, providing 84% of the grass cover.

TREND ASSESSMENT

soil - up

browse - slightly downward

herbaceous understory - up but composition is poor

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 9

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	<i>Agropyron smithii</i>	a-	a-	b12	-	-	4	.07
G	<i>Agropyron spicatum</i>	-	-	6	-	-	2	.01
G	<i>Bouteloua gracilis</i>	100	102	173	43	43	63	5.55
G	<i>Oryzopsis hymenoides</i>	b31	a7	a10	16	3	6	.10
G	<i>Poa secunda</i>	-	-	2	-	-	1	.00
G	<i>Sitanion hystrix</i>	a58	ab82	b110	30	41	47	.84
G	<i>Stipa pinetorum</i>	a-	b4	ab4	-	3	2	.03
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		189	195	317	89	90	125	6.63
Total for Grasses		189	195	317	89	90	125	6.63
F	<i>Androsace septentrionalis</i> (a)	-	-	87	-	-	40	.44
F	<i>Arabis demissa</i>	b22	ab12	a6	13	7	3	.04
F	<i>Astragalus lentiginosus</i>	b21	a3	a3	12	2	2	.01
F	<i>Cryptantha</i> spp.	ab2	b7	a-	1	3	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	4	-	-	2	.01
F	<i>Eriogonum ovalifolium</i>	7	16	13	5	8	8	.19
F	<i>Erigeron pumilus</i>	b20	a-	b34	9	-	17	.23
F	<i>Phlox longifolia</i>	a8	b33	a-	5	15	-	.00
F	<i>Senecio multilobatus</i>	a-	a1	b23	-	1	13	.06
Total for Annual Forbs		0	0	91	0	0	42	0.45
Total for Perennial Forbs		80	72	79	45	36	43	0.54
Total for Forbs		80	72	170	45	36	85	0.99

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

BROWSE TRENDS --
Herd unit 25A, Study no: 9

Type	Species	Strip Frequency '09	Average Cover % '09
B	Artemisia frigida	6	.03
B	Artemisia nova	20	4.51
B	Artemisia tridentata wyomingensis	93	24.40
B	Chrysothamnus viscidiflorus	0	-
B	Gutierrezia sarothrae	64	4.71
B	Opuntia fragilis	11	.06
B	Pediocactus simpsonii	1	-
B	Pinus edulis	0	-
Total for Browse		195	33.74

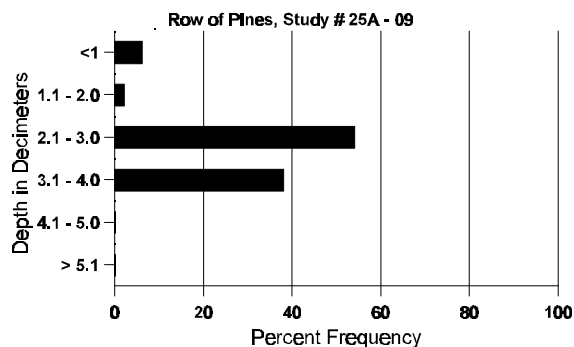
BASIC COVER --
Herd unit 25A, Study no: 9

Cover Type	Nested Frequency '09	Average Cover %		
		'85	'91	'99
Vegetation	346	10.00	6.00	41.90
Rock	285	2.75	3.75	8.67
Pavement	405	31.75	34.75	33.29
Litter	413	34.50	24.50	22.44
Cryptogams	103	3.50	3.50	2.30
Bare Ground	362	17.50	27.50	18.19

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 09, Study Name: Row of Pines

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.7	51.6 (13.6)	6.9	51.3	23.4	25.3	1.1	9.1	192.0	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 9

Type	Quadrat Frequency '89	Pellet Transect Days Use/Acre (ha) '89
Rabbit	28	n/a
Deer	15	13(32)
Elk	0	1(2)
Cattle	3	3(7)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 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											
Artemisia frigida																
Y	'85	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1
M	'85	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	2	2	5	1	-	-	-	-	-	-	-	10	-	-	10
D	'85	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'85		00%			00%			00%								
'91		00%			00%			00%								
'99		17%			42%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	0%			
										'91	0		0%			
										'99	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			
<i>Artemisia nova</i>																	
S	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4
	99	2	2	-	-	-	-	-	-	-	4	-	-	-	80		4
M	85	3	13	-	-	-	-	-	-	-	16	-	-	-	1066	10 13	16
	91	13	-	-	-	1	-	-	-	-	14	-	-	-	933	8 14	14
	99	12	43	4	2	-	-	-	-	-	61	-	-	-	1220	10 17	61
D	85	9	8	-	-	-	-	-	-	-	17	-	-	-	1133		17
	91	18	1	-	1	-	-	-	-	-	7	1	-	12	1333		20
	99	5	10	-	-	-	-	-	-	-	9	-	-	6	300		15
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		53%			00%			00%			- 5%						
'91		05%			00%			32%			-37%						
'99		69%			05%			08%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	2665	Dec:	43%			
											'91	2532		53%			
											'99	1600		19%			
<i>Artemisia tridentata wyomingensis</i>																	
S	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	3	-	-	2	-	-	6	-	-	-	120		6
Y	85	3	2	2	-	-	-	-	-	-	7	-	-	-	466		7
	91	12	-	-	-	-	-	-	1	-	13	-	-	-	866		13
	99	17	-	-	-	-	-	2	-	-	19	-	-	-	380		19
M	85	6	44	10	-	-	-	-	-	-	60	-	-	-	4000	16 17	60
	91	20	8	-	19	-	-	-	-	-	47	-	-	-	3133	16 19	47
	99	48	109	30	4	-	-	-	-	-	191	-	-	-	3820	18 28	191
D	85	6	30	23	-	-	-	-	-	-	43	-	-	16	3933		59
	91	38	14	6	5	1	-	-	-	-	51	-	1	12	4266		64
	99	77	34	14	7	9	-	4	-	-	81	-	-	64	2900		145
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	800		40
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		60%			28%			13%			- 2%						
'91		19%			05%			10%			-14%						
'99		43%			12%			18%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	8399	Dec:	47%			
											'91	8265		52%			
											'99	7100		41%			

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	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	7	9	3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	466	Dec:	57%				
											'91	0		0%				
											'99	0		0%				
<i>Gutierrezia sarothrae</i>																		
S	85	20	-	-	-	-	-	-	-	-	20	-	-	-	1333			20
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	43	-	-	-	-	-	-	-	-	43	-	-	-	860			43
Y	85	52	-	-	-	-	-	-	-	-	52	-	-	-	3466			52
	91	9	1	-	-	-	-	-	-	-	10	-	-	-	666			10
	99	44	-	-	-	-	-	-	-	-	44	-	-	-	880			44
M	85	102	2	-	-	-	-	-	-	-	104	-	-	-	6933	8	7	104
	91	1	-	-	1	2	-	-	-	-	4	-	-	-	266	2	2	4
	99	504	-	-	6	-	-	-	-	-	510	-	-	-	10200	8	9	510
D	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	3	2	2	-	-	-	1	-	-	6	1	-	1	533			8
	99	11	-	-	-	-	-	-	-	-	6	-	-	5	220			11
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		01%			00%			00%			-86%							
'91		23%			09%			05%			+87%							
'99		00%			00%			.88%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	10732	Dec:	3%				
											'91	1465		36%				
											'99	11300		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>Opuntia fragilis</i>																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	99	1	-	-	-	-	-	1	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	10	-	-	1	-	-	-	-	-	11	-	-	-	220	3	11	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+75%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	66		-				
											'99	260		-				
<i>Pediocactus simpsonii</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	0		-				
											'99	20		-				
<i>Pinus edulis</i>																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	0		-				
											'99	0		-				

Trend Study 25A-10-99

Study site name: Cedarless Flat .

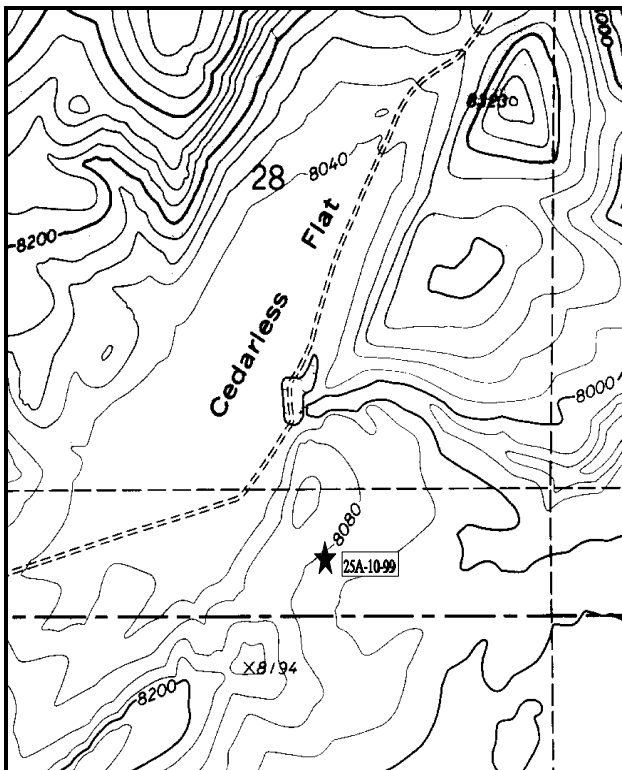
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

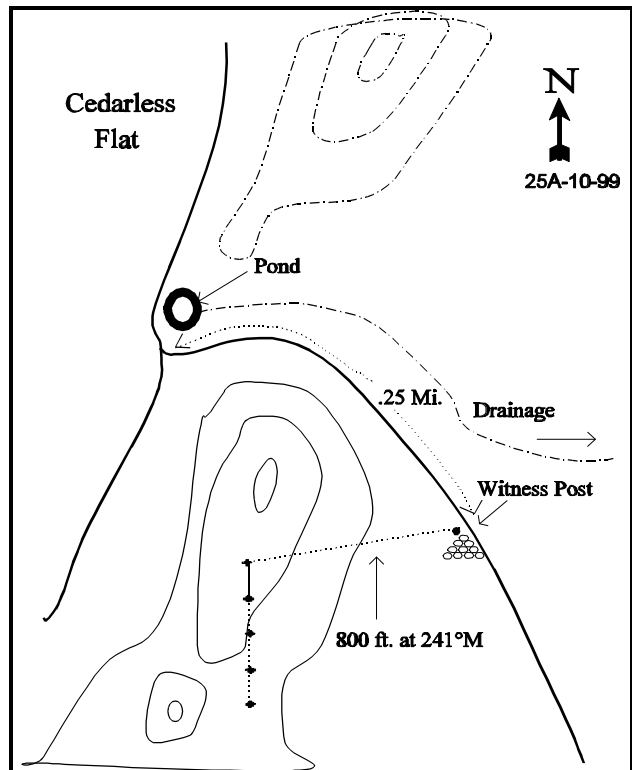
LOCATION DESCRIPTION

From Fremont, travel northeast on SR72 for 2.25 miles to a major fork (the sign says Mill Meadow Reservoir). Turn left and proceed 4.5 miles past the reservoir to Fremont Creek. Cross the bridge and go 0.4 miles to a fork. Bear left on the Mytoge Road and go 1.1 miles to a cattleguard in Cedarless Flat. From the cattleguard, go 0.6 miles to a fork. Turn left and go exactly 0.25 miles to a witness post on the south side of the road. From the witness post, go 800 feet at 241°M to the 0 ft baseline stake. The baseline stake is marked with a red browse tag number 407.



Map Name: Forsyth Reservoir, Utah

Township 26S , Range 3E , Section 33



Diagrammatic Sketch

UTM 4262560.895 N, 448854.172 E

DISCUSSION

Trend Study No. 25A-10 (44-4)

The Cedarless Flat transect is located on a sagebrush hill that is part of critical deer winter and spring range. The land is managed by the Forest Service and has had a long history of overgrazing. Better early spring range is needed to help alleviate depredation by big game on the agricultural lands around Fremont. The area was chained and seeded in 1987 to reduce sagebrush and increase availability of the needed succulent forbs and cool season grasses. Several areas were excluded from the treatment to retain sage grouse habitat. By 1999, treatment boundaries were nearly indistinguishable. The area is within the UM allotment which is grazed in the spring for generally two weeks from June 1st to June 15th as conditions permit. Pellet group data from the site estimate 7 deer, 21 elk, and 4 cow days use/acre (17 ddu/ha, 52 edu/ha, 10 cdu/ha). Escape and thermal cover is limited to thick stands of juniper approximately one-fourth mile away.

The soil is moderately shallow, compacted, and relatively stable. Effective rooting depth is estimated at just over 14 inches. It has a clay loam texture with a slightly alkaline pH (7.4). Phosphorus is limited at 7 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Erosion pavement and rocks are common on the soil surface ranging from 57% cover in 1988 to 37% in 1999. Litter cover is low and there is a moderate amount of localized soil movement occurring.

Wyoming big sagebrush currently ('99) makes up 94% of the browse cover and dominates the vegetative community. The majority are mature plants, averaging about one foot in height and a crown of one and one-half to two feet. All the available sagebrush have shown light to moderate hedging and some individuals display heavy use. Density was high at 8,798 plants/acre in 1985, prior to the treatment. By 1991, there were 6,599 plants/acre estimated and 4,440 plants/acre by 1999. Some of the change in density between 1991 and 1999 may be partly due to the larger sample used in 1999. Currently the sagebrush population appears dynamic with low percent decadence, good vigor, and high numbers of young plants. There are also a few black sagebrush plants on the site.

Other browse present on the site include broom snakeweed, stickleaf low rabbitbrush, and scattered juniper and pinyon trees. The small population of broom snakeweed reported in 1985 has increased dramatically in density to 4,240 plants/acre. About one-half of the population consists of young plants, which would indicate an expanding population.

Herbaceous vegetation was particularly sparse and insignificant prior to the treatment. Sum of nested frequency more than doubled after. Currently blue grama and seeded Russian wildrye are the most common grasses. Seeded crested wheatgrass and Indian ricegrass are also fairly common. Forbs are still lacking and provide very little cover or forage. All forb species combined produced only 1/10th of 1% cover in 1999.

1985 APPARENT TREND ASSESSMENT

Soil condition appears stable while vegetative trend down. The age structure and general vigor of the sagebrush indicates a declining population. Cool season grasses and forbs and valuable forage plants are conspicuously absent.

1991 TREND ASSESSMENT

Soil condition is still considered stable even with the increase in percent bare ground (still relatively low for a sagebrush-grass site), for the area was chained and seeded in 1987. There are currently many more grasses established on the site. The browse trend is up because the treatment thinned the sagebrush and it shows good vigor and a much lower percent of the population is decadent. The herbaceous understory is greatly improved with many cool season grasses established since treatment.

TREND ASSESSMENT

soil - stable

browse - up

herbaceous understory - up

1999 TREND ASSESSMENT

Trend for soil is still considered stable. Percent cover of bare ground is similar to 1991 estimates, while litter cover has declined. This is primarily due to the deterioration of churning debris. Herbaceous cover is still moderately abundant and erosion is not a serious problem. Trend for browse is stable. Density of the key species, Wyoming big sagebrush, has declined 18% but some of the difference is due to the much larger sample used in 1999. Utilization is moderate to heavy but vigor is good and percent decadence has declined from 14% to 4%. Young plants are abundant and account for 31% of the population. This combined with the low number of decadent plants would indicate an expanding population. One negative aspect of the browse trend is the dramatic increase in broom snakeweed to 4,240 plants/acre. Only 599 plants/acre were estimated prior to the treatment in 1985 and no broom snakeweed was encountered in 1991. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses has declined slightly, yet more importantly, sum of nested frequency for the seeded crested wheatgrass has declined significantly with frequency of the less desirable, low growing, warm season blue grama, has increased significantly. Most of the seeded grasses were found growing only within the protection of sagebrush canopies, which would indicate spring grazing pressure. Forbs are still rare in their occurrence and therefore not an important component on this site.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 10

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	a-	c155	b41	-	69	16	1.14
G	Bouteloua gracilis	a70	b104	c193	30	47	70	8.30
G	Bromus inermis	a-	c55	b12	-	29	5	.22
G	Bromus tectorum (a)	-	3	-	-	1	-	-
G	Carex spp.	a-	a-	b15	-	-	5	.07
G	Elymus junceus	a-	b84	b61	-	42	27	2.59
G	Oryzopsis hymenoides	ab15	a15	b36	9	7	17	.72
G	Sitanion hystrix	b97	b75	a29	41	36	16	.20
G	Stipa lettermani	1	5	4	1	2	2	.01
Total for Annual Grasses		0	3	0	0	1	0	0
Total for Perennial Grasses		183	493	391	81	232	158	13.29
Total for Grasses		183	496	391	81	233	158	13.29
F	Androsace septentrionalis (a)	-	-	11	-	-	5	.02

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Arabis demissa	9	2	3	5	2	1	.00
F	Astragalus lentiginosus	_b 4	_a -	_{ab} 5	3	-	2	.03
F	Cryptantha spp.	5	3	1	3	1	1	.03
F	Eriogonum ovalifolium	_b 5	_{ab} 1	_a -	3	1	-	-
F	Erigeron pumilus	4	1	-	2	1	-	-
F	Phlox longifolia	1	5	1	1	4	1	.00
F	Senecio multilobatus	5	-	-	2	-	-	-
Total for Annual Forbs		0	0	11	0	0	5	0.02
Total for Perennial Forbs		33	12	10	19	9	5	0.07
Total for Forbs		33	12	21	19	9	10	0.10

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

BROWSE TRENDS --

Herd unit 25A, Study no: 10

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia nova	2	-
B	Artemisia tridentata wyomingensis	83	9.25
B	Chrysothamnus viscidiflorus viscidiflorus	9	.15
B	Gutierrezia sarothrae	56	.38
B	Opuntia spp.	2	.03
B	Pediocactus simpsonii	3	.03
Total for Browse		155	9.84

BASIC COVER --

Herd unit 25A, Study no: 10

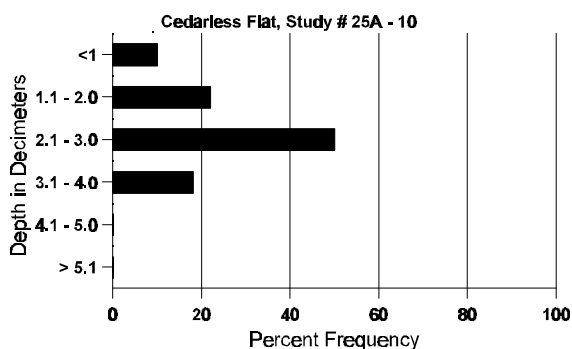
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	285	1.50	4.50	23.21
Rock	300	6.00	8.00	9.06
Pavement	371	51.00	46.50	27.46
Litter	347	32.50	22.75	13.73
Cryptogams	1	0	0	.00
Bare Ground	339	9.00	18.25	20.26

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 10, Study Name: Cedarless Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.1	59.6 (15.1)	7.4	43.3	25.4	31.3	2.6	7.0	112.0	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 10

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	9	n/a
Elk	6	21(52)
Deer	8	7(17)
Cattle	3	4(10)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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 nova																				
M	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0		
	'91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0			
	'99	4	-	-	-	-	-	-	-	-	-	-	-	4	-	-	80	6	15	4
		% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
		'85		00%			00%			00%										
		'91		00%			00%			00%										
		'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85		0		Dec:		-		
												'91		0				-		
												'99		80				-		

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 wyomingensis</i>												
S	85	6	2	-	-	-	-	8	533		8	
	91	12	-	1	-	-	1	13	933		14	
	99	2	-	-	-	-	-	2	40		2	
Y	85	11	4	1	-	-	-	16	1066		16	
	91	18	1	1	-	-	-	20	1333		20	
	99	49	33	2	-	-	-	84	1680		84	
M	85	47	26	6	-	-	-	79	5266	18 20	79	
	91	44	18	2	1	-	-	65	4333	12 15	65	
	99	39	101	37	-	-	-	177	3540	13 22	177	
D	85	14	19	4	-	-	-	34	2466		37	
	91	10	3	1	-	-	-	14	933		14	
	99	-	6	2	1	2	-	3	220		11	
X	85	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	320		16	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		37%		08%		02%		-25%				
'91		22%		04%		00%		-18%				
'99		52%		15%		03%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	8798	Dec:	28%
									'91	6599		14%
									'99	5440		4%
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
Y	85	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	1	66		1	
	99	-	-	-	-	-	-	-	0		0	
M	85	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	0	- -	0	
	99	9	1	-	-	-	1	11	220	7 12	11	
D	85	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	0		0	
	99	-	1	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%						
'91		00%		00%		00%		+73%				
'99		17%		08%		08%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	0%
									'91	66		0%
									'99	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				
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	110	-	-	-	-	-	-	-	-	110	-	-	-	2200		110	
M	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466	8	4	7
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	102	-	-	-	-	-	-	-	-	102	-	-	-	2040	4	4	102
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	599	Dec:	-			
												'91	0		-			
												'99	4240		-			
Opuntia spp.																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	3	-	-	-	-	-	1	-	-	4	-	-	-	266	2	4	4
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	10	3
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+83%							
'91		00%			00%			00%			-80%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	100%			
												'91	399		0%			
												'99	80		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			
Pediocactus simpsonii																	
Y	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	60		-		

Trend Study 25A-11-99

Study site name: Forsyth Reservoir .

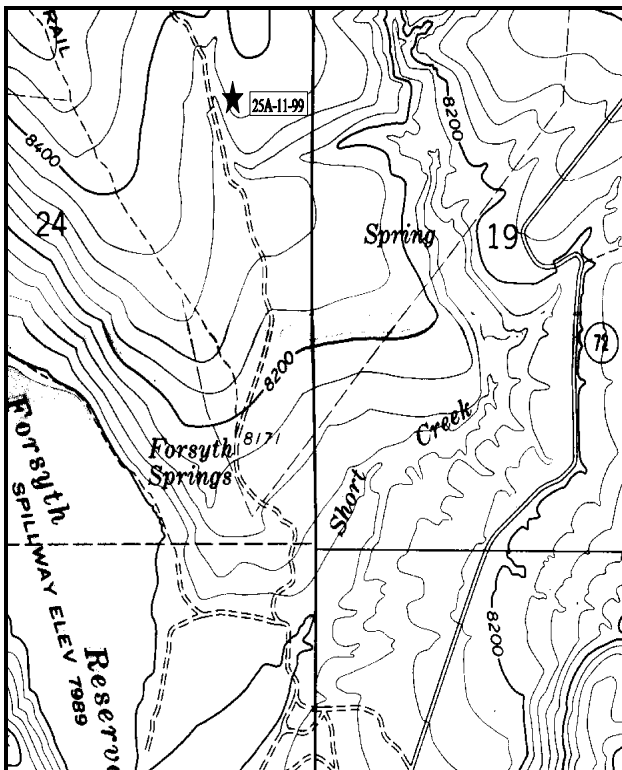
Range type: Black Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

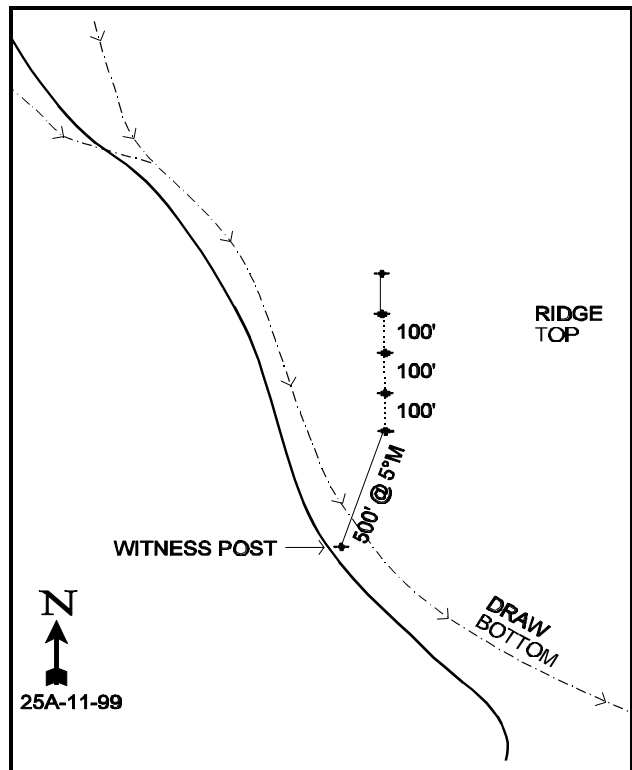
LOCATION DESCRIPTION

Between Lyman and Loa, turn north towards Fremont to connect with SR 72. Travel up SR 72 until you cross a Forest Service boundary cattleguard (about 5 miles from Fremont). Continue another 2.7 miles to Forsyth Reservoir. Turn at the Forsyth Reservoir sign and drive down 0.3 miles to a fork. Turn right and continue 0.1 miles to where the road crosses Short Creek (which empties into the east cove of Forsyth). From Short Creek, go up 0.1 miles to a fork. Turn right and go 0.25 miles to a cattleguard. Continue 0.15 miles beyond the cattleguard to a fork. Take the right fork and go 0.55 miles to a draw below a ridge to the northeast. There is a steel rebar witness post on the right side of the road. The last baseline stake is located 500 feet away at a bearing of 5°M on top of the ridge. The 0-foot baseline stake is 400 feet due north, and has a red browse tag #7062 attached.



Map Name: Forsyth Reservoir, Utah

Township 26S , Range 3E , Section 24



Diagrammatic Sketch

UTM 4265581.540 N, 454183.784 E

DISCUSSION

Trend Study No. 25A-11 (44-5)

The Forsyth Reservoir study site transect is located on the top of a hill north of Forsyth Reservoir. The slope is 5% with a south-southwest aspect and an elevation of 8,400 feet. The area is managed by the Fish Lake National Forest as part of the Tidwell cattle allotment. Historically, the area has received heavy grazing by cattle and sheep, but with an especially high impact within the vicinity of the reservoir. A large area was sprayed with 2,4-D in the spring of 1976 to reduce shrub competition and release the grasses and forbs. A drought after the spraying impaired growth, but five years after the spraying it was noted by Forest Service personnel that there was fair grass production with good vigor. The study site is currently dominated by black sagebrush. The area is still used by cattle every other year in early June, and is used by deer and elk in the winter. Pellet group data from 1999 estimate 2 deer, 60 elk, and 7 cow days use/acre (5 ddu/ha, 148 edu/ha, 17 cdu/ha). Cattle pats and about 70% of the elk pellet groups were from this spring ('99).

Soil on the site is moderately deep with an effective rooting depth estimated at just over 14 inches. Texture is a clay loam with a neutral pH (7.0). Phosphorus is low at only 2.6 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Rock and pavement cover are relatively high on the surface and the profile contains abundant gravel. Litter cover is limited, but percent bare soil is low ranging from 1 to 4% since 1985. The soil appears to absorb and hold water well and the layer of pavement effectively stops erosion.

The dominant browse on the site is black sagebrush which currently ('99) provides 91% of the total browse cover. It has an extremely high density ranging from 15,466 plants/acre in 1985 to 28,180 by 1999. Use of the black sagebrush has been light to moderate with each reading and vigor has remained good. Percent decadence has steadily increased from 9% in 1985 to 29% in 1999. Many of the decadent plants encountered in 1999 were young plants with partial crown death likely due to drought and winter injury, combined with intraspecific competition. The current density appears to be near the maximum for this site. There are some scattered mountain big sagebrush plants on the site, which are more heavily hedged.

Other common shrubs found on the site include fringed sage and stickyleaf low rabbitbrush. Density of fringed sage and stickyleaf low rabbitbrush declined considerable between 1991 and 1999, but most of the change is due to the much larger sample used in 1999. These low growing shrubs show light use and good vigor.

The herbaceous understory is diverse yet not particularly abundant considering the treatment. Grasses currently ('99) produce only 7% cover, while forbs provide only 1%. The dominant grass is the warm season blue grama which provides 36% of the grass cover. Mutton bluegrass and letterman needlegrass are also fairly abundant. Forbs are limited to a few low growing, poor value species like rockcress, low fleabane, and longleaf phlox.

1985 APPARENT TREND ASSESSMENT

The soil appeared stable. Spraying has made this a dynamic vegetative community with many changes occurring. Grasses, as well as the key species black sage, are doing well and increasing. The Forest Service has recommendations to re-spray the sagebrush by 1990. However, additional seeding and further restrictions on cattle grazing may be necessary in order to improve the site for cool season herbaceous species and spring use by wildlife and cattle.

1991 TREND ASSESSMENT

The soil is still stable, with only 1% bare ground at this time. Fringed sagebrush and stickyleaf low

rabbitbrush have increased in density. The key species, black sagebrush, also increased in density by 27%. The herbaceous understory has remained about the same, with few changes.

TREND ASSESSMENT

soil - stable

browse - improving

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is still considered stable even with the slight increase in bare soil, as it is still very low at only about 4%. The soil surface is still covered with pavement which provides adequate protection and erosion is not currently a problem. Trend for browse is stable for the key species, black sagebrush. Some of the changes in density of shrubs between 1991 and 1999 is the result of the larger sample used in 1999. Black sagebrush displays light to moderate use, good vigor, and excellent recruitment. The population currently appears to be at the maximum for the site. The dramatic decline in density of fringed sagebrush and stickyleaf low rabbitbrush also appears to be the result of the larger sample used this year which gives a more representative sample of shrub populations with discontinuous distributions. Trend for the herbaceous understory is down slightly. Sum of nested frequency for perennial grasses has declined slightly, while frequency of perennial forbs has dropped considerably. Sum of nested frequency for blue grama declined slightly with frequency of bottlebrush squirreltail declining significantly. Forbs are limited to a few low growing, poor value species like rockcress, low fleabane, and longleaf phlox.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 11

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron trachycaulum	14	4	9	7	2	4	.04
G	Bouteloua gracilis	_a 140	_b 184	_{ab} 166	64	74	67	2.44
G	Carex spp.	_a 6	_a 6	_b 33	3	2	14	.14
G	Poa fendleriana	102	113	120	49	47	56	2.00
G	Sitanion hystrix	_b 156	_b 161	_a 85	63	66	36	.66
G	Stipa comata	_a 1	_a -	_b 35	1	-	14	.37
G	Stipa lettermani	102	102	85	42	42	41	1.14
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		521	570	533	229	233	232	6.82
Total for Grasses		521	570	533	229	233	232	6.82
F	Androsace septentrionalis (a)	-	-	3	-	-	2	.03
F	Arabis demissa	_c 143	_b 74	_a 25	61	36	11	.05
F	Astragalus lentiginosus	3	-	-	1	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	<i>Chaenactis douglasii</i>	_a 2	_b 14	_a 3	1	8	1	.00
F	<i>Erigeron pumilus</i>	_c 137	_b 110	_a 66	58	49	29	.19
F	<i>Hymenoxys richardsonii</i>	_a 1	_a -	_b 17	1	-	9	.70
F	<i>Pedicularis centranthera</i>	-	-	1	-	-	1	.00
F	<i>Penstemon</i> spp.	_a -	_{ab} 1	_b 9	-	1	4	.02
F	<i>Phlox austromontana</i>	-	-	2	-	-	2	.01
F	<i>Phlox longifolia</i>	_b 60	_{ab} 33	_a 19	27	16	11	.05
F	<i>Senecio multilobatus</i>	_a -	_{ab} 3	_b 10	-	2	5	.02
Total for Annual Forbs		0	0	3	0	0	2	0.03
Total for Perennial Forbs		346	235	152	149	112	73	1.07
Total for Forbs		346	235	155	149	112	75	1.11

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

BROWSE TRENDS --

Herd unit 25A, Study no: 11

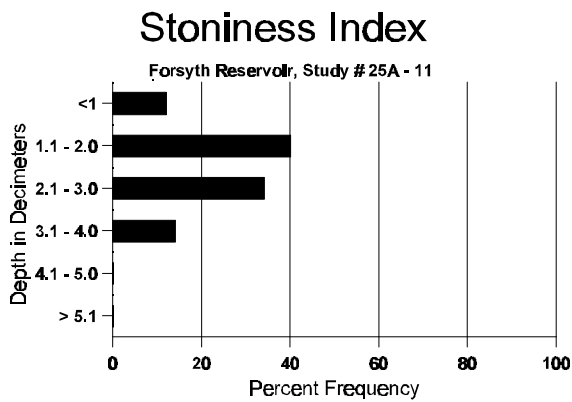
Type	Species	Strip Frequency 09	Average Cover % 09
B	<i>Artemisia frigida</i>	31	.16
B	<i>Artemisia nova</i>	96	19.44
B	<i>Artemisia tridentata vaseyana</i>	2	-
B	<i>Chrysothamnus nauseosus</i>	1	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	29	1.60
B	<i>Cowania mexicana stansburiana</i>	0	-
B	<i>Coryphantha vivipara arizonica</i>	2	.06
B	<i>Eriogonum microthecum</i>	9	.03
B	<i>Gutierrezia sarothrae</i>	4	.01
B	<i>Leptodactylon pungens</i>	2	-
B	<i>Pediocactus simpsonii</i>	2	.03
B	<i>Pinus edulis</i>	1	-
B	<i>Tetradymia canescens</i>	1	-
Total for Browse		180	21.35

BASIC COVER --
Herd unit 25A, Study no: 11

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	321	5.75	10.75	32.02
Rock	313	6.25	2.75	14.71
Pavement	361	49.50	57.00	38.54
Litter	285	32.00	27.75	7.75
Cryptogams	169	4.75	.75	1.71
Bare Ground	177	1.75	1.00	3.56

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 11, Study Name: Forsyth Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.4	53.8 (15.6)	7.0	41.3	35.4	23.3	2.2	2.6	89.6	0.5



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 11

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	6	n/a
Elk	19	60(148)
Deer	5	2(5)
Cattle	2	7(17)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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			
Artemisia frigida																	
S	85	73	-	-	-	-	-	-	-	-	73	-	-	-	4866		73
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	85	208	-	-	-	-	-	-	-	-	208	-	-	-	13866		208
	91	38	11	-	-	-	-	-	-	-	49	-	-	-	3266		49
	99	13	1	-	-	-	-	-	-	-	14	-	-	-	280		14
M	85	140	-	-	-	-	-	-	-	-	140	-	-	-	9333	2 4	140
	91	100	72	36	24	1	-	1	-	-	234	-	-	-	15600	2 3	234
	99	85	8	-	5	-	-	-	-	-	98	-	-	-	1960	4 6	98
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	10	7	6	-	-	-	-	-	-	21	-	-	2	1533		23
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			-12%						
'91		30%			14%			.65%			-89%						
'99		08%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	23199	Dec:	0%			
											'91	20399		8%			
											'99	2240		0%			
Artemisia nova																	
S	85	142	-	-	-	-	-	-	-	-	142	-	-	-	9466		142
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
Y	85	85	1	-	-	-	-	-	-	-	86	-	-	-	5733		86
	91	116	19	3	5	-	-	15	-	-	157	-	1	-	10533		158
	99	271	109	2	-	-	-	-	-	-	382	-	-	-	7640		382
M	85	95	27	3	-	-	-	-	-	-	125	-	-	-	8333	7 10	125
	91	38	19	18	40	2	-	-	-	-	102	15	-	-	7800	6 11	117
	99	379	215	-	-	18	-	-	-	-	612	-	-	-	12240	7 16	612
D	85	5	15	1	-	-	-	-	-	-	20	-	-	1	1400		21
	91	23	6	2	11	-	-	-	-	-	27	1	-	14	2800		42
	99	228	128	3	-	52	4	-	-	-	384	-	-	31	8300		415
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	720		36
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		19%			02%			.43%			+27%						
'91		15%			07%			05%			+25%						
'99		37%			.63%			02%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	15466	Dec:	9%			
											'91	21133		13%			
											'99	28180		29%			

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>Artemisia tridentata vaseyana</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	1	1	-	-	-	-	-	-	2	-	-	-	40	11	25	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		50%			50%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
<i>Chrysothamnus nauseosus</i>																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	2	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	1	-	-	-	-	-	-	1	-	-	-	20	7	9	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	0		-			
												'99	20		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800			12
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	43	-	-	-	-	-	-	-	43	-	-	-	2866			43	
	91	17	8	2	1	-	-	3	-	31	-	-	-	2066			31	
	99	4	-	1	-	-	-	-	-	5	-	-	-	100			5	
M	85	130	-	-	-	-	-	-	-	129	-	1	-	8666	7	8	130	
	91	80	23	8	1	-	-	3	-	109	2	2	2	7666	3	4	115	
	99	84	2	-	-	-	-	-	-	86	-	-	-	1720	6	11	86	
D	85	3	-	-	-	-	-	-	-	3	-	-	-	200			3	
	91	22	3	6	2	-	-	-	-	29	1	1	2	2200			33	
	99	4	-	-	-	-	-	-	-	2	-	-	2	80			4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			.56%			+ 2%							
'91		19%			09%			04%			-84%							
'99		02%			01%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	11732	Dec:	2%			
												'91	11932		18%			
												'99	1900		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		5	6		7	8	9	1	2			
<i>Cowania mexicana stansburiana</i>																	
S	85	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	0		-				
<i>Coryphantha vivipara arizonica</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	6	-	-	-	-	-	-	-	-	6	-	-	120	1	2	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	120		-				
<i>Eriogonum microthecum</i>																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	1	-	-	-	-	-	-	1	1	-	-	133		2	
	99	1	1	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	1	-	-	-	-	-	-	-	1	-	-	-	66	5	5	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	6	1	-	-	-	-	-	-	7	-	-	-	140	5	9	7
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	2	-	-	-	-	-	-	-	-	-	2	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+67%						
'91		33%			00%			00%			+10%						
'99		36%			00%			18%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	66	Dec:	0%				
										'91	199		33%				
										'99	220		18%				

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					
<i>Gutierrezia sarothrae</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	4	-	-	-	80	6	7	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	80		-				
<i>Leptodactylon pungens</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	6	-	-	-	-	-	-	-	6	-	-	-	120	7	9	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	120		-				
<i>Pediocactus simpsonii</i>																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	1	-	-	-	20	1	3	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	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	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Tetradymia canescens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	10	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			

Trend Study 25A-12-99

Study site name: East Tidwell .

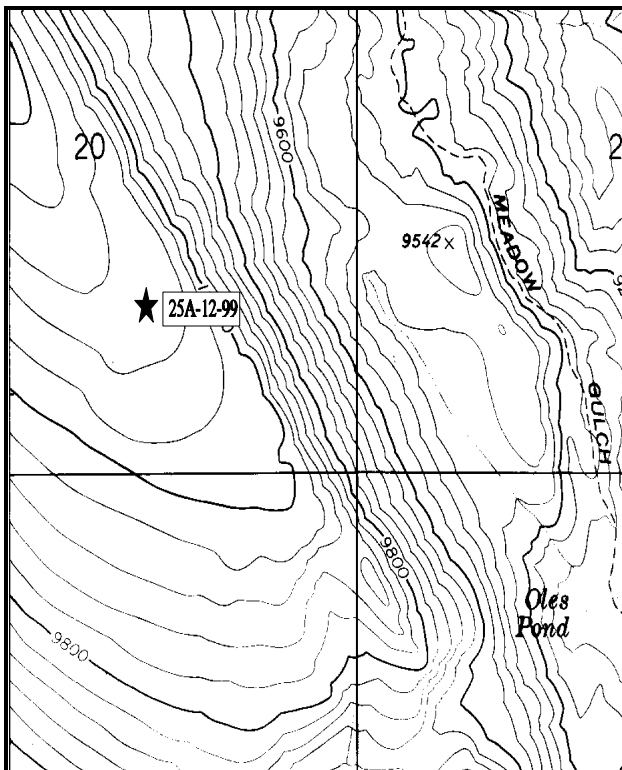
Range type: Alpine-Mixed .

Compass bearing: frequency baseline 173°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

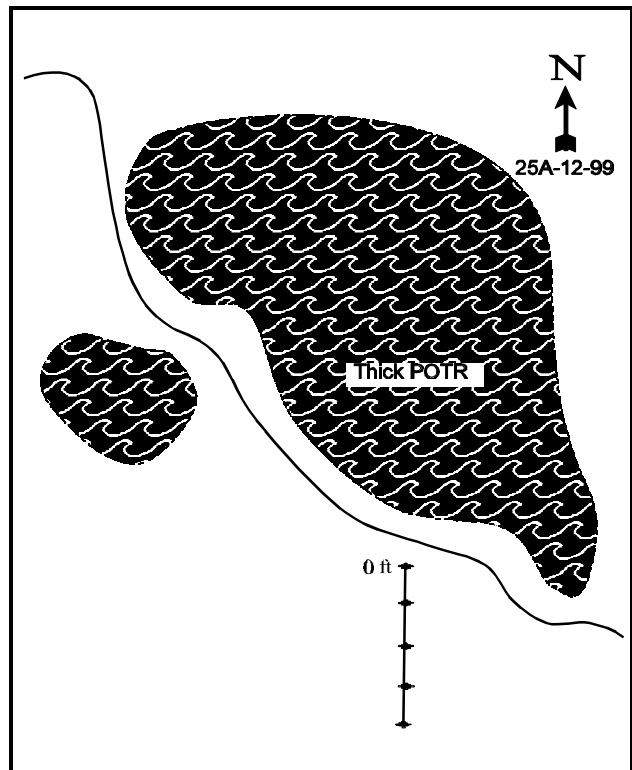
LOCATION DESCRIPTION

Traveling north on U-72 from Fremont, turn west on Forest Service road #018 (between the cattleguard and mile marker #16). Go 0.6 miles (crossing a cattleguard) to a fork in the road, go right. One-half mile later you'll come to a "T" in the road, stay to the left. Go 2.0 miles and turn right at a fork that goes up a steep hill. After 0.1 miles there is a faint intersection. Stay on the main road heading north for 0.9 miles to a gate. Go through the gate and go 0.2 miles to a fork in the road. Stay to the right and go through a grove of trees, up a steep and rocky road. Here the road becomes very faint, but travel 1.2 miles to a witness post. The 0 foot baseline stake is easy to see, and has browse tag #9078 attached.



Map Name: Geyser Peak

Township 25S , Range 4E , Section 20



Diagrammatic Sketch

UTM 4273874.295 N, 456599.828 E

DISCUSSION

Trend Study No. 25A-12 (44-6)

This study site, East Tidwell, was established in 1991. It is located on a 12% southwest facing slope at an elevation of 10,000 feet. The plant community consists entirely of low growing shrubs, forbs, and grasses. The area is grazed by cattle and used heavily by elk. It is within the Solomon allotment which is grazed by cattle on a deferred rotation. On odd numbered years, grazing occurs from August 20 to September 20, and on even numbered years, it is grazed from September 20 to October 31. Pellet group data from 1999 estimate 15 deer and 68 elk days use/acre (37 ddu/ha and 168 edu/ha). Nearly all of the deer and about 75% of the elk pellet groups were from this spring or early summer (1999). No recent cattle use was evident. There is a water trough about 600 feet south of the site which is fed by a pipe that goes to a fenced spring about one-half mile to the north. There was no water in the trough during the 1999 reading and it appeared that the pipe was not functioning.

Soil at the site is well drained and deep with an effective rooting depth of 16 inches. Rock and especially pavement are abundant on the surface. The profile contains mostly gravel sized rock with larger rock concentrated at 10 to 12 inches in depth. Texture of the soil is a loam with a slightly alkaline pH (7.5). Parent material is basalt. Bare ground is low due to the well armored nature of the soil surface. Erosion is slight and there are no active gullies in the area.

Browse on the site consists mainly of Parry rabbitbrush which currently ('99) accounts for 68% of the shrub cover. Several other shrubs including; black sagebrush, mountain big sagebrush, low rabbitbrush, and gray horsebrush, which occur in relatively small numbers. Parry rabbitbrush is very abundant with an estimated density of 38,865 plants/acre in 1991 declining to 13,140 in 1999. Since only a few dead plants were encountered in 1999, the change in density is due to the much larger sample used in 1999 which gives a significantly more representative estimate of shrub densities that have distributions that are clumped or discontinuous. It also appears that the stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*) sampled in 1999 was called Parry rabbitbrush (*Chrysothamnus parryi*) in 1991. The Parry rabbitbrush population is currently ('99) mostly mature with light use, good vigor, and low decadence. Mature shrubs are small measuring only 5 inches high with an 8 crown.

The only other common browse on the site include are fringed sagebrush and gray horsebrush. The fringed sagebrush is mostly unutilized, while the gray horsebrush has received moderate to heavy use in 1991 and mostly light use in 1999. There are a few scattered black and mountain big sagebrush plants on the site. They do not appear to be used.

Due to the high elevation of this site, the herbaceous understory is the key forage source for big game and livestock in this area. Grasses and forbs are diverse and moderately abundant. Twelve species of grasses were sampled in 1999. Four species, prairie Junegrass, mutton bluegrass, bottlebrush squirreltail, and letterman needlegrass, are common and combined together provide 86% of the grass cover. No utilization was noted on the grasses in 1999. Forbs are also diverse with 28 species encountered in 1999. All forbs combined currently produce 14% cover compared to 9% for grasses. There are several useful species on the site, although many of the common forbs are low growing less desirable types such as pussytoes, low fleabane, Eaton fleabane, trailing fleabane, pingue hymenoxys, and elegant cinquefoil. Some of the paintbrush and bastard toadflax had been utilized in 1999.

1991 APPARENT TREND ASSESSMENT

With the high rock cover on the soil, it is unlikely that there will be erosion problems in the future. Overstory is mostly a consistent population of rabbitbrush. There is a diversity of grasses and forbs but only a few shrubs. Because of the high diversity, the site will most likely be able to recover from stressful ecological events, but could be compromised because of the high density of rabbitbrush.

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of bare ground declined but litter cover also declined from 22% to only 6%. The soil surface is well protected by vegetation and pavement and erosion does not appear to be a problem. Shrubs are not a particularly important component on this high elevation site. Trend for browse appears stable for the key species, Parry rabbitbrush. The decline in density since 1991 is due to a combination of the much larger sample used in 1999 and misidentification of low rabbitbrush in 1991. The population is mostly mature, lightly browsed, and in good vigor. The key vegetational component at this elevation is the herbaceous understory, especially the forbs. Trend for the herbaceous understory is stable for grasses and down slightly for forbs. Overall, the herbaceous trend is considered down slightly.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 12

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '99
		'91	'99	'91	'99	
G	Agropyron trachycaulum	-	*24	-	10	.32
G	Bouteloua gracilis	24	14	9	6	.03
G	Carex spp.	49	*9	20	6	.10
G	Festuca ovina	59	77	28	31	.70
G	Koeleria cristata	132	159	56	67	2.15
G	Poa fendleriana	89	*169	38	71	2.90
G	Poa secunda	-	1	-	1	.03
G	Sitanion hystrix	128	*84	52	36	1.22
G	Stipa comata	-	*10	-	6	.06
G	Stipa lettermani	184	*68	77	31	1.35
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		665	615	280	265	8.88
Total for Grasses		665	615	280	265	8.88
F	Agoseris glauca	46	*20	20	11	.15
F	Antennaria rosea	70	62	29	23	1.21
F	Androsace septentrionalis (a)	-	31	-	16	.11
F	Aster spp.	38	*7	16	3	.01
F	Astragalus spp.	76	*55	35	24	1.55
F	Chaenactis douglasii	5	7	3	3	.01
F	Comandra pallida	-	*9	-	5	.10
F	Delphinium spp.	2	-	1	-	-
F	Eriogonum alatum	-	*5	-	3	.06
F	Erigeron eatonii	7	14	3	6	.32

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'91	'99	'91	'99	
F	<i>Erigeron flagellaris</i>	-	5	-	2	.01
F	<i>Erigeron pumilus</i>	5	*56	4	22	1.10
F	<i>Eriogonum umbellatum</i>	19	29	10	14	.52
F	<i>Gentiana calycosa</i>	34	*121	15	57	1.90
F	<i>Geranium caespitosum</i>	174	*-	67	-	-
F	<i>Hymenoxys richardsonii</i>	82	68	39	36	1.59
F	<i>Ivesia gordonii</i>	29	*6	15	3	.04
F	<i>Lesquerella wardii</i>	58	*13	27	6	.05
F	<i>Linum lewisii</i>	22	*56	9	25	.86
F	<i>Lupinus</i> spp.	4	7	1	3	.39
F	<i>Lychnis drummondii</i>	-	*13	-	7	.06
F	<i>Machaeranthera canescens</i>	90	*7	38	4	.07
F	<i>Oxytropis</i> spp.	14	45	9	17	.49
F	<i>Penstemon</i> spp.	95	80	42	41	.43
F	<i>Phlox longifolia</i>	121	*49	60	23	.17
F	<i>Potentilla concinna</i>	134	*39	61	18	.75
F	<i>Polygonum douglasii</i> (a)	-	2	-	1	.00
F	<i>Potentilla gracilis</i>	-	*26	-	12	.06
F	<i>Senecio multilobatus</i>	41	*158	21	68	1.60
F	<i>Taraxacum officinale</i>	26	14	14	10	.10
F	Unknown forb-perennial	2	-	1	-	-
Total for Annual Forbs		0	33	0	17	0.11
Total for Perennial Forbs		1194	971	540	446	13.69
Total for Forbs		1194	1004	540	463	13.80

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 25A, Study no: 12

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia frigida	40	.37
B	Artemisia nova	5	.53
B	Artemisia tridentata vaseyana	2	.15
B	Chrysothamnus parryi	81	5.82
B	Chrysothamnus viscidiflorus viscidiflorus	47	.71
B	Gutierrezia sarothrae	27	.06
B	Symphoricarpos oreophilus	1	-
B	Tetradymia canescens	43	.95
Total for Browse		246	8.61

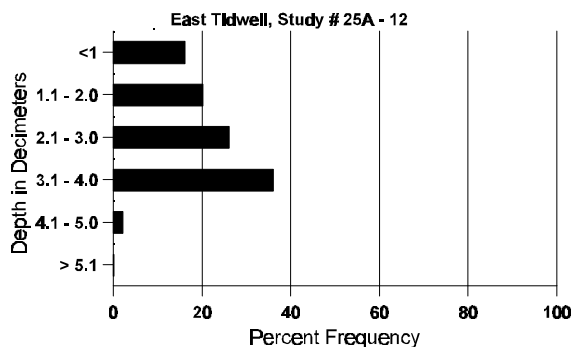
BASIC COVER --
Herd unit 25A, Study no: 12

Cover Type	Nested Frequency '99	Average Cover % '91 '99	
Vegetation	341	10.50	30.06
Rock	300	13.25	10.85
Pavement	348	44.25	43.96
Litter	297	22.25	6.19
Cryptogams	49	.25	.18
Bare Ground	159	9.50	4.02

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 12, Study Name: East Tidwell

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.0	48.8 (16.8)	7.5	47.3	29.4	23.3	3.1	21.0	166.4	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 12

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	12	n/a
Elk	37	68(168)
Deer	17	15(37)
Cattle	2	1(2)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 12

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 frigida</i>																		
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	99	3	-	-	-	-	-	-	1	-	4	-	-	-	80			4
Y	91	10	2	1	1	-	-	-	-	-	14	-	-	-	933			14
	99	32	-	-	-	-	-	-	-	-	32	-	-	-	640			32
M	91	2	1	-	-	-	-	-	-	-	3	-	-	-	200	2	5	3
	99	191	3	-	-	-	-	-	-	-	194	-	-	-	3880	5	7	194
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		18%			06%			00%			+75%							
'99		01%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	1133	Dec:	-			
												'99	4520		-			
<i>Artemisia nova</i>																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100	10	28	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	140		-			
<i>Artemisia tridentata vaseyana</i>																		
M	91	1	1	3	-	-	-	-	-	-	5	-	-	-	333	4	5	5
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40	8	20	2
D	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		17%			67%			00%			-90%							
'99		50%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	399	Dec:	17%			
												'99	40		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 parryi																		
S	91	65	-	-	-	-	-	-	-	-	64	1	-	-	4333		65	
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	91	95	56	10	-	-	-	-	-	-	151	9	-	1	10733		161	
	99	61	-	-	-	-	-	-	-	-	61	-	-	-	1220		61	
M	91	98	105	48	3	1	1	-	-	-	244	10	1	1	17066	4	6	256
	99	570	-	-	-	-	-	-	-	-	570	-	-	-	11400	5	8	570
D	91	41	45	33	10	1	35	1	-	-	137	5	-	24	11066		166	
	99	20	5	-	1	-	-	-	-	-	17	-	-	9	520		26	
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		36%			22%			05%			-66%							
'99		.76%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	38865	Dec:	28%			
												'99	13140		4%			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	94	-	-	1	-	-	-	-	-	95	-	-	-	1900	5	9	95
D	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	1	-	-	-	-	-	-	1	-	-	4	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			.90%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	0%			
												'99	2220		5%			
Gutierrezia sarothrae																		
S	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	1	-	20		1	
Y	91	3	-	-	-	1	-	-	-	-	4	-	-	-	266		4	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	91	5	-	-	-	-	-	-	-	-	5	-	-	-	333	3	3	5
	99	43	-	-	-	-	-	-	-	-	42	1	-	-	860	4	6	43
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		11%			00%			00%			+38%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	599	Dec:	-			
												'99	960		-			

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								
M	91	-	-	-	-	-	-	0
	99	-	-	-	1	-	-	20
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
'91		00%		00%		00%		
'99		100%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'91	0	Dec: -
						'99	20	-
Tetradymia canescens								
S	91	1	-	-	-	-	-	66
	99	4	-	-	-	-	-	80
Y	91	2	1	-	-	-	-	200
	99	31	-	-	-	-	-	620
M	91	2	5	2	-	-	1	666
	99	69	9	-	-	-	-	1560
D	91	3	2	1	-	-	1	466
	99	4	1	-	-	-	-	100
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
'91		40%		25%		05%		+42%
'99		09%		00%		.87%		
Total Plants/Acre (excluding Dead & Seedlings)						'91	1332	Dec: 35%
						'99	2280	4%

Trend Study 25A-13-99

Study site name: Ox Spring .

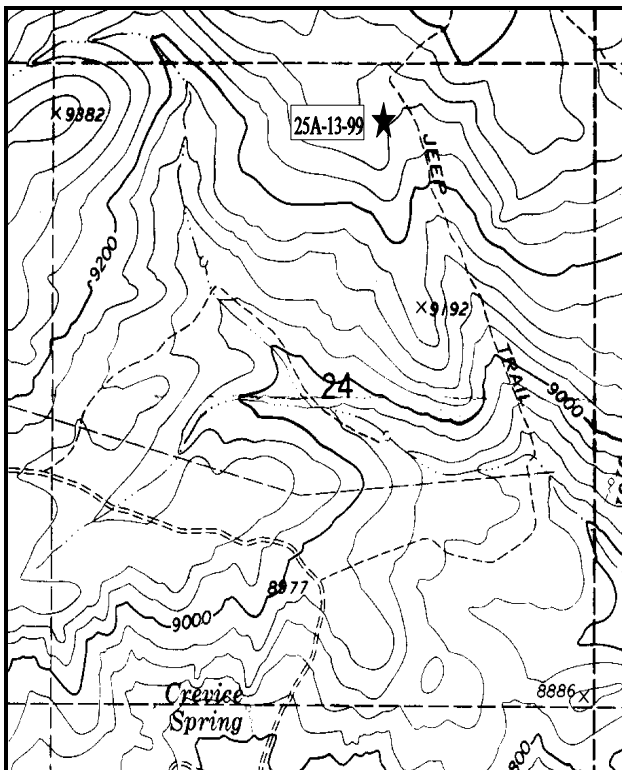
Range type: Burn .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

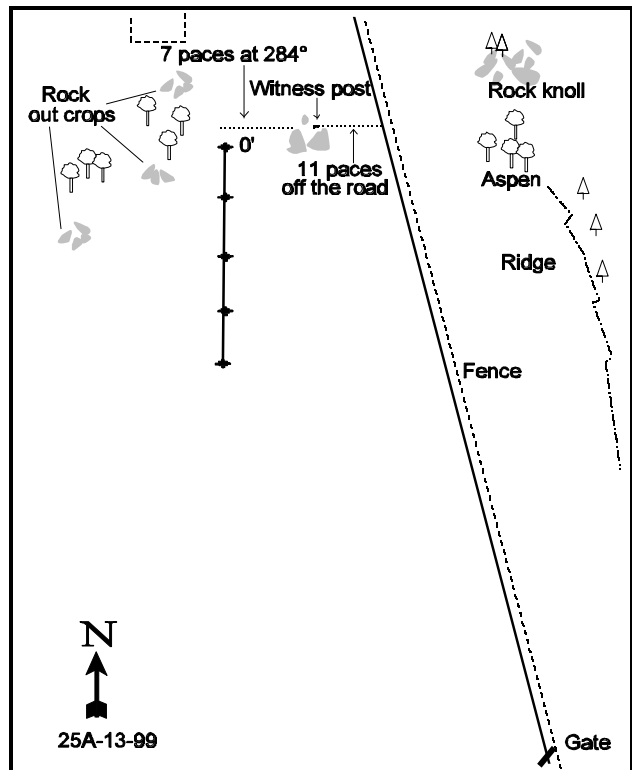
LOCATION DESCRIPTION

Turn west off of SR 72 onto the Mill Meadow Road north of Fremont. Go past the lake and up the Johnson Reservoir Road for 3.8 miles. Turn west off the paved road and go 1.1 miles to a cattleguard at the head of Cedarless Flat. Continue 0.6 miles to a fork in the road. Go right for 1.75 miles to the Ox Spring trail turnoff. Stay left (on the main road) for 1.15 miles to another cattleguard. Go another 1.05 miles to the Briggs Hollow turnoff. Stay right for 0.35 miles, turn right off the Mytoge Road, and go 0.5 miles to a gate. Drive another 0.85 miles (passing through two more gates) to a witness post among some rocks, 11 paces off the left (west) side of the road. From the witness post, the white-topped 0 foot baseline stake is 7 paces away at an azimuth of 284°M.



Map Name: Fish Lake, Utah

Township 26S , Range 2E , Section 24



Diagrammatic Sketch

UTM 4266169.993 N, 444051.066 E

DISCUSSION

Trend Study No. 25A-13 (44-7)

The Ox Spring site is a new study first read in 1991 near Ox Spring. It samples a prescribed burn on a high elevation mountain big sagebrush type with a 10-12% south-facing slope and an elevation of 9,300 feet. The land is administered by the U.S. Forest Service. The area is grazed by cattle during the summer as part of the UM allotment which is used in the spring. Pellet group data from a nearby Division pellet group transect estimated 19 deer and 46 elk days use/acre in 1991 (46 ddu/ha, 114 edu/ha). Elk use appeared heavy in the spring of 1991. An enclosure nearby is used to monitor spring elk utilization. Pellet group data taken along the study site baseline in 1999 estimate 9 deer, 97 elk and 25 cow days use/acre (22 ddu/ha, 240 edu/ha, and 62 cdu/ha). All of the cattle pats appeared to be from last season. Most elk pellet groups seemed to be from the spring.

The soil is moderately deep with an effective rooting depth of over 16 inches. It has a loam texture with a neutral pH (7.3). The soil is dark in color and fertile with a relatively high organic matter content of 5.2%. The surface horizon contains a high percentage of gravel sized rock fragments. Litter and pavement cover most of the bare areas leaving little exposed bare ground. Erosion does not appear to be a problem on this site due to uniform distribution of vegetation and litter cover.

The browse consists of mostly sprouting shrubs: woods rose, Oregon grape, and snowberry. Rabbitbrush was the most numerous species with an estimated 12,466 plants/acre, with light to moderate use 1991. Density declined to 7,240 plants/acre in 1999, due in part to the much larger sample now used which gives much more accurate estimates for browse species. The population is currently ('99) mostly mature with young plants making up 13% of the population. Mature plants have doubled in number since 1991. Utilization was moderate in 1991, but there was little sign of use in 1999. Some mountain big sagebrush and rubber rabbitbrush were encountered in 1999 with the larger sample size.

The site is dominated by native grasses and forbs which currently ('99) provide 72% of the total vegetation cover. The most numerous grass is mutton bluegrass which accounts for 45% of the grass cover. Other common species include bottlebrush squirreltail, prairie Junegrass, Carex, pinewoods needlegrass, and bluebunch wheatgrass. There were 25 species of forbs sampled in 1991 and 20 in 1999. The more common forbs include Watson penstemon, Lupine, aster, and rose pussytoes.

1991 APPARENT TREND ASSESSMENT

Overall, the soil trend appears stable. No recent erosion was evident and no active gullies occur on the site. Vegetation and litter cover appear sufficient to hold the soil in place. The only desirable browse, stickyleaf low rabbitbrush, has a large population with a good percentage of young plants. Native grasses and forbs are diverse and abundant.

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of bare ground has declined but litter cover has also declined. There does not appear to be any problem with erosion on this site. Trend for browse is up slightly. Density of the increaser, stickyleaf low rabbitbrush has declined, while density of the more preferred mountain big sagebrush and white-stemmed rubber rabbitbrush have increased. However, shrubs are not the most important component on this site. Trend for the herbaceous understory is down slightly overall. Sum of nested frequency for grasses increased slightly, although frequency of forbs declined substantially. It appears that forb abundance is declining after a flush of growth following the fire.

TREND ASSESSMENT

soil - stable

browse - up slightly

herbaceous understory - up slightly for grasses, down for forbs, down slightly overall

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 13

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '09
		'91	'99	'91	'99	
G	Agropyron spp.	110	*-	47	-	-
G	Agropyron spicatum	-	*85	-	35	2.27
G	Agropyron trachycaulum	-	*48	-	18	.72
G	Bromus anomalus	-	*38	-	17	.60
G	Carex spp.	75	94	25	31	2.68
G	Koeleria cristata	129	125	54	45	2.82
G	Poa fendleriana	258	275	95	90	10.56
G	Sitanion hystrix	138	*102	55	45	1.87
G	Sporobolus cryptandrus	-	1	-	1	.03
G	Stipa comata	-	4	-	1	.03
G	Stipa pinetorum	78	65	35	-	1.81
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		788	837	311	308	23.44
Total for Grasses		788	837	311	308	23.44
F	Agoseris glauca	74	*-	29	-	-
F	Antennaria rosea	105	124	46	49	5.07
F	Androsace septentrionalis (a)	-	84	-	38	.44
F	Arabis spp.	37	*-	18	-	-
F	Arabis drummondi	10	*-	6	-	-
F	Astragalus argophyllus	12	*-	6	-	-
F	Aster chilensis	80	*15	32	7	.30
F	Astragalus serpens	17	*-	11	-	-
F	Aster spp.	18	37	10	16	1.27
F	Astragalus spp.	6	*38	2	16	.22
F	Castilleja chromosa	6	-	2	-	-
F	Castilleja linariaefolia	4	7	2	4	.07
F	Crepis acuminata	41	*5	22	4	.02
F	Erigeron eatonii	18	*-	8	-	-
F	Erigeron pumilus	-	*8	-	3	.09
F	Eriogonum racemosum	57	74	25	30	1.66
F	Eriogonum umbellatum	8	6	5	5	.08

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'91	'99	'91	'99	
F	<i>Fritillaria atropurpurea</i>	21	*-	10	-	-
F	<i>Lotus utahensis</i>	13	26	10	13	.50
F	<i>Lupinus</i> spp.	116	109	50	48	3.48
F	<i>Lychnis drummondii</i>	-	*9	-	5	.07
F	<i>Machaeranthera canescens</i>	1	2	1	1	.03
F	<i>Penstemon watsonii</i>	131	63	58	26	1.88
F	<i>Phlox austromontana</i>	4	-	2	-	-
F	<i>Phlox longifolia</i>	97	*-	48	-	-
F	<i>Potentilla concinna</i>	3	9	2	3	.33
F	<i>Taraxacum officinale</i>	69	79	28	40	1.31
F	<i>Tragopogon dubius</i>	-	1	-	1	.03
F	Unknown forb-perennial	2	-	1	-	-
F	<i>Viguiera multiflora</i>	-	1	-	1	.00
Total for Annual Forbs		0	84	0	38	0.43
Total for Perennial Forbs		950	613	434	272	16.46
Total for Forbs		950	697	434	310	16.90

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 13

Type	Species	Strip Frequency	Average Cover %
		09	09
B	<i>Artemisia tridentata vaseyana</i>	5	-
B	<i>Chrysothamnus nauseosus</i>	24	.87
B	<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	88	13.89
B	<i>Cowania mexicana</i> <i>stansburiana</i>	0	-
B	<i>Mahonia repens</i>	2	.06
B	<i>Rosa woodsii</i>	6	.09
B	<i>Symphoricarpos oreophilus</i>	13	1.01
B	<i>Tetradymia canescens</i>	0	-
Total for Browse		138	15.93

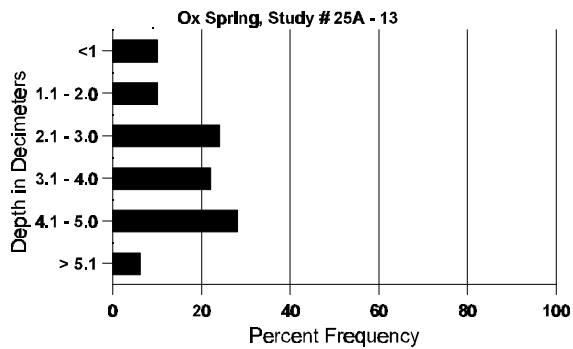
BASIC COVER --
Herd unit 25A, Study no: 13

Cover Type	Nested Frequency '99	Average Cover %	
		'91	'99
Vegetation	373	17.00	56.81
Rock	188	7.00	5.75
Pavement	258	14.50	12.86
Litter	375	45.25	35.65
Cryptogams	-	0	0
Bare Ground	238	16.25	9.22

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 13, Study Name: Ox Spring

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.5	55.2 (16.5)	7.3	33.3	43.4	23.3	5.2	20.5	428.8	0.7

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 13

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	4	n/a
Horse	1	0
Elk	57	97(240)
Deer	7	9(22)
Cattle	8	25(62)

BROWSE CHARACTERISTICS --
Herd unit 25A, Study no: 13

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>																	
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	4	-	-	-	-	-	-	-	-	-	-	-	80		4	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	-	-	-	-	80	22	38	4
X	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	3260		163	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	0	Dec:	-			
											'99	160		-			
<i>Chrysothamnus nauseosus</i>																	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	46	2	-	-	-	-	-	-	-	-	-	-	960	9	14	48
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		00%			00%			00%									
'99		04%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	0	Dec:	-			
											'99	960		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																	
Y	91	54	34	9	6	-	-	1	-	-	-	-	-	6933		104	
	99	46	-	-	-	-	-	-	-	-	-	-	-	920		46	
M	91	24	43	6	5	3	-	-	-	-	-	-	-	5400	5	10	81
	99	310	-	-	-	-	-	-	-	-	-	-	-	6200	13	21	310
D	91	2	-	-	-	-	-	-	-	-	-	-	-	133		2	
	99	6	-	-	-	-	-	-	-	-	1	1	4	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		43%			08%			00%			-42%						
'99		00%			00%			01%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	12466	Dec:	1%			
											'99	7240		2%			
<i>Cowania mexicana stansburiana</i>																	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	9	17	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	0	Dec:	-			
											'99	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				
Mahonia repens																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160	3	6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	260		-			
Rosa woodsii																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	9	-	-	-	-	-	-	-	-	9	-	-	-	180	9	9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	260		-			
Symphoricarpos oreophilus																		
Y	91	-	7	-	-	-	-	-	-	-	7	-	-	-	466		7	
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	91	-	-	2	1	-	-	-	-	-	3	-	-	-	200	6	10	
	99	13	-	-	2	-	-	-	-	-	15	-	-	-	300	19	32	
D	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		70%			20%			00%			-34%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	666	Dec:	0%			
												'99	440		5%			
Tetradymia canescens																		
Y	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		100%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	66	Dec:	-			
												'99	0		-			

Trend Study 25A-14-99

Study site name: Row of Pines Exclosure.

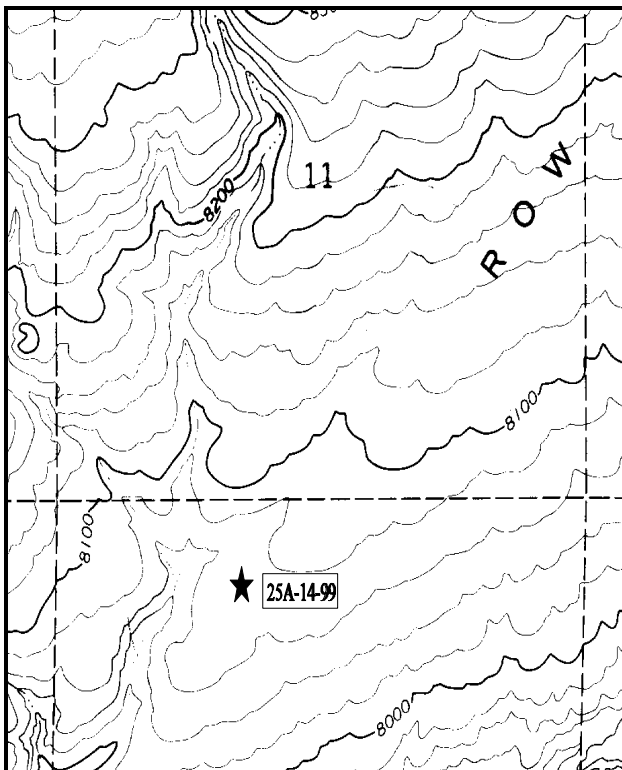
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

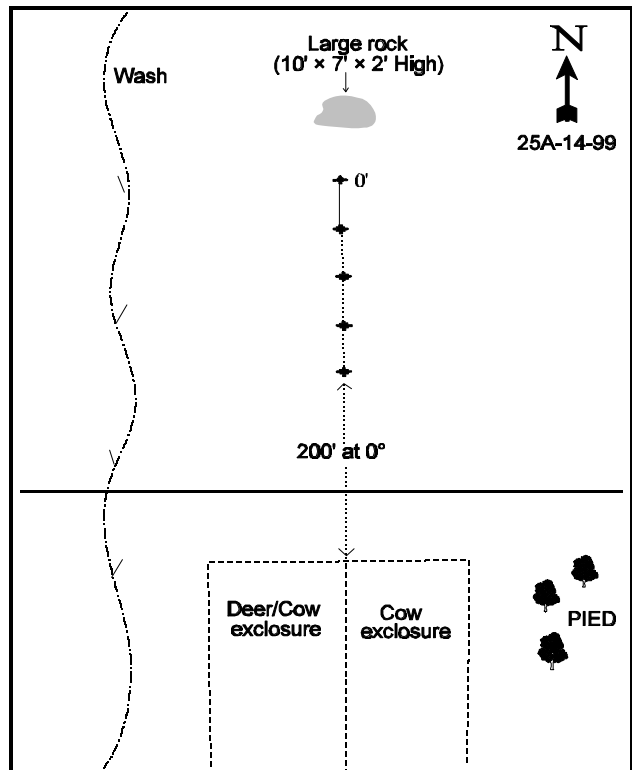
LOCATION DESCRIPTION

From the Chappell Cheese Factory northwest of Loa on SR 24, go west 2.6 miles to a side road on the north where the highway makes a sharp turn (0.95 miles west of mile marker #49). Take this road 0.65 miles and turn right after crossing a cattleguard. After 0.7 more miles, turn right at the fork and cross another cattleguard. Go 2.7 miles to another fork where you will again turn right. After ~60', turn right (east) and go 1.4 miles to an exclosure. Stop at the middle of the exclosure and walk 200 feet at an azimuth of 0°M to the 400' stake. The 0' stake is 400 feet to the north in front of a large rock.



Map Name: Loa, Utah

Township 27S, Range 2E, Section 14



Diagrammatic Sketch

UTM 4258009.860 N, 442706.420 E

DISCUSSION

Trend Study No. 25A-14 (44-8)

The Row of Pines Exclosure was a new study established in 1991. It samples a sagebrush-grass type which was chained and seeded. The site has a slight slope of 3% to 5% with a south aspect. The transect was set up 200 feet north of the Row of Pines exclosure built by the BLM and DWR. The area is within the BLM seven mile allotment which allows cattle grazing for approximately 20 days in May. Cattle sign and tracks were found in the area in 1991. Deer sign and remains were also found in 1991 and pellet group data estimated 21 deer days use/acre (52 ddu/ha). Large amounts of sage grouse droppings were also encountered on the area during study site establishment in 1991. Pellet group data from the site in 1999 estimate 29 deer, 15 elk and 15 cow days use/acre (72 ddu/ha, 37 edu/ha, 37 cdu/ha). All of the elk pellet groups appeared to be from the winter, while about half of the deer pellet groups are from this spring and early summer. All cattle pats appear to be from last season. Escape cover for big game is nonexistent on the site, although some does occur about a one-half mile or so from the transect.

Soil depth is moderately shallow with an estimated effective rooting depth of just over 11 inches. Texture is a sandy clay loam to a loam with a neutral pH (7.0). Soil parent material is basalt. Phosphorus is marginal at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil surface is a combination of pavement and bare ground with some evidence of soil erosion. However, due to the lack of slope, water erosion is not currently a significant problem in this area. Wind erosion however, may be more of a concern.

The dominant browse species is Wyoming big sagebrush which had a density of 6,399 plants/acre in 1991 and 5,580 by 1999. Sagebrush currently ('99) provides 77% of the browse cover. Most of the population is mature or decadent. Seedlings and young are present in low numbers. Utilization has been moderate to heavy since 1991, but vigor is generally good and percent decadence has remained relatively stable at 27% in 1991 and 29% in 1999. However, nearly half (47%) of the decadent plants sampled were classified as dying and there are currently not enough young plants to replace them.

The only other common shrubs are undesirable increasers, narrowleaf low rabbitbrush and broom snakeweed. Narrowleaf low rabbitbrush has declined in density since 1991 primarily due to the much larger sample used in 1999 which gives more accurate density estimates for browse populations with discontinuous distributions. It currently appears stable at 1,100 plants/acre. Broom snakeweed has increased from 6,066 plants/acre in 1991 to 10,000 by 1999. Some of the increase would be due to the much larger sample size, however it has obviously increased considerably. Mature plants have also increased in size from only 2 inches high with a 2 inch crown in 1991 to 7 by 8 inches in 1999. Most of the population is mature where young plants account for 10% of population.

Seeded grasses, crested wheatgrass, smooth brome, and Russian wildrye, have become established since the chaining but in low numbers. The dominant grass is blue grama and bottlebrush squirreltail which currently provide 93% of the grass cover. Forb composition and abundance is poor with all forbs combined providing less than 1% cover in 1999. The only common species encountered in 1999 was low fleabane.

1991 APPARENT TREND ASSESSMENT

With the high amount of pavement and rock, the soil is basically stable. The disturbance due to chaining caused only slight erosion, with much of the erosion likely caused by wind and not water. Forbs on the site are not abundant or diverse. The major forage species is Wyoming big sage which is in good condition.

1999 TREND ASSESSMENT

Trend for soil is stable to improving. Percent cover of bare ground has declined while litter cover has also gone down. Rock and pavement cover have increased. Erosion does not currently appear to be a problem on this site. Trend for browse is down slightly. The key species, Wyoming big sagebrush, has a stable population, however 47% (760 plants/acre) of the decadent plants appear to be dying. The proportion of young plants in the population has declined from 15% in 1991 to only 6% currently. There are not enough young plants to replace decadent/dying individuals. Seedlings are rare. Utilization has remained moderate to heavy. That proportion of the population classified with poor vigor has increased from 2 to 14%. Another negative aspect of the browse trend is the increase in density and size of broom snakeweed. It currently has a mostly mature population of 10,000 plants/acre. Trend for the herbaceous understory is up slightly. Sum of nested frequency of grasses and forbs has increased slightly since 1991. Composition is poor however with the low growing blue grama providing 73% of the grass cover and 68% of the herbaceous cover. Seeded grasses did not establish well and remain at low numbers. Forbs are lacking.

TREND ASSESSMENT

soil - stable to improving

browse - down slightly

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 14

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '99
		'91	'99	'91	'99	
G	Agropyron cristatum	32	36	15	16	.22
G	Bouteloua gracilis	122	149	50	52	6.48
G	Bromus inermis	4	9	3	4	.07
G	Elymus junceus	1	*19	1	11	.18
G	Oryzopsis hymenoides	33	18	16	8	.11
G	Sitanion hystrix	135	152	64	67	1.73
G	Stipa comata	2	1	1	1	.00
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		329	384	150	159	8.83
Total for Grasses		329	384	150	159	8.83
F	Androsace septentrionalis (a)	-	12	-	5	.02
F	Arabis demissa	2	-	2	-	-
F	Astragalus lentiginosus	4	6	2	2	.01
F	Descurainia pinnata (a)	-	4	-	2	.01
F	Eriogonum ovalifolium	7	3	4	2	.18
F	Erigeron pumilus	7	*63	5	32	.38
F	Phlox longifolia	12	5	8	3	.01
F	Sphaeralcea coccinea	13	*5	11	5	.02
Total for Annual Forbs		0	16	0	7	0.03

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'91	'99	'91	'99	
	Total for Perennial Forbs	45	82	32	44	0.61
	Total for Forbs	45	98	32	51	0.64

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 14

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	5	-
B	Artemisia tridentata wyomingensis	93	13.11
B	Chrysothamnus viscidiflorus stenophyllus	31	.45
B	Gutierrezia sarothrae	96	3.20
B	Opuntia fragilis	14	.19
B	Pediocactus simpsonii	1	-
	Total for Browse	240	16.96

BASIC COVER --

Herd unit 25A, Study no: 14

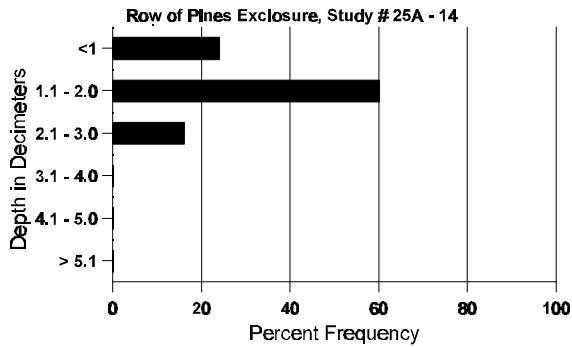
Cover Type	Nested Frequency 09	Average Cover %	
		'91	'99
Vegetation	301	4.00	25.65
Rock	243	11.50	13.64
Pavement	361	23.00	29.28
Litter	350	27.00	18.03
Cryptogams	35	0	.24
Bare Ground	328	34.50	21.60

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 14, Study Name: Row of Pines Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	55.4 (12.2)	7.0	47.3	27.4	25.3	1.6	8.5	163.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 14

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	34	n/a
Elk	5	15(37)
Deer	16	29(72)
Cattle	3	15(37)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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			
Artemisia frigida																	
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	3	2	4	-	-	-	-	-	-	-	-	-	9	180	4	9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>					
'91		00%			00%			00%									
'99		20%			40%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-		
												'99	200		-		

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	91	9	-	-	-	-	-	3	-	-	12	-	-	-	800		12
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	91	4	6	1	2	-	1	-	-	-	14	-	-	-	933		14
	99	9	7	-	-	-	-	1	-	-	17	-	-	-	340		17
M	91	3	19	23	7	2	1	1	-	-	55	-	-	1	3733	7	9
	99	61	89	29	-	2	-	-	-	-	181	-	-	-	3620	13	24
D	91	4	10	9	2	1	-	-	-	-	25	-	-	1	1733		26
	99	31	23	17	2	4	1	3	-	-	43	-	-	38	1620		81
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	620		31
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		40%			36%			02%			-13%						
'99		45%			17%			14%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	6399	Dec:	27%			
											'99	5580		29%			
<i>Chrysothamnus viscidiflorus stenophyllus</i>																	
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	91	4	3	-	-	-	1	-	-	-	7	-	-	1	533		8
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	91	5	14	9	-	-	2	-	-	-	30	-	-	-	2000	4	6
	99	36	2	-	3	-	-	-	-	-	41	-	-	-	820	4	9
D	91	3	5	3	-	-	-	-	-	-	11	-	-	-	733		11
	99	7	2	-	3	-	-	1	-	-	6	2	-	5	260		13
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		45%			31%			02%			-66%						
'99		07%			00%			09%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	3266	Dec:	22%			
											'99	1100		24%			
<i>Gutierrezia sarothrae</i>																	
S	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4
	99	26	-	-	-	-	-	-	-	-	26	-	-	-	520		26
Y	91	20	-	-	2	-	-	2	-	-	24	-	-	-	1600		24
	99	50	-	-	-	-	-	-	-	-	50	-	-	-	1000		50
M	91	30	13	10	8	-	-	1	-	-	62	-	-	-	4133	2	2
	99	435	-	-	-	-	-	4	-	-	439	-	-	-	8780	7	8
D	91	5	-	-	-	-	-	-	-	-	4	-	-	1	333		5
	99	11	-	-	-	-	-	-	-	-	4	-	-	7	220		11
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	500		25
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'91		14%			11%			01%			+39%						
'99		00%			00%			01%									
Total Plants/Acre (excluding Dead & Seedlings)											'91	6066	Dec:	5%			
											'99	10000		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				
Opuntia fragilis																		
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	2	-	-	-	-	-	-	-	-	2	-	-	40		2		
M	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	19	-	-	4	-	-	1	-	-	24	-	-	480	2	8	24	
D	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	1	-	-	-	-	-	-	-	-	-	-	1	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	0%			
												'99	540		4%			
Pediocactus simpsonii																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	1	-	-	-	-	-	-	-	-	1	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	20		-			

Trend Study 25A-16-99

Study site name: Tommy Hollow .

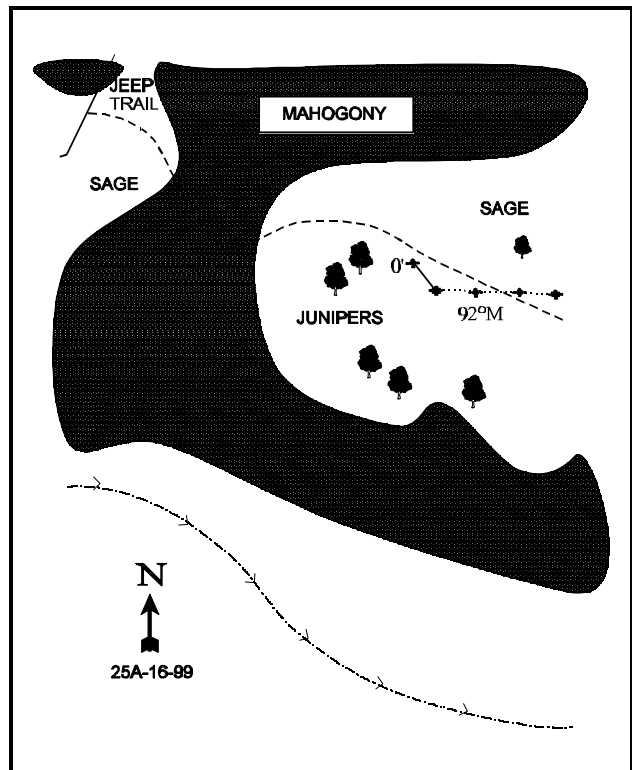
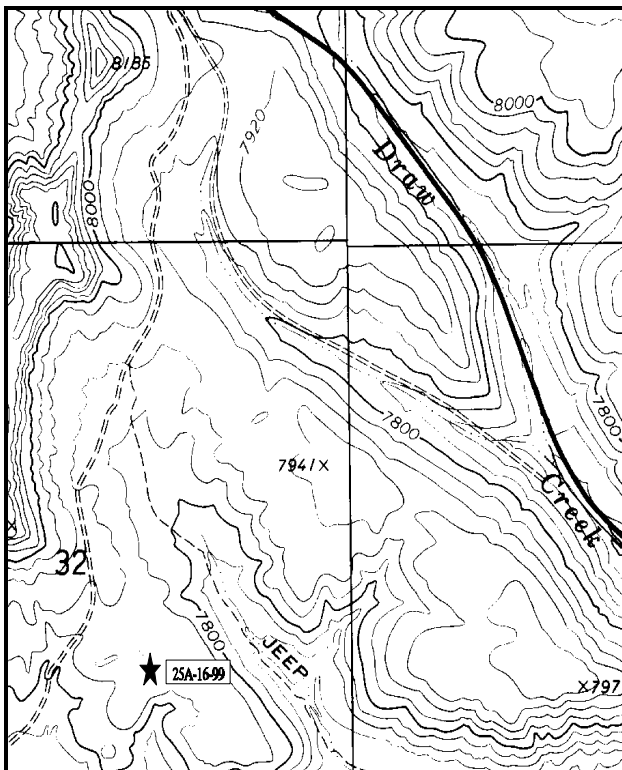
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 167°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Take I-70 east for about 37.5 miles from Salina to a rest area exit. From the exit, turn right once, then right again to go west on the frontage road paralleling the freeway. Drive on the frontage road for 3.75 miles to a road (FS #013) turning left. Take this left turn and proceed 0.1 miles to a "T" in the road, turn left again and go south for 0.75 miles to the crest of the second hill. On the crest there is an old jeep trail turning left and going down the top of the hill. This road goes through a small clearing at the intersection, then through a thick patch of mahogany and junipers. The transect begins in the next sage clearing beyond the trees, about 50 feet past two pinyons standing beside each other near the edge of the clearing. The transect is marked with 2-1/2 foot tall rebar. The 0-foot baseline stake has a red browse tag #7193 attached.



Map Name: Old Woman Plateau, Utah

Diagrammatic Sketch

Township 23S , Range 4E , Section 32

UTM 4290474.897 N, 457845.521 E

DISCUSSION

Trend Study No. 25A-16 (45-2)

This study, Tommy Hollow, is on the low rolling mountains about one mile south of Emigrant Pass on I-70 at about 7,800 feet. It samples a flat that is dominated by sagebrush and grass and surrounded by curlleaf mountain mahogany and pinyon-juniper trees. According to the Forest Service, the Tommy Hollow area is a sheep allotment and grazed in early June and July, but cattle were seen on site in July of 1985. There were no recent signs of deer use, although older pellet groups were common. In 1985, there were also signs to indicate that elk also use the site in winter. Pellet group data in 1991 estimated 42 deer and 15 elk days use/acre (103 ddu/ha, 38 edu/ha). Pellet group data from 1999 estimate 96 deer, 93 elk and 9 cow days use/acre (237 ddu/ha, 229 edu/ha, 22 cdu/ha). Most of the deer and elk pellet groups were from winter use. Rabbit sign was also very common.

The soil is relatively deep with an effective rooting depth estimated at nearly 19 inches. It is a sandy clay loam with a slightly acid pH (6.5). Phosphorus is limiting at only 4.1 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. There is a hard clay layer in some areas at about 4 to 6 inches in depth. The soil penetrometer was able to penetrate the layer but it must be limiting to root development since black sagebrush is found in these areas. The soil surface has little rock or pavement cover and there is a high amount of bare soil exposed in the shrub interspaces. There is little erosion occurring however due to the lack of significant slope combined with fairly good vegetation and litter cover.

The key species in the flat are Wyoming big sagebrush and black sagebrush which currently ('99) provide 62% of the browse cover. Both have high population densities with good numbers of seedlings and young. Utilization was light to moderate in 1985 and 1999, but heavier in 1991. Percent decadence has been low except for 1991 when 55% of the black sagebrush and 51% of the Wyoming big sagebrush were classified as decadent. Currently, both populations of sagebrush are more healthy, show light to moderate use, low decadence, and contain low numbers of dead plants. Some of the change in density of sagebrush between 1991 and 1999 is due to the much larger sample used in 1999.

Several other desirable browse species available on or near the site include winterfat, bitterbrush, curlleaf mountain mahogany, and Utah serviceberry. Besides providing variety in forage, the nearby curlleaf mountain mahogany and pinyon-juniper stands provide good protective cover. Bitterbrush occur in low numbers but continue to receive moderate to heavy use. The entire population was classified as decadent in 1991, but currently only 33% of the stand is currently ('99) decadent. Stickyleaf low rabbitbrush and broom snakeweed are also abundant. There apparently was some confusion with identification of these two similar looking species in 1985 and 1991. Currently ('99) rabbitbrush numbers 12,580 plants/acre and broom snakeweed 5,780. They are small in stature, mostly unutilized and appear to have stable populations.

The understory vegetation is composed of a variety of grasses and forbs. The frequency of grasses is moderate. Common grasses include mutton bluegrass, bottlebrush squirreltail, blue grama, and western wheatgrass. Forbs are diverse but most species occur only occasionally. The most abundant forb is the low growing pussytoes which currently ('99) provides 60% of the forb cover.

1985 APPARENT TREND ASSESSMENT

Basically, the range trend appears stable to slightly down. There is a minimal amount of erosion which will not be a problem unless the ground is severely disturbed. Species diversity is high and the key species are vigorous and reproducing. Increaser species should be monitored closely as an indication of deteriorating range conditions.

1991 TREND ASSESSMENT

Soil trend would be considered improving since 1985 because there is less bare ground. However, it is still considered in poor condition because percent bare ground is still relatively high at 34%. Key browse species (Wyoming big sagebrush and black sagebrush) have shown some notable changes. The black sagebrush population has decreased by 12%, but it was already over 10,000 plants per acre. Percent decadency has gone from 7% to 55%. This would be expected with the prolonged drought. Wyoming big sagebrush has increased dramatically. It's population has more than doubled, but percent decadency has gone up from 6% to 51%. With increased moisture, this decadency rate would be expected to go downward. Broom snakeweed was picked up in 1991 with an estimated population of 133 plants per acre. Browse trend would be considered slightly down. The principal grass species have been stable since 1985, with the exception of western wheatgrass which has gone from an 8% to 33% quadrat frequency. The forbs are stable with some losses and some gains, depending on their tolerance to drought.

TREND ASSESSMENT

soil - stable to slightly improving, but in poor condition

browse - slightly down

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable to slightly improving, but still poor condition. Percent bare ground has increased but litter cover has also gone down. There is litter erosion occurring on the site due to the high vegetation cover combined with the gentle terrain. Trend for the key species, Wyoming big sagebrush and black sagebrush, is considered up slightly. The populations contain few dead plants indicating that the difference in densities between 1991 and 1999 is mainly due to the much larger sample now used which gives more accurate estimates for browse densities. Both populations show light to moderate use, improved vigor, and declining decadence. Both populations also show good young recruitment. Another positive aspect of the browse trend is the improvement in vigor for bitterbrush. During the 1991 reading, all of the bitterbrush were decadent and showed poor vigor. Now all show normal vigor and only 33% of the plants are considered decadent. Trend for the herbaceous understory is down slightly. Sum of nested frequency of grasses has declined slightly while nested frequency of perennial forbs has declined considerably. Nested frequency of Carex and bottlebrush squirreltail declined significantly while mutton bluegrass increased significantly. The forb composition is diverse but low growing species pussytoes, low fleabane, and desert phlox are the most abundant.

TREND ASSESSMENT

soil - stable to slightly improving

browse - up slightly

herbaceous understory - down slightly

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 16

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	<i>Agropyron smithii</i>	a19	b84	b109	8	33	43	1.16
G	<i>Bouteloua gracilis</i>	116	117	91	47	48	34	1.48
G	<i>Bromus tectorum</i> (a)	-	-	2	-	-	1	.00
G	<i>Carex</i> spp.	b269	b264	a27	89	89	12	.69
G	<i>Festuca ovina</i>	b11	a-	c62	5	-	26	.84
G	<i>Oryzopsis hymenoides</i>	b72	a8	a4	33	4	2	.01
G	<i>Poa fendleriana</i>	a23	a30	b174	10	14	66	4.87
G	<i>Poa secunda</i>	b9	a-	a2	6	-	1	.00
G	<i>Sitanion hystrix</i>	ab142	b166	a110	58	70	40	2.10
G	<i>Stipa comata</i>	8	5	5	4	3	3	.07
G	<i>Stipa lettermani</i>	a8	a14	b52	3	5	20	1.18
Total for Annual Grasses		0	0	2	0	0	1	0.00
Total for Perennial Grasses		677	688	636	263	266	247	12.42
Total for Grasses		677	688	638	263	266	248	12.43
F	<i>Agoseris glauca</i>	-	5	-	-	2	-	-
F	<i>Allium</i> spp.	1	-	2	1	-	1	.03
F	<i>Antennaria rosea</i>	a14	b74	a27	6	36	9	2.40
F	<i>Androsace septentrionalis</i> (a)	-	-	28	-	-	15	.07
F	<i>Arabis</i> spp.	a-	c91	b13	-	46	6	.03
F	<i>Arabis demissa</i>	c47	b25	a-	25	12	-	-
F	<i>Astragalus convallarius</i>	-	-	1	-	-	1	.03
F	<i>Astragalus</i> spp.	1	1	9	1	1	5	.22
F	<i>Castilleja chromosa</i>	1	1	3	1	1	2	.01
F	<i>Calochortus nuttallii</i>	a23	b50	a5	10	24	2	.01
F	<i>Crepis acuminata</i>	-	2	-	-	1	-	-
F	<i>Cymopterus</i> spp.	-	3	-	-	2	-	-
F	<i>Erigeron eatonii</i>	ab6	a1	b13	3	1	6	.08
F	<i>Erigeron pumilus</i>	c110	b39	a14	49	21	7	.03
F	<i>Eriogonum racemosum</i>	a3	a-	b13	1	-	7	.13
F	<i>Hymenoxys richardsonii</i>	a-	a-	b13	-	-	6	.18
F	<i>Ipomopsis aggregata</i>	-	-	3	-	-	1	.03
F	<i>Machaeranthera canescens</i>	-	1	2	-	1	2	.01
F	<i>Penstemon</i> spp.	a-	a-	b8	-	-	4	.07
F	<i>Penstemon pachyphyllus</i>	3	2	2	1	1	2	.06
F	<i>Phlox austromontana</i>	a2	a-	b21	1	-	10	.22
F	<i>Polygonum douglasii</i> (a)	-	-	9	-	-	4	.02
F	<i>Potentilla gracilis</i>	-	-	3	-	-	1	.00
F	<i>Sphaeralcea coccinea</i>	b83	b60	a34	34	28	14	.34

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Taraxacum officinale	-	-	4	-	-	2	.01
F	Unknown forb-perennial	-	-	2	-	-	1	.00
Total for Annual Forbs		0	0	37	0	0	19	0.09
Total for Perennial Forbs		294	355	192	133	177	89	3.94
Total for Forbs		294	355	229	133	177	108	4.03

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

BROWSE TRENDS --

Herd unit 25A, Study no: 16

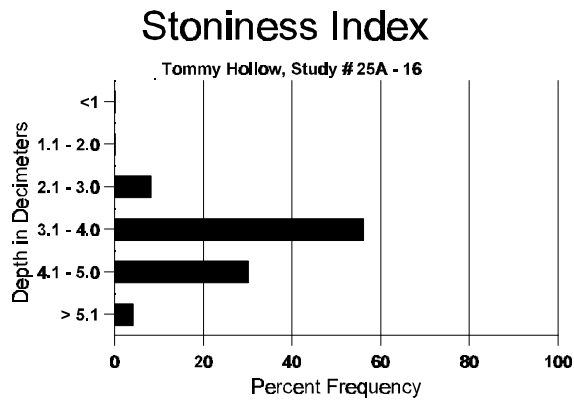
Type	Species	Strip Frequency 09	Average Cover % 09
B	Amelanchier utahensis	4	.38
B	Artemisia nova	69	3.59
B	Artemisia tridentata tridentata	1	.15
B	Artemisia tridentata wyomingensis	85	13.40
B	Ceratoides lanata	5	.00
B	Cercocarpus ledifolius	0	.00
B	Chrysothamnus depressus	5	.03
B	Chrysothamnus viscidiflorus viscidiflorus	84	5.66
B	Echinocereus triglochidatus	-	.00
B	Gutierrezia sarothrae	53	.93
B	Opuntia spp.	15	.26
B	Pinus edulis	2	-
B	Purshia tridentata	8	2.97
B	Symphoricarpos oreophilus	4	.21
B	Tetradymia canescens	3	-
Total for Browse		338	27.61

BASIC COVER --
Herd unit 25A, Study no: 16

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	351	13.50	9.75	45.80
Rock	10	.25	0	.04
Pavement	127	1.50	1.75	.53
Litter	352	43.25	46.00	36.16
Cryptogams	172	0	8.50	6.69
Bare Ground	290	41.50	34.00	27.71

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 16, Study Name: Tommy Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.8	51.8 (18.1)	6.5	52.9	15.8	31.3	1.6	4.1	163.2	0.6



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 16

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	67	n/a
Elk	32	93(230)
Deer	15	96(237)
Cattle	3	9(22)

BROWSE CHARACTERISTICS --
Herd unit 25A, 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	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	-	-	2	-	1	-	-	-	-	3	-	-	-	60	38 29	3
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		50%			00%			00%			-24%						
'99		40%			40%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	0%			
											'91	132		50%			
											'99	100		0%			
Artemisia nova																	
S	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800		12
	91	8	-	-	1	-	-	-	-	-	9	-	-	-	600		9
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7
Y	85	73	1	-	-	-	-	-	-	-	74	-	-	-	4933		74
	91	19	9	7	1	-	-	-	-	-	34	2	-	-	2400		36
	99	84	10	-	-	-	-	-	-	-	94	-	-	-	1880		94
M	85	71	5	2	-	-	-	-	-	-	77	-	1	-	5200	8 11	78
	91	-	12	13	1	2	-	1	-	-	29	-	-	-	1933	7 10	29
	99	205	55	-	-	-	-	-	-	-	260	-	-	-	5200	9 16	260
D	85	8	1	2	-	-	-	-	-	-	11	-	-	-	733		11
	91	15	28	30	-	2	1	-	-	2	60	-	-	18	5200		78
	99	34	1	1	-	-	-	-	-	-	20	-	-	16	720		36
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		04%			02%			.61%			-12%						
'91		37%			37%			13%			-18%						
'99		17%			.25%			04%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	10866	Dec:	7%			
											'91	9533		55%			
											'99	7800		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 tridentata tridentata																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	-	-	-	-	-	-	1	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		50%			50%			00%			-85%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	0%			
											'91	132		50%			
											'99	20		100%			
Artemisia tridentata wyomingensis																	
S	85	37	-	-	-	-	-	-	-	-	37	-	-	-	2466		37
	91	117	-	1	5	-	-	4	-	-	127	-	-	-	8466		127
	99	13	-	-	-	-	-	-	-	-	13	-	-	-	260		13
Y	85	57	-	-	-	-	-	-	-	-	55	2	-	-	3800		57
	91	30	37	14	5	1	2	-	-	-	89	-	-	-	5933		89
	99	86	13	-	-	-	-	-	-	-	99	-	-	-	1980		99
M	85	42	9	1	-	-	-	-	-	-	50	1	1	-	3466	11 11	52
	91	8	7	15	2	-	-	-	-	-	32	-	-	-	2133	11 18	32
	99	111	63	-	-	-	-	-	-	-	174	-	-	-	3480	21 32	174
D	85	3	3	1	-	-	-	-	-	-	6	1	-	-	466		7
	91	31	45	47	-	-	4	-	-	-	83	-	-	44	8466		127
	99	39	30	1	1	-	-	-	-	-	62	-	-	9	1420		71
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		10%			02%			.86%			+53%						
'91		36%			33%			18%			-58%						
'99		31%			.29%			03%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	7732	Dec:	6%			
											'91	16532		51%			
											'99	6880		21%			

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				
Ceratoides lanata																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	91	-	1	2	-	-	1	-	-	-	4	-	-	-	266		4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	32	-	-	-	-	-	-	-	-	32	-	-	-	2133	4	3	32
	91	-	-	41	-	-	1	2	-	-	44	-	-	-	2933	1	2	44
	99	-	-	5	-	3	2	-	-	-	10	-	-	-	200	3	3	10
D	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	2	-	-	-	-	-	-	1	-	-	1	133		2	
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+18%							
'91		02%			94%			02%			-93%							
'99		27%			73%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	2733	Dec:	7%			
												'91	3332		4%			
												'99	220		9%			
Cercocarpus ledifolius																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
Chrysothamnus depressus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	1	5	-	-	4	-	-	-	10	-	-	-	666	2	2	10
	99	-	3	2	3	-	1	-	-	-	9	-	-	-	180	3	5	9
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	1	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+92%							
'91		17%			83%			00%			-77%							
'99		33%			33%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	100%			
												'91	798		8%			
												'99	180		0%			

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>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	65	13	14	7	1	1	-	-	-	100	1	-	-	6733		101	
	99	19	-	-	1	-	-	-	-	-	20	-	-	-	400		20	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	67	94	61	20	13	2	3	-	-	259	1	-	-	17333	5	5	
	99	597	2	-	-	-	-	-	-	-	599	-	-	-	11980	4	9	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	2	1	6	-	-	1	-	-	-	6	-	-	4	666		10	
	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		33%			23%			01%			-49%							
'99		.31%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	24732		3%			
												'99	12580		2%			
<i>Gutierrezia sarothrae</i>																		
S	85	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	85	47	-	-	-	-	-	-	-	-	47	-	-	-	3133		47	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	41	-	-	-	-	-	-	-	-	41	-	-	-	820		41	
M	85	222	-	-	-	-	-	-	-	-	222	-	-	-	14800	5	7	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133	4	5	
	99	248	-	-	-	-	-	-	-	-	248	-	-	-	4960	6	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-99%							
'91		00%			00%			00%			+98%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	17933	Dec:	-			
												'91	133		-			
												'99	5780		-			

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	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	3	-	-	1	-	-	-	-	-	4	-	-	-	266		4	
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	2	-	-	2	-	-	-	133	2	1	
	99	19	-	-	-	-	-	-	-	-	19	-	-	-	380	3	12	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+31%							
'99		00%			00%			07%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	0%				
											'91	399		0%				
											'99	580		7%				
Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	0		-				
											'99	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	5	6	7	8	9	1	2	3	4				
Purshia tridentata																	
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2
M	85	-	1	1	-	-	-	-	-	-	2	-	-	-	133	20 23	2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	1	1	1	-	1	-	-	-	4	-	-	-	80	20 48	4
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	1	-	3	-	-	-	4	266		4
	99	-	2	1	-	-	-	-	-	-	3	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		33%			33%			00%			+25%						
'91		00%			75%			100%			-32%						
'99		33%			33%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	199	Dec:	0%		
												'91	266		100%		
												'99	180		33%		
Symphoricarpos oreophilus																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	14 27	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	120		-		
Tetradymia canescens																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20	12 15	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			33%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	60		-		

Trend Study 25A-18-99

Study site name: Elk Camp .

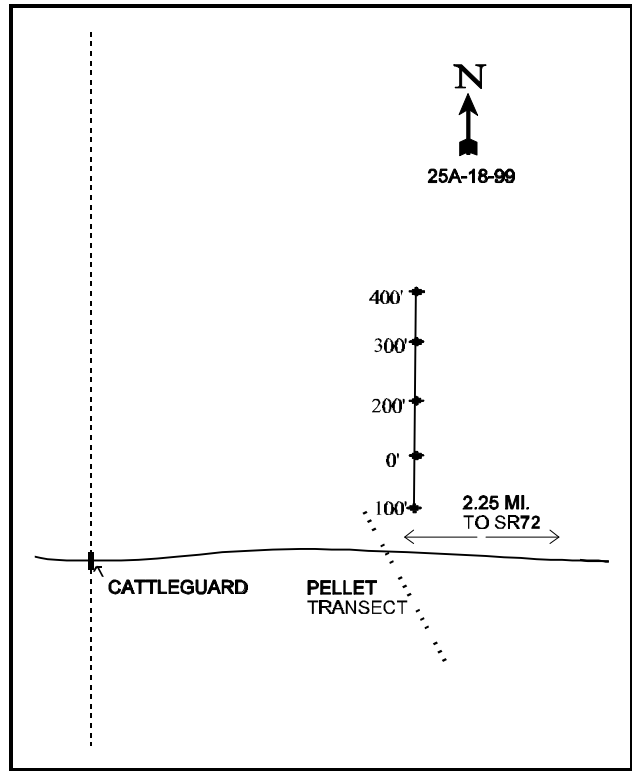
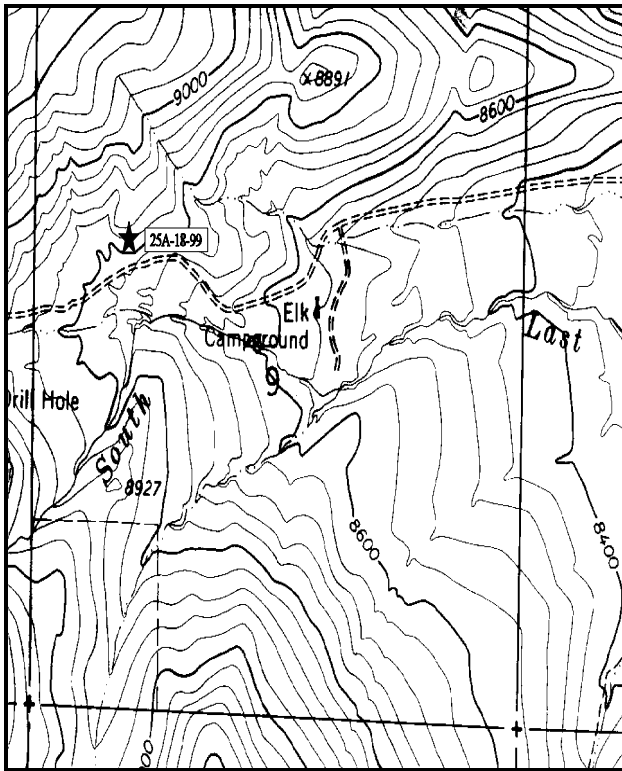
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline Line 1-170°M, Lines 2-4-352°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Go east from Salina on I-70 for approximately 37.5 miles to the rest area. From the exit, go 2.4 miles east on the frontage road to the junction with SR72. Travel south on SR 72 for 10.15 miles to a gravel road to the right with a sign for Last Chance Road. Turn and go 2 miles to the Elk Camp Road, and continue straight for another 0.2 miles. Stop here, approximately 90 yards short of a cattleguard, and look for a small yellow stake 10 feet off the south side of the road. The yellow pellet group transect stakes run northwest, with one stake every 30 feet. Follow the yellow stakes 90 feet up from the road to a large rebar which marks the 100-foot end of the frequency baseline. The 0-foot baseline stake is 100 feet north and is tagged #7040.



Map Name: John's Peak, Utah

Diagrammatic Sketch

Township 25S , Range 4E , Section 9

UTM 4278136.872 N, 458329.702 E

DISCUSSION

Trend Study No. 25A-18 (45-4)

The Elk Camp trend study is located alongside a Division pellet group transect on the south side of a hill overlooking Elk Camp and south Last Chance Creek. The hill has a slope of about 35% near the base, but it levels out to 12-15% further up the baseline. Elevation is approximately 8,800 feet. The surrounding gentle hills are covered by open sagebrush, grass slopes, scattered pinyons and junipers, and patches of aspen. The range type of the trend study site can be described as a mixed mountain brush, dominated by black sagebrush and antelope bitterbrush.

Pellet group counts demonstrate that deer use varies greatly from year to year (Jense et al. 1985, 1991). The site is above the normal limits of deer winter range as described by Huff and Blotter (1964), but is good range for mild winters and as a transitional range during the spring and fall. Elk use is low but it has increased steadily since 1980 (Jense et al. 1985, 1991). Pellet group data taken along the study site baseline in 1999 estimate 53 deer, 21 elk and 11 cow days use/acre (130 ddu/ha, 52 edu/ha, 27 cdu/ha). All of the cattle pats were from last season. Most of the deer and elk pellet groups were from winter use, but some were more recent. A dead fawn was also found near the site which appears to have died recently. In the past, the area was grazed by sheep, but in 1978 the permits were converted to cattle and it became a part of the Last Chance Cattle Allotment (Fish Lake National Forest). However, sheep were noted on a hillside nearby the transect in July of 1985. The area is within the Lower Last Chance pasture of the Last Chance allotment. Grazing occurs for 25 days on odd years, then the area is rested on even years. Grazing use is light on the slope, but heavier in the valley below along the riparian corridor.

Soil on the site is moderately shallow due to the rocky nature of the site. Effective rooting depth was estimated at only 11 inches. Soil texture is a loam with a slightly acid pH (6.5). There are many large rocks on the surface and throughout the soil. These rocks are of volcanic origin, as is the soil. Infiltration of water is good, but minor sheet erosion has removed some of the top soil leaving an erosion pavement. Pedestaling and terracing is evident on the steeper slopes but erosion is minimal due to the high protective ground cover.

There are several species of shrubs present on the site. The key browse species, black sagebrush, mountain big sagebrush, and bitterbrush, currently make up 66% of the browse cover. The black sagebrush appeared to be declining in 1985 and 1991. Over 50% of the population was decadent in 1985 and many plants had poor vigor. In 1991, percent decadency increased to 70%. The plants had been lightly to moderately utilized. In 1999 the study baseline was lengthened from 100 feet to 400 feet in order to get a better sample. This much larger sample is more effective at estimating shrub densities which often have aggregated and/or discontinuous distributions. Density of black sagebrush with the new sample is 3,560 plants/acre. Utilization continues to be light to moderate but vigor has improved and percent decadency has declined from 70% to 21%. The change in density is due primarily to the larger sample since there were only 160 dead plants sampled. The population of black sagebrush appears to be stable now with adequate recruitment to maintain the current population.

The mountain big sagebrush population has increased with each reading. It occurs in larger numbers further up the slope where it levels out and the soil is deeper. There is a good percentage of seedlings and young in the population and mature sagebrush are producing seed. Use of the mountain big sagebrush has been moderate since 1985 but vigor has been good and percent decadence moderate to low, ranging from 31% in 1991 to only 15% in 1999. Dead plants were common in 1999 due in part to a spotty prescribed burn which effected one of the frequency/density belts. Many of the dead sagebrush were actually burned stems.

The most preferred browse on the site is bitterbrush which has a low spreading growth form on this site. The stand has been heavily hedged since 1985 and the population has steadily declined in density from 5,599 plants/acre in 1985 to 2,560 by 1999. During the 1999 reading, many bitterbrush plants had been browsed to

the point where they have become partly unavailable and some mature plants were classified as unavailable due to heavy use. None of the bitterbrush were producing seed on the site in 1999, but some seedlings and young were encountered. Percent decadence was extremely high in 1991 at 90%, although currently ('99) only 5% of the population is decadent. The population appears to be stable for the moment but continued heavy use could eventually cause problems if coupled with drought.

There is a variety of other browse on the site which add change to the diet and diversity to the community is considered important. The snowberry, gray horsebrush, rubber rabbitbrush, and stickyleaf low rabbitbrush show signs of light hedging.

The site supports a variety of grasses and forbs. The most abundant grasses include muttongrass, sedge, and blue grama. These three species currently ('99) provide 87% of the grass cover. Utilization of the grasses is light with excellent seed production. Forbs are diverse but not very abundant. The more frequently encountered species are low growing and offer little forage.

1985 APPARENT TREND ASSESSMENT

The range appears healthy and well-balanced. The vegetative trend would have to be considered stable. The age class composition information alone would indicate a declining population for black sagebrush. However, over the area as a whole, it appears well-established with adequate regeneration. The bitterbrush population is quite healthy, although heavily hedged. The plant composition is unlikely to change over the next five years, as the diversity should help protect it from any sudden changes. The soil trend is also stable, although it sustains a small amount of top soil loss because of the slope and rockiness of the site.

1991 TREND ASSESSMENT

The soil trend is down because of the increase in percent bare ground which has increased from 9 to 21% and the loss of litter from 61% down to 44%. These data would indicate the propensity for accelerated soil loss to high intensity summer storms. Overall, there are three key browse species, black sagebrush, mountain big sagebrush, and bitterbrush. Black sagebrush decreased in density by 6% (8,532 down to 7,999) and decadency went from 56% to 70%. Mountain big sagebrush was the only one that had increased densities. It increased by 52%. Bitterbrush had it's densities decrease by 31%. Decadency for bitterbrush went from 1% to 90%. The two with the highest densities in effect had the highest losses to their respective populations. Therefore, the trend for browse would be downward. For the herbaceous understory, the grasses as a group slightly increased, while the forbs as a group, were stable. The forbs that did increase were small and insignificant as a forage for wildlife.

TREND ASSESSMENT

soil - slightly down

browse - down

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable to slightly improving. Percent cover of bare ground has declined from 21% to 14% and litter cover declined from 44% to 34%. Erosion is minimal. Trend for browse is up. Density of black sagebrush declined 55% since 1991 but most of the change is due to the larger sample taken in 1999. Use remains moderate to heavy but vigor has improved and percent decadence has declined from 70% to 21%. Mountain big sagebrush has increased in density. It too shows moderate use but displays good vigor and low decadence. The preferred bitterbrush continues to be heavily browsed. Vigor has improved and percent decadence has declined from 90% in 1991 to only 5% now. The population currently appears stable but no

plants were producing seed in 1999 due to the heavy use and drought. Trend for the herbaceous understory is stable with similar sum of nested frequency values for grasses and forbs compared to 1991.

TREND ASSESSMENT

soil - stable to slightly improving

browse - up

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 18

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron smithii	a-	b13	b18	-	5	7	.11
G	Bouteloua gracilis	73	76	96	32	32	35	3.65
G	Carex spp.	112	88	106	48	39	40	3.25
G	Festuca ovina	2	4	9	2	2	4	.09
G	Poa fendleriana	192	186	194	69	75	68	3.56
G	Sitanion hystrix	b83	b109	a47	37	49	20	.42
G	Stipa lettermani	20	46	46	10	17	19	.90
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		482	522	516	198	219	193	12.00
Total for Grasses		482	522	516	198	219	193	12.00
F	Agoseris glauca	a-	b14	a-	-	6	-	-
F	Allium spp.	-	2	7	-	1	2	.03
F	Antennaria rosea	b23	a9	b36	14	5	15	.83
F	Androsace septentrionalis (a)	-	-	5	-	-	2	.01
F	Arabis demissa	12	8	7	6	4	3	.18
F	Artemisia ludoviciana	-	3	-	-	1	-	-
F	Astragalus spp.	a-	a-	b22	-	-	9	.14
F	Castilleja chromosa	b13	b13	a-	7	6	-	-
F	Chaenactis douglasii	2	-	-	1	-	-	-
F	Cirsium spp.	-	-	4	-	-	2	.18
F	Comandra pallida	a-	a-	b5	-	-	3	.06
F	Collinsia parviflora (a)	-	-	9	-	-	4	.02
F	Cryptantha spp.	-	2	-	-	1	-	-
F	Erigeron pumilus	a-	a-	b6	-	-	3	.18
F	Eriogonum racemosum	25	34	24	15	18	14	.27
F	Eriogonum umbellatum	16	11	4	8	5	2	.01
F	Hymenoxys richardsonii	c18	b7	a-	10	3	-	-
F	Lithospermum incisum	-	3	-	-	2	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	<i>Machaeranthera canescens</i>	11	3	12	5	1	6	.05
F	<i>Penstemon</i> spp.	a ⁻	ab ²	b ¹⁰	-	2	5	.05
F	<i>Phlox austromontana</i>	a ⁻	a ⁻	b ³²	-	-	11	.35
F	<i>Phlox longifolia</i>	b ¹⁹	c ⁴⁸	a ⁴	14	22	2	.01
F	<i>Polygonum douglasii</i> (a)	-	-	1	-	-	1	.00
F	<i>Senecio multilobatus</i>	ab ²	a ⁻	b ⁷	2	-	4	.04
F	<i>Sphaeralcea coccinea</i>	6	3	3	2	1	1	.00
F	Unknown forb-perennial	b ¹⁴	a ⁻	a ⁻	6	-	-	-
F	<i>Zigadenus paniculatus</i>	3	-	-	1	-	-	-
Total for Annual Forbs		0	0	15	0	0	7	0.03
Total for Perennial Forbs		164	162	183	91	78	82	2.42
Total for Forbs		164	162	198	91	78	89	2.46

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

BROWSE TRENDS --

Herd unit 25A, Study no: 18

Type	Species	Strip Frequency 09	Average Cover % 09
B	<i>Artemisia frigida</i>	4	-
B	<i>Artemisia nova</i>	52	5.33
B	<i>Artemisia tridentata vaseyana</i>	58	7.46
B	<i>Chrysothamnus nauseosus albicaulis</i>	1	-
B	<i>Chrysothamnus nauseosus hololeucus</i>	6	.48
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	69	3.28
B	<i>Echinocereus triglochidatus</i>	2	.00
B	<i>Eriogonum microthecum</i>	0	-
B	<i>Gutierrezia sarothrae</i>	12	.70
B	<i>Juniperus scopulorum</i>	0	-
B	<i>Mahonia repens</i>	7	.04
B	<i>Opuntia</i> spp.	0	-
B	<i>Pinus edulis</i>	3	2.51
B	<i>Purshia tridentata</i>	49	6.53
B	<i>Rosa woodsii</i>	17	1.89
B	<i>Symphoricarpos oreophilus</i>	23	.75
B	<i>Tetradymia canescens</i>	11	.06
Total for Browse		314	29.08

CANOPY COVER --

Herd unit 25A, Study no: 18

Species	Percent Cover 09
Pinus edulis	4

BASIC COVER --

Herd unit 25A, Study no: 18

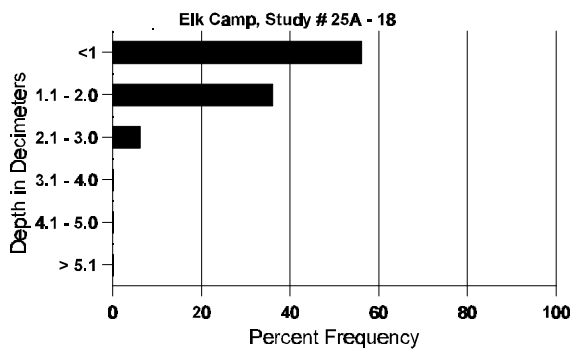
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	339	5.50	13.00	42.04
Rock	223	17.25	21.50	15.66
Pavement	189	7.00	.75	2.48
Litter	348	60.75	44.25	33.96
Cryptogams	5	.25	0	.06
Bare Ground	224	9.25	20.50	14.08

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 18, Study Name: Elk Camp

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.0	55.4 (11.6)	6.5	50.9	29.8	19.3	3.0	16.8	211.2	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 18

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	23	n/a
Elk	18	21(52)
Deer	27	53(131)
Cattle	4	11(27)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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				
Artemisia frigida																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	9	-	-	-	-	-	-	-	9	-	-	-	600	3	2	9	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	2	2	-	-	-	-	-	-	4	-	-	-	80	3	8	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		33%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	666	Dec:	-				
											'91	0		-				
											'99	120		-				
Artemisia nova																		
S	85	3	-	-	-	-	-	-	-	3	-	-	-	200		3		
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	2	-	-	1	-	-	-	-	2	-	1	-	60		3		
Y	85	11	5	-	-	-	-	-	-	14	-	1	1	1066		16		
	91	4	3	-	-	-	-	-	-	7	-	-	-	466		7		
	99	6	12	-	-	-	-	-	-	18	-	-	-	360		18		
M	85	19	21	-	-	-	-	-	-	39	-	1	-	2666	10	16	40	
	91	8	13	5	3	-	-	-	-	29	-	-	-	1933	11	16	29	
	99	71	42	9	1	-	-	-	-	123	-	-	-	2460	10	20	123	
D	85	34	34	4	-	-	-	-	-	61	-	8	3	4800		72		
	91	8	26	41	-	2	1	-	6	67	2	7	8	5600		84		
	99	25	9	2	-	-	1	-	-	33	-	-	4	740		37		
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	160		8		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		47%			03%			11%			- 6%							
'91		37%			44%			13%			-55%							
'99		35%			07%			02%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	8532	Dec:	56%				
											'91	7999		70%				
											'99	3560		21%				

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	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	99	6	-	-	2	-	-	1	-	-	9	-	-	-	180			9
Y	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	4	5	-	-	-	-	1	-	-	9	-	1	-	666			10
	99	29	2	-	-	-	-	1	-	-	32	-	-	-	640			32
M	85	-	6	-	-	-	-	-	-	-	6	-	-	-	400	18	20	6
	91	2	5	-	3	-	-	-	-	-	9	1	-	-	666	22	23	10
	99	32	46	3	3	-	-	-	-	-	83	1	-	-	1680	27	37	84
D	85	1	2	-	-	-	-	-	-	-	2	-	1	-	200			3
	91	2	5	2	-	-	-	-	-	-	5	-	-	4	600			9
	99	6	11	1	-	1	-	2	-	-	12	-	-	9	420			21
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	880			44
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		57%			00%			07%			+52%							
'91		52%			07%			17%			+29%							
'99		44%			03%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	933	Dec:	21%			
												'91	1932		31%			
												'99	2740		15%			
<i>Chrysothamnus nauseosus albicaulis</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
D	85	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			100%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	100%			
												'91	0		0%			
												'99	40		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 nauseosus hololeucus														
Y	85	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	20		1
M	85	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	7	1	3	-	-	-	-	-	-	-	220	9 13	11
X	85	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'85		00%			00%			00%						
'91		00%			00%			00%						
'99		08%			25%			00%						
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-	
										'91	0		-	
										'99	240		-	
Chrysothamnus viscidiflorus viscidiflorus														
S	85	1	-	-	-	-	-	-	-	-	1	-	-	1
	91	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	28	-	-	-	-	-	-	-	-	28	-	-	28
	91	32	6	-	2	1	-	-	-	-	40	1	-	41
	99	25	-	-	-	-	-	-	-	-	25	-	-	25
M	85	92	-	-	-	-	-	-	-	-	92	-	-	92
	91	39	41	34	1	1	-	-	-	-	116	-	-	116
	99	159	11	3	-	-	-	-	-	-	173	-	-	173
D	85	1	-	-	-	-	-	-	-	-	1	-	-	1
	91	3	2	-	-	-	1	-	-	-	5	-	-	6
	99	5	-	-	-	-	-	-	-	-	3	-	-	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'85		00%			00%			00%			+26%			
'91		31%			21%			.61%			-63%			
'99		05%			01%			.98%						
Total Plants/Acre (excluding Dead & Seedlings)										'85	8065	Dec:	1%	
										'91	10866		4%	
										'99	4060		2%	
Echinocereus triglochidatus														
M	85	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	2	-	-	-	-	-	-	-	-	-	40	3 2	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'85		00%			00%			00%						
'91		00%			00%			00%						
'99		00%			00%			00%						
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-	
										'91	0		-	
										'99	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		5	6		7	8	9	1	2		
<i>Eriogonum microthecum</i>																
M	85	2	-	-	-	-	-	-	-	2	-	-	133	1	4	2
	91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'85		00%			00%			00%								
'91		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'85	133	Dec:	-			
										'91	0		-			
										'99	0		-			
<i>Gutierrezia sarothrae</i>																
M	85	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	29	-	-	-	-	-	-	-	29	-	-	580	5	7	29
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'85		00%			00%			00%								
'91		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-			
										'91	0		-			
										'99	580		-			
<i>Juniperus scopulorum</i>																
Y	85	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	1	-	-	66			1
	99	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	1	-	-	-	-	-	-	-	1	-	-	66	46	41	1
	91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'85		00%			00%			00%			+ 0%					
'91		00%			00%			00%								
'99		00%			00%			00%								
Total Plants/Acre (excluding Dead & Seedlings)										'85	66	Dec:	-			
										'91	66		-			
										'99	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			
Mahonia repens								
Y	85	-	-	-	-	-	-	-
	91	-	-	-	-	-	-	-
	99	5	-	-	2	-	-	-
M	85	-	-	-	-	-	-	-
	91	-	-	-	-	-	-	-
	99	25	-	-	7	-	-	-
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
	'85	00%		00%		00%		
	'91	00%		00%		00%		
	'99	00%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'85	0	Dec: -
						'91	0	-
						'99	780	-
Opuntia spp.								
Y	85	1	-	-	-	-	-	-
	91	-	-	-	-	-	1	-
	99	-	-	-	-	-	-	-
M	85	8	-	-	-	-	-	-
	91	2	-	-	1	-	1	-
	99	-	-	-	-	-	-	-
D	85	-	-	-	-	-	-	-
	91	1	-	-	-	-	-	-
	99	-	-	-	-	-	-	-
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
	'85	00%		00%		00%		-34%
	'91	00%		00%		00%		
	'99	00%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'85	599	Dec: 0%
						'91	398	17%
						'99	0	0%
Pinus edulis								
Y	85	-	-	-	-	-	-	-
	91	-	-	-	-	-	-	-
	99	1	-	-	-	-	-	-
M	85	-	-	-	-	-	-	-
	91	-	-	-	-	-	-	-
	99	2	-	-	-	-	-	-
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>
	'85	00%		00%		00%		
	'91	00%		00%		00%		
	'99	00%		00%		00%		
Total Plants/Acre (excluding Dead & Seedlings)						'85	0	Dec: -
						'91	0	-
						'99	60	-

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				
Purshia tridentata																		
S	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	15	9	11	-	-	-	-	-	-	33	2	-	-	2333		35	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	4	1	-	7	2	-	-	-	18	-	-	-	360		18	
M	85	5	16	27	-	-	-	-	-	-	48	-	-	-	3200	13 21	48	
	91	-	-	3	-	-	3	-	-	-	6	-	-	-	400	6 16	6	
	99	2	13	14	-	17	49	2	-	6	103	-	-	-	2060	13 29	103	
D	85	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	1	38	-	-	7	1	-	5	29	-	-	23	3466		52	
	99	2	-	-	-	-	1	4	-	-	3	-	-	4	140		7	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		30%			46%			00%			-31%							
'91		02%			97%			40%			-34%							
'99		32%			57%			03%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	5599	Dec:	1%				
											'91	3866		90%				
											'99	2560		5%				
Rosa woodsii																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	31	-	-	-	-	-	-	-	-	31	-	-	-	620		31	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	43	-	-	-	-	-	-	-	-	43	-	-	-	860	12 14	43	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	0		-				
											'99	1480		-				

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									
Symphoricarpos oreophilus																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	4	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	-	-	-	1	-	-	1	-	2	-	-	-	133		2	
	99	2	2	1	-	-	-	-	-	5	-	-	-	100		5	
M	85	4	5	-	-	-	-	-	-	9	-	-	-	600	18	16	9
	91	1	-	9	3	2	-	1	-	16	-	-	-	1066	19	16	16
	99	7	8	4	3	1	-	-	-	23	-	-	-	460	18	30	23
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		38%			00%			00%			+32%						
'91		11%			53%			00%			-56%						
'99		39%			18%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	866	Dec:	0%				
										'91	1265		5%				
										'99	560		0%				
Tetradymia canescens																	
Y	85	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	2	-	-	-	-	-	-	-	2	-	-	-	133	7	5	2
	91	-	1	-	1	-	-	-	-	2	-	-	-	133	13	10	2
	99	4	3	-	1	-	-	-	-	8	-	-	-	160	10	10	8
D	85	2	1	-	-	-	-	-	-	3	-	-	-	200		3	
	91	1	-	2	-	-	1	-	-	2	-	-	2	266		4	
	99	-	4	-	-	-	-	-	-	3	-	-	1	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		17%			00%			00%			+14%						
'91		14%			43%			29%			-44%						
'99		54%			00%			08%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	399	Dec:	50%				
										'91	465		57%				
										'99	260		31%				

Trend Study 25A-19-99

Study site name: Row of Pines - Cattle Exclosure .

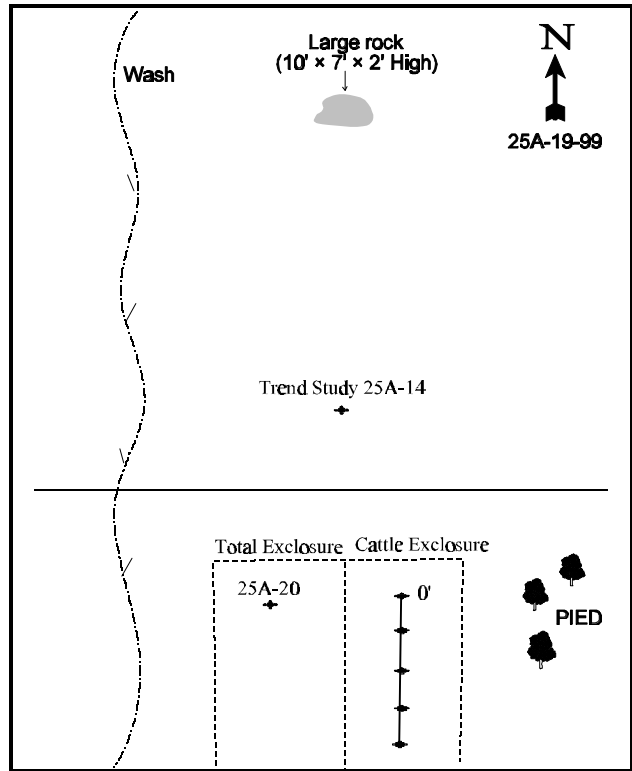
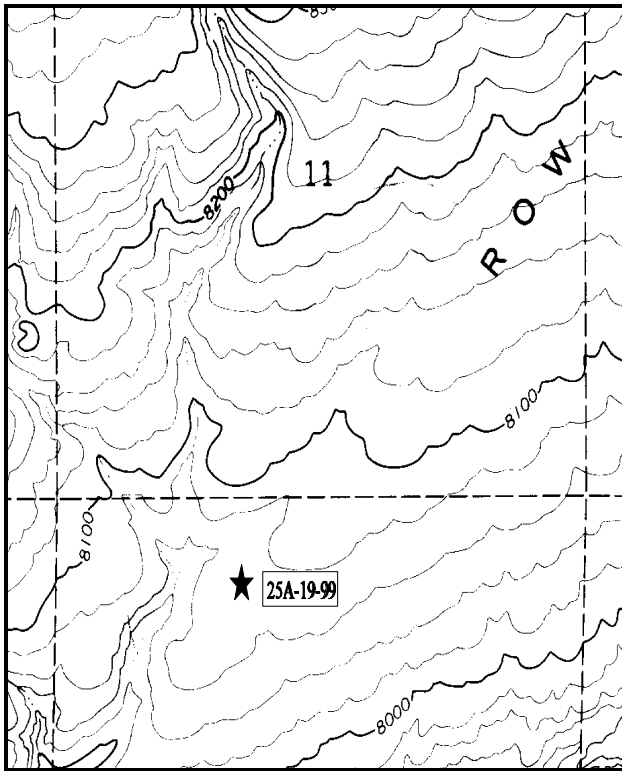
Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 210°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(71ft).

LOCATION DESCRIPTION

From the Chappell Cheese Factory northwest of Loa on SR 24, go west 2.6 miles to a side road on the north where the highway makes a sharp turn (0.95 miles west of mile marker #49). Take this road 0.65 miles and turn right after crossing a cattleguard. After 0.7 more miles, turn right at the fork and cross another cattleguard. Go 2.7 miles to another fork where you will again turn right. After ~60', turn right (east) and go 1.4 miles to an exclosure. The baseline runs down through the middle of the livestock exclosure (east side), with the 0 ft stake having browse tag #409 attached.



Map name: Loa, Utah

Diagrammatic Sketch

Township 27S , Range 2E , Section 14 .

UTM 4257898.994 N, 442713.387 E

DISCUSSION

Trend Study No. 25A-19

The Row of Pines Livestock Exclosure is a new trend study site established in 1999 inside the livestock exclosure. The exclosure was built in the late 1980's after the area was chained and seeded. A trend study (25A-14) was established in 1991 about 200 feet to the north of the exclosure. During the 1999 reading of the study outside of the exclosure, it was determined that data was needed within the livestock exclosure and the total exclosure. The area supports a sagebrush grass type which is nearly level (3-5% slope) and has a slight south aspect. Deer and elk use within the livestock exclosure was relatively heavy. Pellet group data estimated 48 deer and 58 elk days use/acre (119 ddu/ha and 143 edu/ha), most of which was winter use.

Soil depth is moderately shallow with an estimated effective rooting depth of just over 11 inches. Texture is a sandy clay loam to a loam with a neutral pH (7.0). Soil parent material is basalt. Phosphorus is marginal at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil surface is mostly a combination of pavement and bare ground with some evidence of soil erosion. Vegetation and litter cover are low at 22% and 12% respectively. However, due to the lack of slope, water erosion is not a major problem in this area.

The key browse species in this area is Wyoming big sagebrush which has an estimated density of 5,820 mostly mature plants/acre within the livestock exclosure. Utilization is moderate to heavy. Recruitment is poor with no seedlings and only 3% of the population consisting of young plants. Percent decadence is moderately high at 27% but more importantly, 63% of the decadent plants (980 plants/acre) appear to be dying. Even if only half of these plants actually die, there are only 160 young plants/acre to replace them. The only other common shrubs found in the exclosure are increasers, thinleaf low rabbitbrush and broom snakeweed with densities of 880 and 2,380 plants/acre respectively. Both populations are mostly mature and appear stable.

The herbaceous understory is dominated by grasses which are diverse for a Wyoming big sagebrush site. Common species include seeded crested wheatgrass and Russian wildrye, and native blue grama and bottlebrush squirreltail. Blue grama provides 37% of the grass cover while crested wheatgrass accounts for 26% of the grass cover and bottlebrush squirreltail provides another 19%. Other seeded grasses, intermediate wheatgrass and smooth brome, occur occasionally. Forbs are rare and produce less than one-half of 1% cover. The only fairly common species is low fleabane.

1999 APPARENT TREND ASSESSMENT

The soil trend appears stable due to abundant protective ground cover. However, rock and pavement provide most of this cover. Erosion is minimal due to the armored nature of the soil surface combined with the gentle terrain. Trend for the key browse, Wyoming big sagebrush, appears to be declining due to low recruitment combined with a high number of decadent dying plants. Utilization is moderate to heavy with most plants not currently producing seed. The increasers, thinleaf low rabbitbrush and broom snakeweed, appear to have mature and stable populations. The herbaceous understory is dominated by a variety of seeded and native grasses. The livestock exclosure contains more seeded grasses than outside. The low abundance of cool season perennial grasses outside of the exclosure and higher numbers of cool season grasses inside of the livestock exclosure indicates higher grazing pressure outside of the exclosure in the spring. Forbs are lacking here as well as outside of the exclosure.

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 19

Type	Species	Nested Frequency '99	Quadrat Frequency '99	Average Cover % '99
G	Agropyron cristatum	130	52	2.66
G	Agropyron intermedium	1	1	.00
G	Bouteloua gracilis	91	37	3.86
G	Bromus inermis	10	3	.09
G	Elymus junceus	40	19	1.20
G	Oryzopsis hymenoides	10	6	.27
G	Sitanion hystrix	136	58	2.01
G	Stipa comata	1	1	.06
G	Stipa pinetorum	2	1	.15
Total for Annual Grasses		0	0	0
Total for Perennial Grasses		421	178	10.33
Total for Grasses		421	178	10.33
F	Androsace septentrionalis (a)	2	2	.01
F	Astragalus spp.	3	1	.00
F	Cryptantha spp.	3	2	.03
F	Eriogonum ovalifolium	1	1	.03
F	Erigeron pumilus	32	15	.15
F	Sphaeralcea coccinea	10	4	.04
F	Unknown forb-perennial	4	2	.03
Total for Annual Forbs		2	2	0.00
Total for Perennial Forbs		53	25	0.30
Total for Forbs		55	27	0.31

BROWSE TRENDS --
Herd unit 25A, Study no: 19

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia tridentata wyomingensis	91	8.23
B	Chrysothamnus viscidiflorus stenophyllus	28	.11
B	Gutierrezia sarothrae	67	1.06
B	Opuntia fragilis	6	.18
Total for Browse		192	9.59

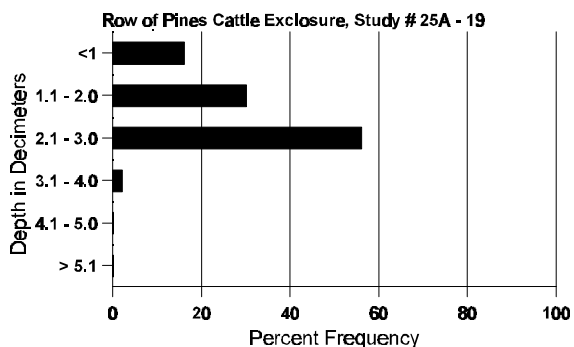
BASIC COVER --
Herd unit 25A, Study no: 19

Cover Type	Nested Frequency '99	Average Cover % '99
Vegetation	305	21.47
Rock	278	12.68
Pavement	423	22.53
Litter	427	11.73
Cryptogams	5	.00
Bare Ground	420	22.28

SOIL ANALYSIS DATA --
Herd Unit 25A, Study # 19, Study Name: Row of Pines Cattle Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	62.0 (12.3)	7.0	47.3	27.4	25.3	1.6	8.5	163.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 25A, Study no: 19

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	1	NA
Elk	24	87 (214)
Deer	22	71 (175)

BROWSE CHARACTERISTICS --

Herd unit 25A, 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 tridentata wyomingensis</i>																		
Y	99	2	3	3	-	-	-	-	-	-	8	-	-	-	160		8	
M	99	6	112	87	-	-	-	-	-	-	203	-	-	2	4100	12	23	205
D	99	1	29	36	3	-	9	-	-	-	29	-	-	49	1560		78	
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	940		47	
% Plants Showing '99		<u>Moderate Use</u> 49%			<u>Heavy Use</u> 46%			<u>Poor Vigor</u> 18%				<u>%Change</u>						
Total Plants/Acre (excluding Dead & Seedlings)														'99	5820	Dec:	27%	
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
Y	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	99	28	7	2	4	-	-	-	-	-	41	-	-	-	820	5	8	41
D	99	1	1	-	-	-	-	-	-	-	-	-	-	2	40		2	
% Plants Showing '99		<u>Moderate Use</u> 18%			<u>Heavy Use</u> 05%			<u>Poor Vigor</u> 05%				<u>%Change</u>						
Total Plants/Acre (excluding Dead & Seedlings)														'99	880	Dec:	5%	
<i>Gutierrezia sarothrae</i>																		
S	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	99	115	-	-	-	-	-	-	-	-	115	-	-	-	2300	7	8	115
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
% 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	2380	Dec:	-	
<i>Opuntia fragilis</i>																		
M	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200	2	5	10
% 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	200	Dec:	-	

Trend Study 25A-20-99

Study site name: Row of Pines - Total Exclosure .

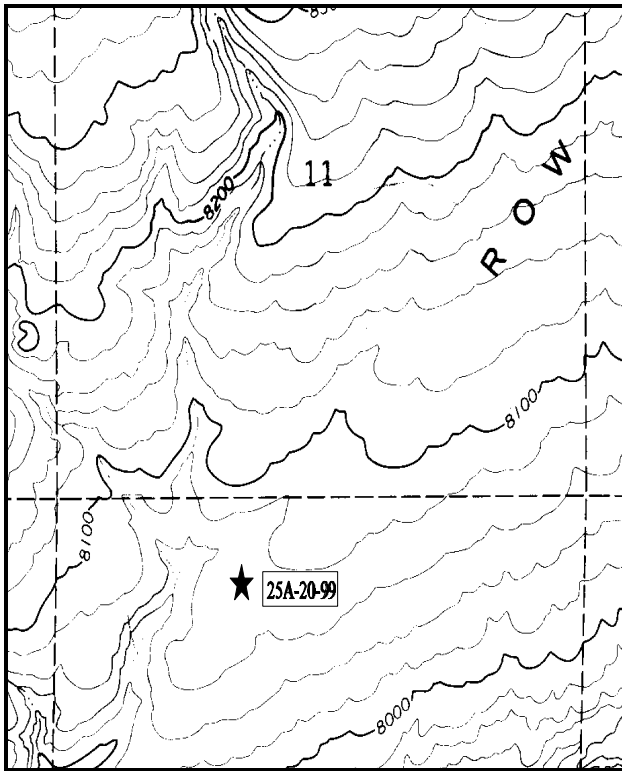
Range type: Sagebrush-Grass .

Compass bearing: frequency baseline 205°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(71ft).

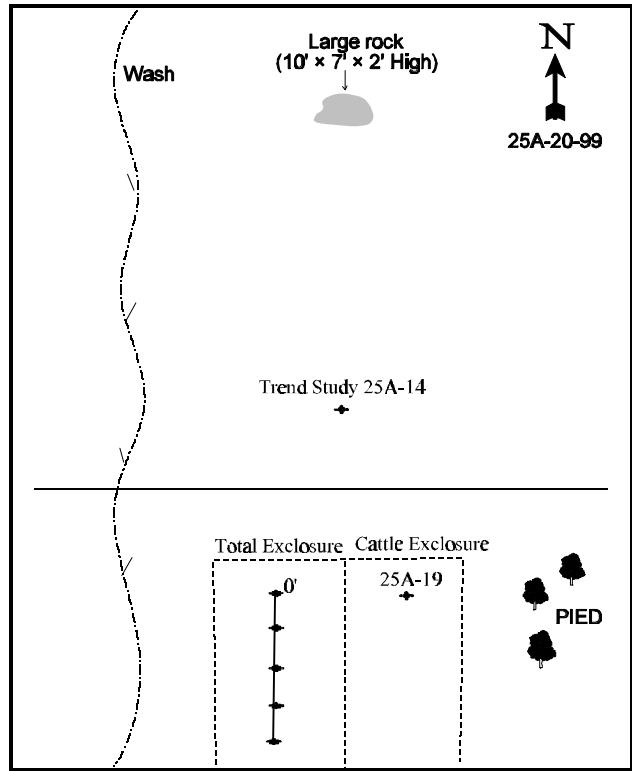
LOCATION DESCRIPTION

From the Chappell Cheese Factory northwest of Loa on SR 24, go west 2.6 miles to a side road on the north where the highway makes a sharp turn (0.95 miles west of mile marker #49). Take this road 0.65 miles and turn right after crossing a cattleguard. After 0.7 more miles, turn right at the fork and cross another cattleguard. Go 2.7 miles to another fork where you will again turn right. After ~60', turn right (east) and go 1.4 miles to an exclosure. The baseline runs down through the middle of the total exclosure (west side), with the 0 ft stake having browse tag #410 attached.



Map name: Loa, Utah

Township 27S , Range 2E , Section 14 .



Diagrammatic Sketch

UTM 4257938.767 N, 442657.546 E

DISCUSSION

Trend Study No. 25A-20

The Row of Pines Total Exclosure is a new trend study site established in 1999 within the total exclosure. The exclosure was built in the late 1980's after the area was chained and seeded. A trend study (25A-14) was established in 1991 about 200 feet to the north of the exclosure. During the 1999 reading of this study site, it was determined that data was needed within both the livestock exclosure and the total exclosure. The area supports a sagebrush grass type which is nearly level (3-5% slope) and has a slight south aspect. The general area is used by deer and elk in the winter and early spring, and by cattle in the spring and summer. One old cattle pat was encountered within the total exclosure but the fences appear to be in good repair now.

Soil conditions in the total exclosure are nearly identical to that of the livestock exclosure and outside. Soil depth is moderately shallow with an estimated effective rooting depth of just over 11 inches. Texture is a sandy clay loam to a loam with a neutral pH (7.0). Soil parent material is basalt. Phosphorus is marginal at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil surface is mostly a combination of pavement and bare ground with some evidence of soil erosion. Vegetation cover is moderate at 28% and litter cover is low at just 11%. However, due to the lack of slope, water erosion is not a major problem in this area.

The key browse is Wyoming big sagebrush which has a density of 6,160 plants/acre. Conditions here, within the total exclosure, are very similar to the livestock exclosure. The population is mostly mature with a moderate decadency rate of 27%. However, 65% of the decadent plants (1,080 plants/acre) appear to be dying. No seedlings were encountered and young recruitment is low with just 320 young plants/acre estimated. Since the sagebrush is not utilized within the total exclosure, this decadence must be caused by drought or winter injury, or a combination of both. Density of the increaser, thinleaf low rabbitbrush is similar to the livestock exclosure at 900 plants/acre. However, broom snakeweed density is over 2½ times higher at 6,320 plants/acre. Most of the population consist of mature plants but 4% are young.

The total exclosure supports a similar perennial grass understory as the livestock exclosure. Seeded crested wheatgrass and Russian wildrye provide 58% of the grass cover. Bottlebrush squirreltail is the most abundant native grass. The warm season blue grama is not as abundant here as it is in the livestock exclosure. It only produces 12% of the grass cover. Forbs are rare and less diverse in the total exclosure. Low fleabane accounts for 98% of the forb cover.

1999 APPARENT TREND ASSESSMENT

Soil conditions are very similar to the livestock exclosure and outside of the exclosure. Vegetation and litter cover are low and most of the protective ground cover comes from rock and pavement. Erosion is minimal due to the armored nature of the soil surface. The browse trend appears to be declining, similar to the livestock exclosure. There is no use here but recruitment is still low, vigor poor, percent decadence moderate, and a large proportion of the decadent plants appear to be dying. Another negative aspect is the large population of the increaser, broom snakeweed, which is more abundant here compared to the livestock exclosure. The herbaceous understory is similar to the livestock exclosure but grasses produce slightly less cover. Forbs are rare and dominated by low fleabane which provides 98% of the forb cover.

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 20

Type	Species	Nested Frequency '99	Quadrat Frequency '99	Average Cover % '99
G	Agropyron cristatum	99	40	2.69
G	Agropyron intermedium	2	1	.00
G	Bouteloua gracilis	49	21	1.08
G	Bromus inermis	4	3	.05
G	Elymus junceus	63	23	2.51
G	Oryzopsis hymenoides	18	7	.62
G	Sitanion hystrix	125	50	2.01
Total for Annual Grasses		0	0	0
Total for Perennial Grasses		360	145	8.99
Total for Grasses		360	145	8.99
F	Androsace septentrionalis (a)	5	2	.01
F	Castilleja spp.	3	1	.00
F	Erigeron pumilus	54	24	.92
F	Sphaeralcea coccinea	10	3	.02
Total for Annual Forbs		5	2	0.00
Total for Perennial Forbs		67	28	0.94
Total for Forbs		72	30	0.95

BROWSE TRENDS --
Herd unit 25A, Study no: 20

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia tridentata wyomingensis	91	13.97
B	Chrysothamnus viscidiflorus stenophyllus	25	.25
B	Gutierrezia sarothrae	85	3.00
	Opuntia fragilisb	2	-
Total for Browse		203	17.23

BASIC COVER --

Herd unit 25A, Study no: 20

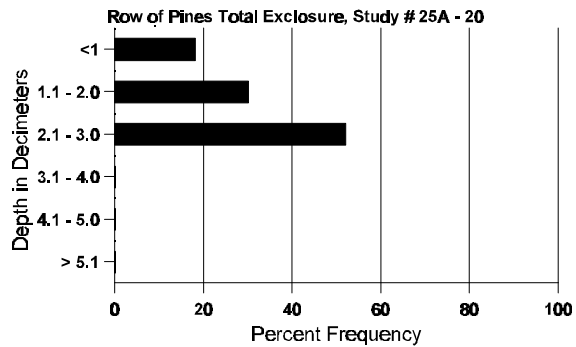
Cover Type	Nested Frequency '99	Average Cover % '99
Vegetation	298	28.20
Rock	302	9.11
Pavement	435	31.69
Litter	374	10.99
Bare Ground	402	20.04

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 20, Study Name: Row of Pines Total Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.1	60.8 (11.6)	7.0	47.3	27.4	25.3	1.6	8.5	163.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 20

Type	Quadrat Frequency '99
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 20

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 wyomingensis</i>																		
Y	99	16	-	-	-	-	-	-	-	-	16	-	-	-	320			16
M	99	209	-	-	-	-	-	-	-	-	206	-	-	3	4180	11	21	209
D	99	83	-	-	-	-	-	-	-	-	29	-	-	54	1660			83
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	620			31
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 19%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	6160	Dec:	27%	
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
M	99	34	-	-	3	-	-	-	-	-	36	-	1	-	740	4	7	37
D	99	8	-	-	-	-	-	-	-	-	-	-	-	8	160			8
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 20%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	900	Dec:	18%	
<i>Gutierrezia sarothrae</i>																		
Y	99	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
M	99	302	-	-	-	-	-	-	-	-	299	-	1	2	6040	7	9	302
D	99	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	260			13
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 02%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	6320	Dec:	1%	
<i>Opuntia fragilis</i>																		
Y	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
% 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	40	Dec:	-	

ROW OF PINES EXCLOSURE COMPARISON SUMMARY

Total Exclosure 25A-20, Livestock Exclosure 25A-19, and Outside 25A-14

1999 Comparisons

Ground cover characteristics are similar between sites in that vegetation and litter cover are low and most of the ground cover is made up of rock and pavement. The total exclosure has the most vegetation cover at 28.2%, while outside has 26% and the livestock exclosure produces 22%. Litter cover is highest outside of the exclosure at 18%, with the livestock and total exclosures containing 12% and 11% respectively. Rock and pavement cover account for 43% cover outside of the exclosure, the livestock exclosure has 35%, and the total exclosure 41%. Percent bare ground is very similar ranging from 20% in the total exclosure to 22% in the livestock exclosure.

Due to the study sites close proximity, soil conditions are nearly identical. The soil is moderately shallow with effective rooting depths at just over 11 inches. Soil texture is a sandy clay loam to a loam with an identical neutral pH (7.0). Phosphorus is marginal on all sites at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Soil temperatures are lower outside of the exclosure at 55.4°F, compared to 62°F in the livestock exclosure and 60.8°F in the total exclosure. There is minimal soil movement occurring but the armored nature of the soil surface limits erosion.

Wyoming big sagebrush shows similar trends on all sites. Population densities are similar ranging from 5,580 plants/acre outside to 5,820 plants/acre in the livestock exclosure, and 6,160 in the total exclosure. Utilization was moderate outside of the exclosure and much heavier in the livestock exclosure. Pellet group data estimates 29 deer, 15 elk and 15 cow days use/acre (72 ddu/ha, 37 edu/ha, 37 cdu/ha) outside of the exclosure and 48 deer and 58 elk days use/acre (118 ddu/ha, 143 edu/ha) in the livestock exclosure. All populations of sagebrush are mostly mature and percent decadence is moderate, ranging from 29% outside to 27% in the livestock and total exclosures. All sites also show high proportions of dying decadent plants which range from 47% outside to 63% in the livestock exclosure and 65% in the total exclosure. Seed production and recruitment is poor on all sites and young plants are not abundant enough to maintain the current populations. Since sagebrush in the total exclosure has not been utilized, the poor condition and health must be the result of drought and/or winter injury. It appears that the sagebrush populations will decline on all sites with the highest mortality being in the total exclosure, then the livestock exclosure. These stands may not decline if recruitment improves in the next few years.

Density of the increaser, thinlineaf low rabbitbrush, is similar between sites ranging from 880 plants/acre in the livestock exclosure to 1,100 outside. Another increaser, broom snakeweed, is extremely abundant outside of the exclosure at 10,000 plants/acre. This population is mostly mature but young plants account for 10% of the population and it has a biotic potential (# of seedlings) of 5%. This would suggest a slowly expanding population. Density of broom snakeweed is also high in the total exclosure at 6,320 plants/acre but nearly all of these are mature (96%). The lowest density is in the livestock exclosure which has an estimated 2,380 plants/acre. This stand is also nearly all mature (97%).

The herbaceous understories are similar on all sites with respect to species present but composition differs. Outside of the exclosure, blue grama dominates the grass composition by providing 73% of the grass cover. The only other common grass is bottlebrush squirreltail which adds an additional 20% of the grass cover. All other grasses occur occasionally. Forbs are rare and consist mostly of low fleabane which accounts for 59% of the meager forb cover. Compositions are similar in the livestock and total exclosures. Seeded grasses, crested wheatgrass and Russian wildrye occur only occasionally outside of the exclosure, but they are much more abundant in the livestock and total exclosures where they provide 38% and 58% of the grass cover respectively. Native grasses, blue grama, and bottlebrush squirreltail are also abundant within the exclosures. Bottlebrush squirreltail occurs at similar frequency in both exclosures but blue grama is more abundant in the livestock exclosure where it provides 37% of the grass cover compared to 12% in the total exclosure. Both exclosures contain few forbs.

SUMMARY

WILDLIFE MANAGEMENT UNIT 25A (44) - PLATEAU, FISH LAKE

Twelve trend study sites on the Fish Lake Unit were originally established in 1985. These were reread in 1991 and an additional 3 summer or transitional sites were established. All 15 sites were reread in 1999 and two new sites were established within the Row of Pines Exclosure. Overall, the trend study sites show a lack of forbs. The only sites with a moderately high proportion of forbs in the understory occur at East Tidwell (#25A-12) a high elevation summer range site, and Ox Spring (#25A-13) which samples a prescribed burn. Both of these sites currently display a downward trend with respect to forbs. Forb cover for the other 13 trend study sites averages only 1.7% . Seven of these sites show declining trends for forbs while the other 6 are stable.

Of the 10 winter range sites on the Fish Lake unit, three sites, Triangle Mountain (#25A-1) and Black Mountain (#25A-2), and Durfee Homestead (#25A-4) monitor pinyon-juniper chainings on deer and elk winter range. The trend study at Lower Dog Flat (#25A-8) samples a chaining on mountain big sagebrush. The Triangle and Black Mountain studies have little browse on site.

Other winter range sites which sample mostly sagebrush include; Sage Flat (#25A-3), Praetor Slope (#25A-5), Row of Pines (#25A-9), Cedarless Flat (#25A-10), Forsyth Reservoir (#25A-11), and Tommy Hollow (#25A-16). The trend study at Evans Reservoir (#25A-7) samples primarily pronghorn range but it is also used by deer and elk in the winter.

Four trend study sites sample deer and elk summer and/or transitional range on the Fish Lake unit. These include; East Tidwell (#25A-12), Ox Spring (#25A-13), Row of Pines Exclosure (#25A-14), and Elk Camp (#25A-18).

TREND SUMMARY

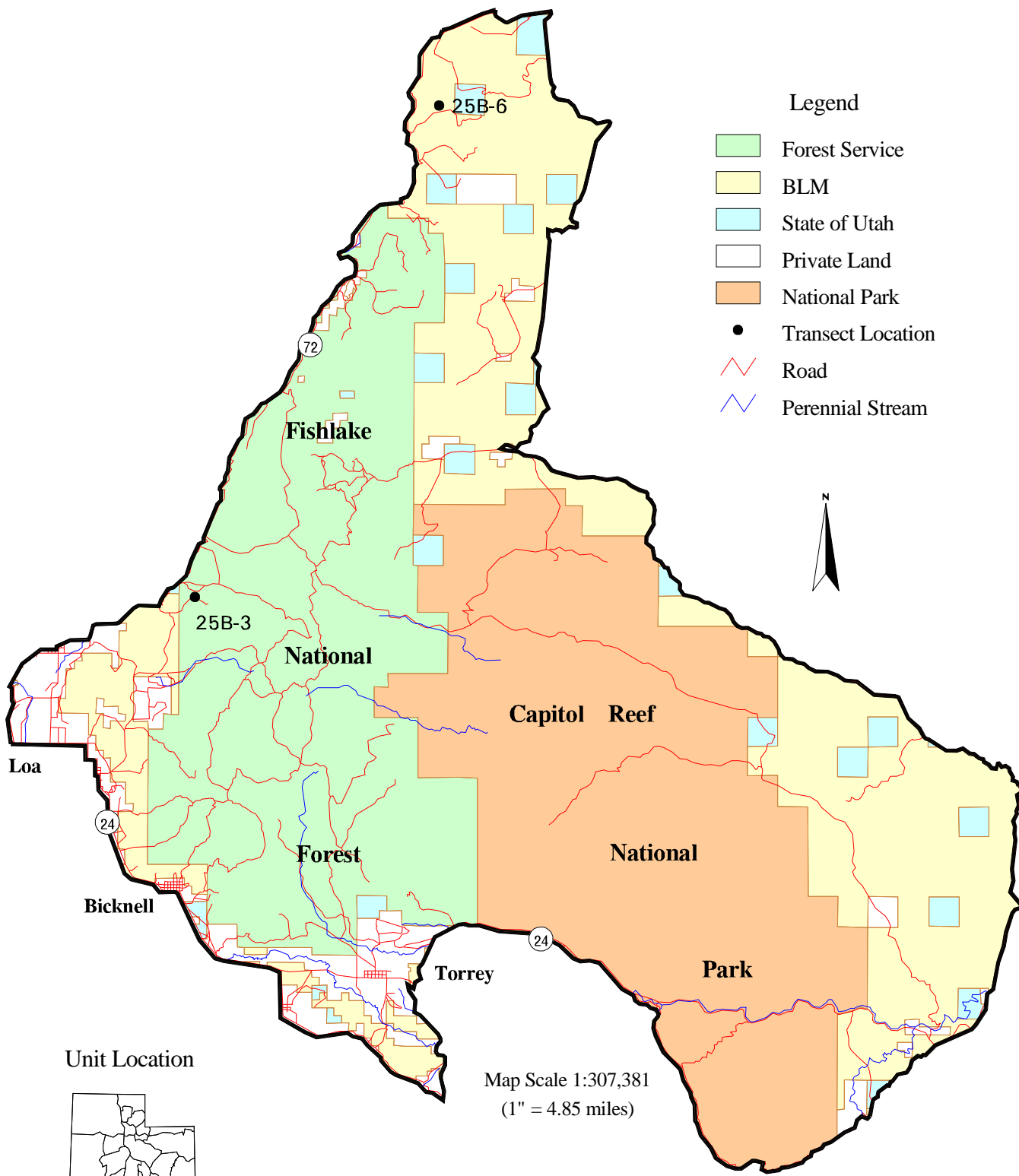
Site	Category	1994	1999
25A-1 Triangle Mountain	soil	+	0
	browse	+	0
	herbaceous understory	+	0
25A-2 Black Mountain	soil	-	0
	browse	-	0
	herbaceous understory	+	0
25A-3 Sage Flat	soil	0	0
	browse	+	0
	herbaceous understory	-	-
25A-4 Durfee Homestead	soil	-	0/+
	browse	-	-
	herbaceous understory	-	0

Site	Category	1994	1999
25A-5 Praetor Slope	soil	0/-	0
	browse	-	0
	herbaceous understory	0	0
25A-7 Evans Reservoir	soil	-	0/+
	browse	-	-
	herbaceous understory	+	-
25A-8 Lower Dog Flat	soil	0	0
	browse	0	0
	herbaceous understory	0	0
25A-9 Row of Pines	soil	-	+
	browse	-	-
	herbaceous understory	0	+
25A-10 Cedarless Flat	soil	0	0
	browse	+	0
	herbaceous understory	+	-
25A-11 Forsyth Reservoir	soil	0	0
	browse	+	0
	herbaceous understory	0	-
25A-12 East Tidwell	soil	est	0
	browse	est	0
	herbaceous understory	est	-
25A-13 Ox Spring	soil	est	0
	browse	est	+
	herbaceous understory	est	-
25A-14 Row of Pines Exclosure	soil	est	0/+
	browse	est	-
	herbaceous understory	est	+
25A-16 Tommy Hollow	soil	0/+	0/+
	browse	-	+
	herbaceous understory	0	-

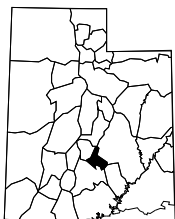
Site	Category	1994	1999
25A-18 Elk Camp	soil	-	0/+
	browse	-	+
	herbaceous understory	0	0
25A-19 Row of Pines Livestock Exclosure	soil		est
	browse		est
	herbaceous understory		est
25A-20 Row of Pines Total Exclosure	soil		est
	browse		est
	herbaceous understory		est

(-) = downward, (+) = upward, (0) = stable, (0/+) = stable to slightly upward, (0/-) = stable to slightly declining, (est) = trend study established

Management Unit 25B



Unit Location



WILDLIFE MANAGEMENT UNIT 25B (46,43) - PLATEAU, THOUSAND LAKE MOUNTAIN

Boundary Description

Wayne, Emery, and Sevier Counties - Boundary begins at Highway SR-24 and Highway SR-72; north on SR-72 to Interstate 70; east on I-70 to Cainesville road; south on this road to SR-24; west on SR-24 to SR72 and beginning point.

Unit Description

The Thousand Lake Wildlife Management unit is now part of the large management unit 25 - Plateau. This unit is divided into three sub units, Fish Lake (25A), Boulder Mountain (25C) and Thousand Lake (25A). Management unit 25B (46,43) was named after Thousand Lake Mountain, a lava-capped plateau with numerous small natural lakes. This mountain reaches an elevation of 11,295 feet and overlooks Capital Reef National Park and the desert country east of the unit. At the extreme southeastern corner of the unit is the lowest point elevationally in the herd unit at Cainesville (about 4,100 feet). The vegetative composition varies greatly throughout the unit with respect to topographical relief and elevation. Cainesville averages about 185 frost-free days and 5 to 6 inches of rainfall a year, while Thousand Lake Mountain receives 25 to 30 inches of rainfall a year and averages only 20 to 40 frost-free days. Grazing, uranium exploration, and logging are the three uses that have had the most impact on the Thousand Lakes unit.

Grazing of cattle, horses, and sheep commenced with the settlement of the region in the 1860's. The range was open to anyone and was used from the time the snow melted enough in the spring to get livestock on the mountain, until the snow drove them off in the fall. Much of the east side, especially the Solomon Basin area, was used year-round by cattle. Because of the plentiful, well-dispersed water sources, the relatively flat mountain top was also heavily grazed each summer. This overgrazing resulted in soil compaction and soil loss at water sources, erosion problems, decreased water quality, and a decrease of the valuable grass-forb component in the vegetative community until nearly monotypic shrub types remained. The Forest Service has gradually increased grazing restrictions in order to allow the range to recover. Currently many areas are beginning to show improvements, but it will take a long time for the land to recover naturally.

Uranium prospectors have also left their mark on the land. Four-wheel drive vehicles and heavy equipment tracks crisscross the unit and are still quite visible.

Stands of ponderosa pine, Douglas-fir, and Engelmann spruce are found on the mountain with many areas having been logged in the past. Fire suppression has helped to accelerate succession of the high mountain aspen-meadow parklands toward climax stands of Engelmann spruce. Canopy closure in these spruce forests nearly eliminates all understory species, resulting in a significant loss of forage production. Timber sales and prescribed burns which open up the canopy and encourage resprouting of aspen would be necessary to retain sufficient acreage of the already limited big game summer range.

Despite human impacts, portions of Thousand Lake Mountain are under consideration for wilderness designation. However, gas and oil exploration is an ongoing activity and coal deposits in the Last Chance area have drawn proposals for both underground and strip mining. Also, Highway U-72 which forms the western boundary, has been paved and will now be maintained for year-round use. This will tend to encourage more recreation and tourism through the area.

The unit has good winter range with ample protective cover, large basins, draws, and open ridges. The upper limits of the normal winter range vary from 8,400 feet at the northern boundary to 9,000 feet on the south end of the mountain. The lower normal winter range limit is between 6,000 and 7,400 feet in elevation. At present, the winter range appears ample to support the deer and elk from the Thousand Lakes unit and also

many wintering deer from the adjacent Fish Lake unit. Solomon Basin, Sage Flat, Horse Valley, Sand Flat, Paradise Flat, and Lyman Slopes are all winter concentration areas.

Several different estimates of the size of the unit's big-game ranges can be found. Many of these estimates are discussed here. Huff and Blotter (1964) conducted the original survey of the area's deer ranges and reported 90,489 acres of winter range. Jense et al. (1985) quoted this estimate but rounded it off. Mann (1985) used the same figure to arrive at an estimate of 3,800 acres that needs to be acquired from the private sector and maintained to help maintain the deer herd. In the deer herd unit management plan, Bogedahl (1983) gave markedly different estimates of the range sizes. This project planimetered the boundaries of the winter range as drawn on the original base map by Huff and Blotter to arrive at an estimate of 103,733 acres.

Huff and Blotter (1964) inventoried the vegetation on the winter range in 1963. They reported acreage and cover density for three major vegetative types. Pinyon-juniper made up 73% of the winter range with about 9% cover for desirable browse species. The sagebrush and mixed browse types accounted for 10% and 4% of the winter range and had 19% and 18% of the cover respectively for the key browse species. Ponderosa pine, with a healthy understory of antelope bitterbrush, is located along the upper edge of the winter range between Water Canyon and Sand Creek.

The condition of the spring and summer range is the current management concern. As the snow begins to recede in the spring, deer seek green grasses and forbs which are very scarce on the heavily over grazed spring ranges. At this time, the early green-up in the alfalfa and grain fields on private land near Loa, Fremont, Lyman and Torrey are very attractive to wildlife and depredation problems become serious. The DWR has been working in cooperation with the BLM and Forest Service on revegetation projects immediately above these private lands to provide spring forage and alleviate this problem. Most of the big game summer range is in fairly good condition and adequate for present needs, but it is limited in size and should be managed carefully to insure that the necessary quality and quantity of summer range is maintained in order to maintain herds at current levels. Small sage flats on top of the mountain which have been sprayed with 2,4-D, have displayed increased summer use by deer as forb and grass production increases. Limited use of these treatments in combination with logging and prescribed burns in spruce and aspen stands could be helpful in maintaining and improving the summer range.

Wildlife Management Unit Objectives

The current management plan is to achieve a target wintering population of 2,000 deer with a postseason buck to doe ratio of 15:100, with 30% of these bucks being 3 point or better. The objective for elk is to achieve a population of 4,800 wintering elk on sub units 25A - Fish Lake and 25B - Thousand Lake with a herb composition of 8 bulls to 100 cows with at least 4 of those bulls being 2 ½ years or older.

Trend Study Site Description

Forest Service, BLM, and DWR personnel met in August, 1985 to discuss range trend study's and to select critical areas of big game range where trend should be monitored. Five sites were chosen for permanent range trend studies on the herd unit. These studies; Thousand Lake (#25B-1), Horse Valley (#25B-2), Sage Flat (#25B-3), Solomon Basin (#25B-4), and Polk Creek (#25B-5), were established in 1985. Another site, Little Deer Peak (#25B-6), has been added to the Thousand Lake unit. It originally was from a neighboring unit, but was switched to Thousand Lake unit with the latest alignment of the management unit boundaries. All of these sites were reread in 1991 and 4 of the 6 sites were read in 1994. All 6 sites were revisited in 1999.

Trend Study 25B-1-99

Study site name: Thousand Lake .

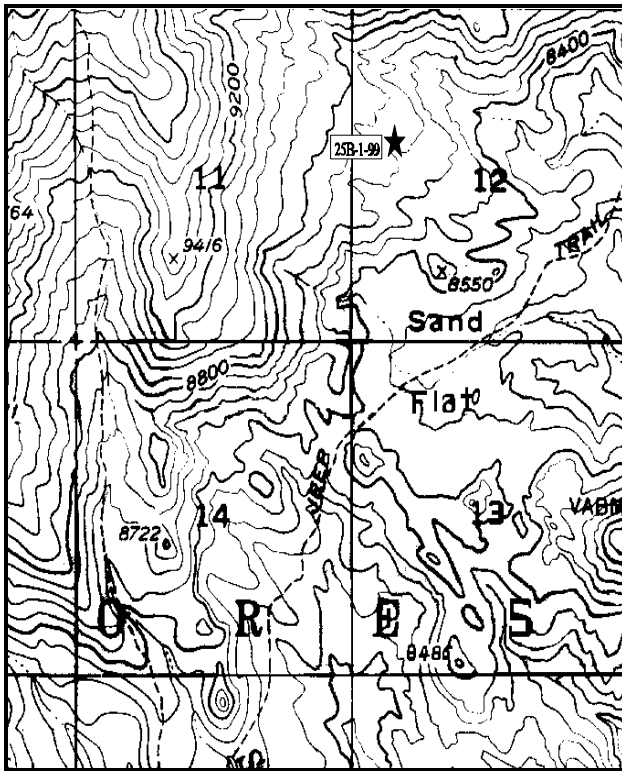
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

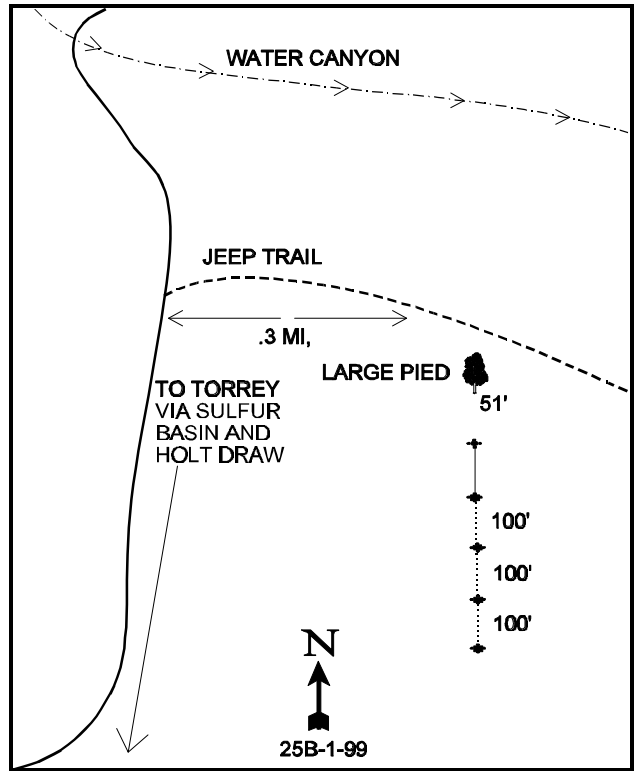
LOCATION DESCRIPTION

Take the Sand Creek-Sulfur Creek turnoff from SR 24 west of Torrey (0.35 miles from mile marker 68). Go 0.8 miles along this road to a Forest Service boundary and cattleguard. Continue 0.6 miles past two water tanks on the left. After another mile there is a road forking off to the right towards Hells Hole, continue straight through the wash. In 0.1 miles you will pass a fork, stay left on the main road which switchbacks up into the canyon (Holt Draw). Go 3.1 miles up the canyon and to the top of a ridge where a road forks to the right towards Sand Flat. Stay left on the main road (rough and rocky) and go 2.15 miles to a fork in Sulfur Basin. Take the right fork which cuts up the side of the ridge and go 1.25 miles into another basin where there is a faint road off to the right. Go 0.25 miles down this road to a large pinyon just off the right side of the road. The 0-foot baseline stake is 51 feet south of the pinyon. The stake is a rebar approximately 3 feet tall with a red browse tag #7123 attached.



Map Name: Torrey, Utah

Township 28S , Range 4E , Section 12



Diagrammatic Sketch

UTM 4249066.900 N, 462243.192 E

DISCUSSION

Trend Study No. 25B-1 (46-1)

The Thousand Lake trend study is located on the east side of Thousand Lake Mountain. The site has an aspect to the southeast with a slope of 5% to 10% and elevation of 8,600 feet. The vegetation type is mixed mountain brush. It is not unusual to see deer in this area, frequently in late summer and early fall. There is evidence that deer use the area during light to moderate winters. Pellet group data taken on site during the 1999 reading estimated 15 deer days use/acre (38 ddu/ha), 23 elk days use/acre (56 edu/ha), and 7 cow days use/acre (16 cdu/ha).

The soil appears moderately deep and quite compacted below the surface, making it difficult to drive transect stakes into the ground. Effective rooting depth was estimated at 15 inches. Soil texture was determined to be a sandy loam with a neutral pH (7.1). Soil phosphorus was low at 5.5 ppm, where values below 10 ppm could limit normal plant development and growth. There are rocks throughout the profile, although surface rock and pavement currently make up less than 12% of the ground cover. There was a high percentage of litter cover (>70%), primarily under the vegetation in the past, however currently litter cover is 45%. The north end of the transect lies in a small drainage where more abundant vegetation and litter provide good cover to help stop erosion. There is evidence of recent erosion with several shallow gullies.

The key browse species include bitterbrush, black sagebrush and mountain big sagebrush. They all have lower densities than mountain low rabbitbrush, however they are all larger and together appear to dominate the area. The black sagebrush had initially (1985) shown moderate (46%) to heavy (38%) utilization with 64% of the plants classified as decadent. Percent decadency has been declining since the first survey (64%, 56%, and 30%), however biotic potential has never been above 2% (proportion of seedlings to population) and percent young age class has never been above 7%. These numbers would indicate that black sagebrush would be declining in numbers, but not the decrease indicated by the population estimates. Some of the changes in density between 1991 and 1999 are due to the sample size being increased by more than three times. This is now giving a more accurate density estimate for the black sagebrush population. Black sagebrush currently makes up 18% of the total browse cover.

Bitterbrush currently ('99) makes up 24% of the total browse cover, making it the most productive of the key species. Percent decadence has varied through the years from a high of 42% in 1991 to 19% currently. Its biotic potential has varied from a high of 21% in 1985 to only 1% currently. Percent young has been as high as 47% in the past, but is currently moderately high at 19%. These data would indicate an improving trend for bitterbrush. Again, one should not focus too much on the population decrease. Due to the increased sample size, the density is now more representative of the true density of bitterbrush on this site.

The lower portion of the site also supports a fairly vigorous, lightly utilized population of mountain big sagebrush. It provides 11% of the total browse cover and has good biotic potential (8%) and a moderately large young age class (26%). This would indicate an improving trend for mountain big sagebrush. Gray horsebrush is also present but contributes to less than 1% of the browse cover. It currently shows mostly light (50%) to moderate (45%) hedging. Another shrub species of note is broom snakeweed, which is found on the drier portions of the site, but not in association with the more densely occurring shrub species. It is a very young population which has experienced a significant drop in its population (57%) in 1991. Since then its population has remained stable.

The pinyon population appears to be stable with only scattered young plants on the transect. Point quarter method data indicates that there are an estimated 87 trees/acre with an average diameter of almost 4 inches. Point quarter estimated juniper density at 20 trees/acre with an average diameter of just over 4 inches, while ponderosa's density was 19 trees/acre with an average diameter of almost 7 inches. More mature pinyon-juniper and ponderosa pine surrounded by the site. The most common browse species on the transect

was mountain low rabbitbrush, but only provides 15% of the browse cover. It is considered an aggressive increaser with fair to poor forage value for livestock and deer. Observations indicate that deer do browse it, with over 90% of the plants being lightly browsed. The population appeared to be stable in 1985, but it actually increased by 29% in 1991. However, in 1999 the sample size was increased by more than three times and now gives a much more accurate estimated density of only about 7,520/acre.

There is a good variety of grass species present. The grasses are desirable species which provide good ground cover and forage for big game and livestock. The grasses provide 71% of the herbaceous cover, however the herbaceous component only contributes to 19% of the total vegetative cover. The abundance of forbs is quite low to be significant in terms of production, but several of the common species are known to be utilized by big game whenever they are available, especially the buckwheat species (*Eriogonum* spp.), penstemon, and longleaf phlox. Grasses and forbs appear to have been depleted by overgrazing in the past, but since the reduction in numbers of livestock and implementation of a rest-rotation system, the herbaceous vegetation appears to be improving it's vigor and density.

1985 APPARENT TREND ASSESSMENT

Soil was depleted from past abuse, but with increased vegetative cover and litter, the soil surface and some of the gullies appear to be stabilizing. Therefore, trend appears to be improving. Vegetative trend is similar, although the presence of several woody increaser species and the poor vigor and declining population of black sagebrush is not desirable. Continued rest from livestock grazing appears necessary to allow the range to improve and herbaceous species to recover.

1991 TREND ASSESSMENT

Soil appears to be stable, but still only in fair condition. It would show good improvement if there could be an increase in grass cover and decrease of percent bare ground to less than 10%. This would be more practical than an increase in the forb cover, which has shown very little change since the last inventory in 1985. The key browse species, black sagebrush and bitterbrush, show some interesting changes. Black sagebrush has actually increased it's density by 2% (from 11,933 to 12,133 plants per acre). Even with this high density and the extended drought, percent decadency has gone from 64 to 56%. Bitterbrush has also done well through the drought period, for it's density has increased by 55% (from 999 to 2,199 plants per acre), but percent decadency has gone from 0% to 42%. This rate of decadency could be turned around with changing precipitation patterns and an end to this extended drought. Most of the key grasses have increased quadrat and nested frequency values except for slender wheatgrass. The forbs have not changed much since the last inventory.

TREND ASSESSMENT

soil - stable

browse - up

herbaceous understory - stable to slightly improving

1999 TREND ASSESSMENT

Trend for soil would be considered stable, but still only in fair condition. The increase in percent bare ground is because the transect was lengthened four times longer than the original transect and the black sagebrush type that is sampled more, has characteristically more bare soil than the mountain big sagebrush type. The two most productive key browse species, black sagebrush and bitterbrush, show some interesting density changes, however these decreases are from the greatly increased sample size which now gives better estimates for browse species. Black sagebrush shows characteristics of a stable population, but could decline in density in the future with low biotic potential (2%) and fairly low percent young age class (7%) if there are no improvements in the future. However, percent decadence has improved from 56% down to 30% and those

classified with poor vigor have decreased from a high of 25% (1991) to 10% in 1999. The percentage of plants with moderate to heavy use has also decreased from 53% in 1991 down to 19% in 1999. Bitterbrush has also done well through the extended drought period, with improvements in percent decadency from a high of 42% in 1991 to 19% in 1999. The percent classified in the young age class are still relatively high at 19%. Most of the key grasses are stable to decreasing nested frequency values except for slender wheatgrass and needle and thread grass. The forbs have changed little, but have improved slightly since 1991. Overall, trend for herbaceous species is stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25B, Study no: 1

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % '09
		'85	'91	'99	'85	'91	'99	
G	Agropyron smithii	-	-	2	-	-	1	.00
G	Agropyron trachycaulum	b ₄₅	a ₂₃	ab ₃₁	20	9	15	.60
G	Bouteloua gracilis	a ₈₃	b ₁₂₂	ab ₁₁₂	36	46	46	3.45
G	Bromus inermis	b ₁₅	a ₁	a ₋	6	1	-	-
G	Carex spp.	a ₅₀	b ₇₈	a ₃₄	21	33	15	.12
G	Oryzopsis hymenoides	2	1	-	1	1	-	-
G	Poa fendleriana	a ₋	a ₋	b ₄₄	-	-	20	.76
G	Poa pratensis	b ₁₀₂	ab ₆₄	a ₅₁	41	26	19	.78
G	Sitanion hystrix	a ₂₄	b ₈₀	a ₄₃	12	38	18	.89
G	Stipa comata	a ₋	a ₃	b ₂₄	-	1	10	.49
G	Stipa lettermani	a ₁₉	b ₄₇	ab ₃₁	8	19	14	.46
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		340	419	372	145	174	158	7.57
Total for Grasses		340	419	372	145	174	158	7.57
F	Arabis demissa	4	4	3	3	2	1	.00
F	Artemisia ludoviciana	1	1	-	1	1	-	-
F	Aster spp.	-	-	5	-	-	2	.18
F	Astragalus spp.	-	2	-	-	1	-	-
F	Cryptantha spp.	a ₁₂	a ₁₉	b ₄₉	9	8	20	.42
F	Epilobium brachycarpum (a)	-	-	1	-	-	1	.15
F	Eriogonum brevicaulle	1	5	-	1	2	-	-
F	Eriogonum racemosum	b ₃₀	b ₂₉	a ₆	16	16	3	.06
F	Eriogonum umbellatum	a ₂	a ₋	b ₂₈	2	-	14	1.36
F	Hymenoxys richardsonii	-	3	4	-	1	3	.33
F	Linum lewisii	a ₋	a ₋	b ₇	-	-	3	.06

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Lygodesmia spp.	-	-	2	-	-	2	.03
F	Machaeranthera canescens	4	6	-	2	3	-	-
F	Penstemon comarrhenus	7	8	2	3	3	2	.16
F	Phlox longifolia	1	11	3	1	5	2	.06
F	Senecio multilobatus	_b 14	_a	_b 15	6	-	6	.20
F	Unknown forb-perennial	3	-	-	1	-	-	-
F	Zigadenus paniculatus	2	-	-	1	-	-	-
Total for Annual Forbs		0	0	1	0	0	1	0.15
Total for Perennial Forbs		81	88	124	46	42	58	2.89
Total for Forbs		81	88	125	46	42	59	3.04

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

BROWSE TRENDS --

Herd unit 25B, Study no: 1

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	2	.18
B	Artemisia nova	86	8.38
B	Artemisia tridentata vaseyana	36	5.01
B	Chrysothamnus nauseosus	1	-
B	Chrysothamnus viscidiflorus lanceolatus	82	6.81
B	Cowania mexicana stansburiana	2	-
B	Eriogonum microthecum	5	.04
B	Gutierrezia sarothrae	6	.15
B	Juniperus osteosperma	1	.38
B	Leptodactylon pungens	9	.21
B	Pinus edulis	6	13.63
B	Purshia tridentata	52	11.30
B	Ribes spp.	0	-
B	Symphoricarpos oreophilus	3	.00
B	Tetradymia canescens	17	.24
Total for Browse		308	46.35

CANOPY COVER --

Herd unit 25B, Study no: 1

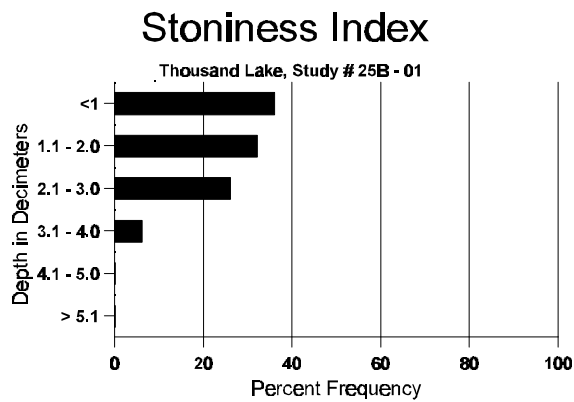
Species	Percent Cover 09
Pinus edulis	18

BASIC COVER --
Herd unit 25B, Study no: 1

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	298	5.25	8.50	49.81
Rock	152	7.00	5.25	8.80
Pavement	164	3.50	1.25	3.06
Litter	371	71.00	71.50	45.38
Cryptogams	20	.25	0	.38
Bare Ground	229	13.00	13.50	21.11

SOIL ANALYSIS DATA --
Herd Unit 25B, Study # 01, Study Name: Thousand Lake

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.0	49.2 (16.4)	7.1	68.9	13.8	17.3	1.6	5.5	105.6	0.5



PELLET GROUP DATA --
Herd unit 25B, Study no: 1

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Rabbit	-	8	n/a
Elk	-	15	23 (57)
Deer	-	11	15 (37)
Cattle	-	2	7 (17)

BROWSE CHARACTERISTICS --
Herd unit 25B, Study no: 1

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																		
M	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	1	-	-	2	-	-	-	-	-	3	-	-	-	60	4	5	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	60		-			
Artemisia nova																		
S	'85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	3	-	-	3	-	-	-	-	-	6	-	-	-	120			6
Y	'85	5	3	-	-	-	-	-	-	-	7	-	1	-	533			8
	'91	1	2	-	-	-	-	-	-	-	3	-	-	-	200			3
	'99	23	-	-	1	-	-	-	-	-	23	-	1	-	480			24
M	'85	19	36	2	-	-	-	-	-	-	53	-	4	-	3800	6	10	57
	'91	34	37	4	1	1	-	-	-	-	73	1	2	1	5133	6	16	77
	'99	153	42	-	16	-	-	3	-	-	214	-	-	-	4280	11	19	214
D	'85	5	43	66	-	-	-	-	-	-	81	-	17	16	7600			114
	'91	48	47	3	1	2	-	-	-	1	60	-	3	39	6800			102
	'99	65	19	-	8	4	-	4	-	-	67	-	-	33	2000			100
X	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	820			41
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		46%			38%			21%			+ 2%							
'91		49%			04%			25%			-44%							
'99		19%			00%			10%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	11933	Dec:	64%			
												'91	12133		56%			
												'99	6760		30%			

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	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	3	-	-	-	-	-	8	-	-	-	160		8	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	23	-	-	5	-	-	-	-	-	28	-	-	-	560		28	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	50	3	-	1	-	-	-	-	-	54	-	-	-	1080	22	29	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	22	1	-	1	-	-	-	-	-	24	-	-	-	480		24	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	200		10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		04%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	0		0%			
												'99	2120		23%			
<i>Chrysothamnus nauseosus</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	25	26	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	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>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	20	-	-	-	-	-	-	-	-	20	-	-	-	1333		20	
	91	25	-	-	-	-	-	-	-	-	25	-	-	-	1666		25	
	99	10	-	-	2	-	-	-	-	-	12	-	-	-	240		12	
M	85	135	2	-	-	-	-	-	-	-	137	-	-	-	9133	4	4	137
	91	233	11	-	4	-	-	6	-	-	251	3	-	-	16933	3	8	254
	99	309	9	-	24	-	-	2	-	-	344	-	-	-	6880	8	14	344
D	85	48	4	5	-	-	-	-	-	-	56	-	1	-	3800		57	
	91	8	10	-	-	2	-	-	-	-	14	-	-	6	1333		20	
	99	14	1	-	5	-	-	-	-	-	13	-	-	6	400		20	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		03%			02%			.46%			+28%							
'91		08%			00%			02%			-62%							
'99		03%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	14266	Dec:	27%				
											'91	19932		7%				
											'99	7520		5%				
<i>Cowania mexicana stansburiana</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	19	0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			50%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	0%				
											'91	0		0%				
											'99	40		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					
Eriogonum microthecum										
Y	85	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	0	-	0
	99	3	-	-	-	-	-	60	-	3
M	85	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	0	-	0
	99	2	3	-	-	-	-	100	9 13	5
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>					
'85		00%	00%	00%						
'91		00%	00%	00%						
'99		38%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'85	0	Dec:	-		
					'91	0		-		
					'99	160		-		
Gutierrezia sarothrae										
S	85	6	-	-	-	-	-	400	-	6
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	0	-	0
Y	85	3	-	-	-	-	-	200	-	3
	91	3	-	-	-	-	-	200	-	3
	99	1	-	-	-	-	-	20	-	1
M	85	3	-	-	-	-	-	200	4 4	3
	91	-	-	-	-	-	-	0	-	0
	99	9	-	-	-	-	-	180	11 21	9
D	85	1	-	-	-	-	-	66	-	1
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	-	-	-	0	-	0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>					
'85		00%	00%	14%	-57%					
'91		00%	00%	00%	+ 0%					
'99		00%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'85	466	Dec:	14%		
					'91	200		0%		
					'99	200		0%		
Juniperus osteosperma										
M	85	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	0	-	0
	99	-	-	-	1	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>					
'85		00%	00%	00%						
'91		00%	00%	00%						
'99		100%	00%	00%						
Total Plants/Acre (excluding Dead & Seedlings)					'85	0	Dec:	-		
					'91	0		-		
					'99	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					
Leptodactylon pungens																	
Y	85	4	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	21	-	-	-	-	-	-	-	21	-	-	-	1400	5	6	21
	91	1	1	-	2	-	-	1	-	5	-	-	-	333	5	5	5
	99	3	4	-	2	-	-	3	-	12	-	-	-	240	9	8	12
D	85	5	-	-	-	-	-	-	-	5	-	-	-	333		5	
	91	5	3	-	-	-	-	1	-	5	-	-	4	600		9	
	99	1	-	-	3	-	-	1	-	3	-	-	2	100		5	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			-50%						
'91		27%			00%			27%			-66%						
'99		24%			00%			12%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	1999	Dec:	17%				
										'91	999		60%				
										'99	340		29%				
Pinus edulis																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	4	-	-	-	-	4	-	-	-	266		4	
	99	2	-	-	1	-	-	2	-	5	-	-	-	100		5	
Y	85	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	2	-	4	-	-	-	80	-	-	4
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+ 0%						
'91		00%			00%			00%			+45%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)										'85	66	Dec:	-				
										'91	66		-				
										'99	120		-				

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				
Purshia tridentata																		
S	85	4	-	-	-	-	-	-	-	-	3	-	1	-	266		4	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	1	-	-	-	-	1	-	-	-	20		1	
Y	85	6	1	-	-	-	-	-	-	-	7	-	-	-	466		7	
	91	3	-	-	-	-	-	-	-	3	-	-	-	200		3		
	99	7	7	-	-	2	-	-	-	16	-	-	-	320		16		
M	85	2	1	5	-	-	-	-	-	8	-	-	-	533	9	22	8	
	91	5	3	7	-	-	-	-	-	15	1	-	-	1066	7	19	16	
	99	4	14	8	3	13	9	-	-	51	-	-	-	1020	17	49	51	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	91	3	-	6	-	-	-	4	-	10	-	-	4	933		14		
	99	2	2	-	4	5	3	-	-	13	-	-	3	320		16		
X	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	-	-	-	-	-	-	-	-	-	-	-	-	220		11		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		13%			33%			00%			+55%							
'91		09%			45%			12%			-25%							
'99		52%			24%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	999	Dec:	0%			
												'91	2199		42%			
												'99	1660		19%			
Ribes spp.																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	35	50	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
Symphoricarpos oreophilus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	-	-	4	-	-	-	-	4	-	-	-	80	20	44	4	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	99	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	0		0%			
												'99	100		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				
Tetradymia canescens																		
S	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	'99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	'85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	'91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	'99	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	'85	1	1	1	-	-	-	-	-	-	3	-	-	-	200	9	7	3
	'91	4	1	-	-	-	-	-	-	-	5	-	-	-	333	6	7	5
	'99	5	7	1	2	-	-	-	-	-	15	-	-	-	300	13	12	15
D	'85	1	1	1	-	-	-	-	-	-	2	-	1	-	200			3
	'91	2	-	-	-	-	-	-	-	-	1	-	-	1	133			2
	'99	1	1	-	1	-	-	-	-	-	-	1	-	2	60			3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		22%			22%			11%			-11%							
'91		13%			00%			13%			-25%							
'99		45%			05%			10%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	600	Dec:	33%				
											'91	532		25%				
											'99	400		15%				

Trend Study 25B-2-99

Study site name: Horse Valley .

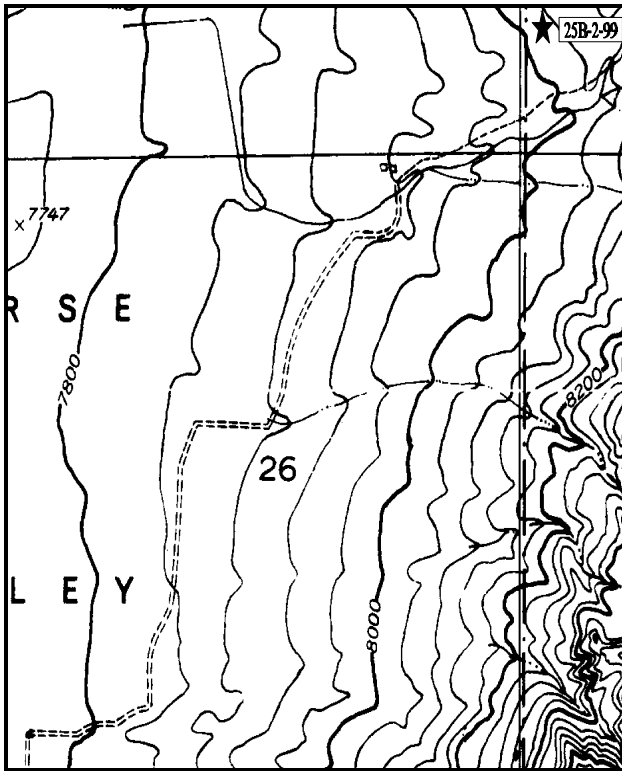
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11&95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

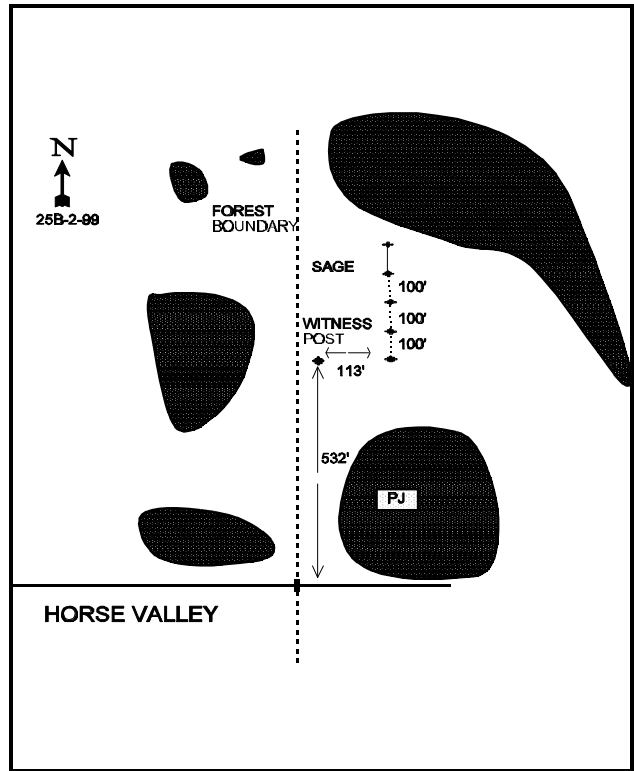
LOCATION DESCRIPTION

At the north end of main street (SR 24) in Lyman, SR 24 turns west towards Loa. Turn east here and go 0.35 miles to a 3-way split just beyond a cattleguard. Take the middle fork (the main road) and go 2.2 miles to a fork. Stay left and continue 1.05 miles on the main road to another fork. Again stay left and proceed 0.5 miles north just past a small reservoir to an intersection. Take the right fork toward Neffs Reservoir. On the main road, go 1.6 miles up and east across the top of some private land to a cattleguard at the Forest Service boundary. Park here, then walk 532 feet north along the east side of the fence to a witness post (rebar) next to the fence. The 400' stake is 114 feet east of the witness post. The 0-foot baseline stake lies 400 feet north, and has a red browse tag #7065 attached.



Map Name: Loa 1 NE, Utah

Township 27S , Range 3E , Section 24



Diagrammatic Sketch

UTM 4255485.545 N, 452812.384 E

DISCUSSION

Trend Study No. 25B-2 (46-2)

The Horse Valley transect is located in a sagebrush opening just east of the Forest Service boundary fence in Horse Valley. The other side of the fence is a strip of BLM land which has been proposed for a pinyon-juniper chaining and seeding treatment. Most of the valley is privately owned farmland. The study site has a gentle slope (3-5%) with a south-west aspect. The key species is Wyoming big sagebrush. Cattle graze in the area as part of the Thousand Lakes allotment. The area is thought to be a winter deer concentration area, with many moving into the lower fields in late winter or early spring. However, the pellet group transect read along the baseline in 1999 showed less than 1 days use/acre for both cattle and deer.

The light brown-orange soil appears to be moderate deep with an effective rooting depth of almost 15 inches. It is composed mainly of sand and some silt with little organic matter. Textural analysis indicates it is a sandy clay loam soil that is mildly alkaline (pH of 7.6). Amount of soil phosphorus (7.7 ppm) could be limiting to plant growth and development because it is below what is thought the minimal value of 10 ppm. Rocks and pavement together make up about 30% of the ground cover. Percent bare soil has varied from year to year, however the ratio of bare soil to protective cover has improved since 1994. This would indicate an improved trend for soil, but still poor condition with herbaceous cover only contributing to 20% of the total vegetative cover. Active gullies up to 1-1/2 feet deep are common. Movement of soil and rock fragments is detectable and in some places plant roots are exposed.

Wyoming big sagebrush provides almost all of the browse cover on this site. However, there has been a lot difficulty through the years differentiating between black sagebrush and Wyoming big sagebrush on this site. There is obviously a high occurrence of hybridizing between the two and the great deal of variation expressed in the plants within the area sampled. Wyoming big sagebrush visually dominates the area as it currently ('99) makes up 91% of the browse cover. The population has many individuals that have hybridized with black sagebrush or with mountain big sagebrush. Forty percent of the leaf samples taken fluoresce with a black light, indicating regression with the higher elevation mountain big sagebrush. These sagebrush average 1 1/2 feet in height and 2 feet and more in diameter. The Wyoming big sagebrush was generally vigorous and growing well in 1985, but since then percent decadency has increased and remained between 45 and 41% with the long term effects of the extended drought becoming evident. A majority (65%) of the plants have been only lightly hedged, while a few individuals have been more heavily utilized, usually individuals that are hybrids of mountain big sagebrush and Wyoming big sagebrush. The young age class and seedlings initially (1985) made up 22% of the population, but were scattered and occur only in patches. The combined biotic potential and young age class has steadily gone down since then to only 3% in 1994 and 10% in 1999.

While sagebrush dominates the browse cover, the more numerous broom snakeweed and narrowleaf low rabbitbrush make up less than 10% of the total browse cover. Since 1991, there have been large fluctuations in density estimates for broom snakeweed and low rabbitbrush. The narrowleaf low rabbitbrush is moderately abundant, but is generally small in stature. It displayed moderate to heavy use in past years (57% in '91 and 37% in '94), with some of the plants displaying poor vigor. Currently these shrubs appear unutilized. Broom snakeweed occurs over the entire area and appears unutilized. It had a vigorous expanding population in 1985 with a biotic potential (proportion of seedlings to the population) of 153%, which decreased rapidly by a factor of more than four times in 1994. Now it has grown rapidly back up again to 4,890 plants/acre. These kind of fluctuations in density occur often for this species with the variable precipitation patterns of southern Utah. Pinyon and pricklypear cactus appear to be slowly invading the area.

Forbs and grasses are scarce and diversity is low because Wyoming big sagebrushes cover is currently nearly 20%. The most abundant forb is pingue hymenoxys, an increaser which is often poisonous to sheep and sometimes cattle. Grass frequency is very low and the most common species are blue grama and bottlebrush squirreltail. The total cover from grasses and forbs currently is just over 4%.

1985 APPARENT TREND ASSESSMENT

Soil trend appears to be downward. The soil is fairly unstable and has a low amount of cover. Small gullies are common and active. Vegetative trend appears slightly down because of the increase of undesirable increasers. The Wyoming big sagebrush population appears stable and moderately used. A proposed chaining would be helpful on the adjacent mature pinyon-juniper woodlands and older sagebrush stands as long as adequate cover is left for wildlife. More herbaceous vegetation is needed in the area to provide green forage for transitional spring range.

1991 TREND ASSESSMENT

Soil trend appears to be continuing downward because percent bare ground and rock is increasing with a corresponding loss of litter cover. Key browse species have decreased densities. Black sagebrush has decreased by 43% with percent decadency going from 14% up to 75%. Wyoming big sagebrush densities did not go down very much (only 5%), but here again the percent decadency went from 14% up to 45%. Narrowleaf low rabbitbrush also lost some of its population to the drought. Its population went down 13% with 96% of its population classified as decadent. The most troubling aspect is that broom snakeweed increased by 24%. It went from 6,199 up to 8,199 plants per acre. This trend for broom snakeweed is contrary to most other sites in Utah this year.

TREND ASSESSMENT

soil - down, poor condition

browse - slightly down

herbaceous understory - stable, but still very poor condition

1994 TREND ASSESSMENT

Soil trend now appears to be stabilizing with percent bare ground cover slightly lower than 1991 estimates. The soils would have to still be considered in poor condition, but stable at this time. The key browse species (Wyoming big sagebrush) has a lower density, primarily because of the increased sample size giving better density estimates for populations with discontinuous distributions. The principal feature changes noted for monitoring the condition and trend of this sagebrush population is that there are no seedlings, the percent young is about 3%, and the percent of the population that are classified as decadent has slightly improved to 41%. However, 24% are now displaying poor vigor, up from 13% in 1991. Of major concern is that one in three Wyoming big sagebrush plants are dead. The proportion of black sagebrush displaying poor vigor has decreased to 33%, which is an improvement from 1991 when it was 75%. The increasers, narrowleaf low rabbitbrush and broom snakeweed, have experienced large decreases in their respective populations, 61% and 83%. The herbaceous understory trend is downward for nested frequency values for both grasses and forbs has gone downward since 1991.

TREND ASSESSMENT

soil - stable, but poor condition

browse - downward

herbaceous understory - downward

1999 ASSESSMENT OF TREND

Soil trend appears to be improving slightly with improving ratios of bare soil to protective cover. However, soils would still be considered in poor condition, but slightly improved at this time. Protective cover is still very low (herbaceous, litter, and cryptogamic cover), as illustrated by the number of active small gullies and pedestalling of most all the sagebrush. The key browse species (Wyoming big sagebrush) has a higher density, primarily because some of the plants were classified as black sagebrush during past readings. The

principal feature changes noted for monitoring the condition and trend of this population is that there are few seedlings (1%), the percent young is about 10%, and the percent of the population that are classified as decadent has remained in the low forties (41%, still considered high). Although, those classified with poor vigor have decreased to 13%. The proportion of the sagebrush population classified as black sagebrush has gone down to where it is a very small portion of the sagebrush population. The increasers, low rabbitbrush and broom snakeweed, have again experienced a large decrease and increase in their respective populations, -65% and +71%. The herbaceous understory trend is essentially stable for nested frequency values for grasses and forbs. However, herbaceous vegetation is still lacking.

TREND ASSESSMENT

soil - slightly improved, but still poor condition

browse - stable

herbaceous understory - stable, but still very poor

HERBACEOUS TRENDS --

Herd unit 25B, Study no: 2

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'85	'91	'94	'99	'85	'91	'94	'99	'04	'09
G	<i>Bouteloua gracilis</i>	48	66	61	64	21	25	26	25	1.16	1.66
G	<i>Carex</i> spp.	-	6	-	-	-	2	-	-	-	-
G	<i>Oryzopsis hymenoides</i>	1	3	-	1	1	2	-	1	-	.00
G	<i>Sitanion hystrix</i>	43	72	56	50	22	34	27	22	.34	.55
G	<i>Stipa comata</i>	_{ab} 9	_b 17	_a -	_a 1	4	8	-	1	.00	.00
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		101	164	117	116	48	71	53	49	1.50	2.22
Total for Grasses		101	164	117	116	48	71	53	49	1.50	2.22
F	<i>Androsace septentrionalis</i> (a)	-	-	-	7	-	-	-	4	-	.02
F	<i>Arabis demissa</i>	-	3	-	-	-	2	-	-	-	-
F	<i>Astragalus convallarius</i>	1	2	3	-	1	1	1	-	.00	-
F	<i>Astragalus</i> spp.	-	-	-	3	-	-	-	2	-	.01
F	<i>Chaenactis douglasii</i>	-	3	-	-	-	1	-	-	-	-
F	<i>Cryptantha jamesii</i>	_c 30	_{bc} 24	_b 6	_a -	14	12	4	-	.04	-
F	<i>Cryptantha</i> spp.	-	-	3	-	-	-	1	-	.03	-
F	<i>Erigeron pumilus</i>	4	8	3	3	3	4	3	2	.01	.01
F	<i>Hymenoxys richardsonii</i>	39	59	42	51	17	30	19	22	1.16	2.17
F	<i>Phlox longifolia</i>	-	-	-	3	-	-	-	1	-	.00
F	<i>Townsendia incana</i>	-	3	-	-	-	2	-	-	-	-
Total for Annual Forbs		0	0	0	7	0	0	0	4	0	0.01
Total for Perennial Forbs		74	102	57	60	35	52	28	27	1.25	2.19
Total for Forbs		74	102	57	67	35	52	28	31	1.25	2.21

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

BROWSE TRENDS --
Herd unit 25B, Study no: 2

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia frigida	0	0	-	-
B	Artemisia nova	24	2	4.38	.03
B	Artemisia tridentata vaseyana	0	17	-	4.19
B	Artemisia tridentata wyomingensis	58	67	10.72	14.72
B	Atriplex canescens	0	3	-	-
B	Chrysothamnus viscidiflorus stenophyllus	46	25	1.06	.46
B	Echinocereus triglochidatus	0	1	-	-
B	Gutierrezia sarothrae	41	68	.18	1.15
B	Leptodactylon pungens	0	1	-	-
B	Opuntia spp.	7	17	.04	.13
B	Pinus edulis	0	4	-	.15
Total for Browse		176	205	16.39	20.85

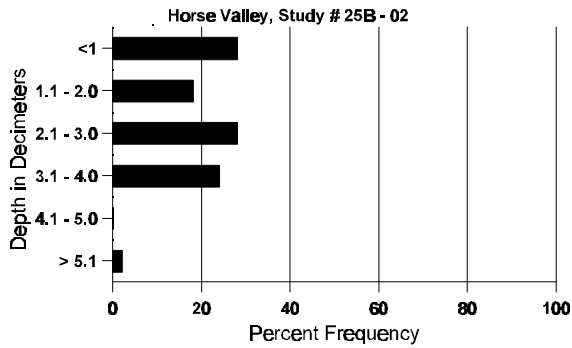
BASIC COVER --
Herd unit 25B, Study no: 2

Cover Type	Nested Frequency		Average Cover %			
	'04	'09	'85	'91	'94	'99
Vegetation	201	230	6.50	5.75	18.79	24.79
Rock	302	211	11.00	17.25	18.92	12.81
Pavement	303	309	31.50	25.75	8.72	22.56
Litter	349	317	23.50	14.50	16.85	21.91
Cryptogams	66	96	1.75	.75	1.15	2.45
Bare Ground	340	308	25.75	36.00	34.85	24.42

SOIL ANALYSIS DATA --
Herd Unit 25B, Study # 02, Study Name: Horse Valley

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.5	53.8 (16.8)	7.6	50.9	27.8	21.3	2.2	7.7	112.0	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25B, Study no: 2

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'94	'99	
Rabbit	14	9	n/a
Deer	8	3	1 (2)
Cattle	0	0	1 (2)

BROWSE CHARACTERISTICS --

Herd unit 25B, 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	5	6	7	8		9	1		2
Artemisia frigida														
M	'85	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	1	-	-	-	-	-	-	-	-	66	3	3	1
	'94	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>			
'85		00%			00%			00%						
'91		00%			00%			00%						
'94		00%			00%			00%						
'99		00%			00%			00%						
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-	
										'91	66		-	
										'94	0		-	
										'99	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 nova												
S	85	1	-	-	-	-	-	-	1	66		1
	91	-	-	-	-	-	-	-	0	0		0
	94	9	-	-	1	-	-	-	10	200		10
	99	-	-	-	-	-	-	-	0	0		0
Y	85	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	1	-	1	20		1
	99	-	-	-	-	-	-	-	-	0		0
M	85	-	6	-	-	-	-	-	6	400	9 17	6
	91	1	-	-	-	-	-	-	1	66	9 19	1
	94	23	1	-	1	-	-	-	25	500	18 33	25
	99	1	-	-	-	-	-	-	1	20	13 18	1
D	85	-	1	-	-	-	-	-	-	66		1
	91	3	-	-	-	-	-	-	-	200		3
	94	21	2	-	-	-	-	-	7	460		23
	99	1	-	-	-	-	-	-	1	20		1
X	85	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	160		8
	99	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		100%		00%		14%		-43%				
'91		00%		00%		75%		+73%				
'94		06%		00%		33%		-96%				
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	466	Dec:	14%
									'91	266		75%
									'94	980		47%
									'99	40		50%

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>Artemisia tridentata wyomingensis</i>																	
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	85	7	4	-	-	-	-	-	-	-	10	-	1	-	733		11
	91	5	3	-	1	-	-	-	-	-	9	-	-	-	600		9
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4
	99	20	-	-	1	-	-	1	-	-	22	-	-	-	440		22
M	85	10	33	2	-	-	-	-	-	-	41	-	4	-	3000	20 26	45
	91	10	8	4	1	2	-	-	-	-	24	1	-	-	1666	17 24	25
	94	46	32	2	-	-	-	-	-	-	80	-	-	-	1600	20 36	80
	99	70	35	2	3	1	-	-	-	-	111	-	-	-	2220	19 30	111
D	85	1	6	2	-	-	-	-	-	-	9	-	-	-	600		9
	91	14	4	4	3	2	-	-	-	1	20	-	1	7	1866		28
	94	44	11	3	-	-	-	-	-	-	24	-	-	34	1160		58
	99	49	26	3	10	1	2	-	-	-	60	-	-	31	1820		91
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	940		47
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	940		47
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		66%			06%			08%			- 5%						
'91		31%			15%			13%			-31%						
'94		30%			04%			24%			+37%						
'99		28%			03%			14%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	4333	Dec:	14%			
											'91	4132		45%			
											'94	2840		41%			
											'99	4480		41%			
<i>Atriplex canescens</i>																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	2	1	-	-	-	-	-	-	-	3	-	-	-	60	-	3
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	-	1	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'94		00%			00%			00%									
'99		25%			00%			25%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	0%			
											'91	0		0%			
											'94	0		0%			
											'99	80		25%			

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	85	6	-	-	-	-	-	-	6	6	400		6
	91	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	20			1
Y	85	11	4	-	-	-	-	-	-	15			15
	91	1	-	-	-	-	-	-	-	1			1
	94	-	-	-	-	-	-	-	-	0			0
	99	9	-	-	-	-	-	-	-	9			9
M	85	43	8	5	-	-	-	-	-	49	-	7	56
	91	-	3	-	-	-	1	-	-	4	-	-	4
	94	68	19	8	7	-	-	-	-	102	-	-	102
	99	34	-	-	3	-	-	-	-	37	-	-	37
D	85	34	17	8	-	-	-	-	-	49	-	7	59
	91	36	26	17	8	10	7	4	-	38	-	8	108
	94	15	25	3	2	-	-	-	-	27	-	-	45
	99	11	-	-	2	-	-	-	-	6	-	-	13
X	85	-	-	-	-	-	-	-	-	-	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	21
	99	-	-	-	-	-	-	-	-	-	-	-	11
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'85		22%		10%		13%		-13%					
'91		35%		22%		62%		-61%					
'94		30%		07%		12%		-60%					
'99		00%		00%		12%							
Total Plants/Acre (excluding Dead & Seedlings)										'85	8666	Dec:	45%
										'91	7532		96%
										'94	2940		31%
										'99	1180		22%
Echinocereus triglochidatus													
M	85	-	-	-	-	-	-	-	-	-	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	0
	99	1	-	-	-	-	-	-	-	1	-	-	1
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>					
'85		00%		00%		00%							
'91		00%		00%		00%							
'94		00%		00%		00%							
'99		00%		00%		00%							
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-
										'91	0		-
										'94	0		-
										'99	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											
Gutierrezia sarothrae																
S	85	142	-	-	-	-	-	-	142	-	-	-	9466		142	
	91	1	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	114	-	-	3	-	-	-	116	1	-	-	2340		117	
Y	85	15	-	-	-	-	-	-	15	-	-	-	1000		15	
	91	9	-	-	1	-	-	-	10	-	-	-	666		10	
	94	8	-	-	2	-	-	-	10	-	-	-	200		10	
	99	149	-	-	10	-	-	-	159	-	-	-	3180		159	
M	85	69	7	-	-	-	-	-	70	-	6	-	5066	7	6	76
	91	71	1	-	22	-	-	4	96	1	1	-	6533	5	4	98
	94	47	-	-	9	-	-	-	56	-	-	-	1120	7	6	56
	99	63	-	-	2	-	-	-	65	-	-	-	1300	7	8	65
D	85	1	1	-	-	-	-	-	-	-	-	2	133		2	
	91	10	-	1	4	-	-	-	14	-	1	-	1000		15	
	94	5	-	-	-	-	-	-	4	-	-	1	100		5	
	99	23	-	-	2	-	-	-	24	-	-	1	500		25	
X	85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	380		19	
	99	-	-	-	-	-	-	-	-	-	-	-	200		10	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>						
'85		09%		00%		09%				+24%						
'91		02%		.81%		02%				-83%						
'94		00%		00%		01%				+71%						
'99		00%		00%		.40%										
Total Plants/Acre (excluding Dead & Seedlings)									'85	6199	Dec:	2%				
									'91	8199		12%				
									'94	1420		7%				
									'99	4980		10%				
Leptodactylon pungens																
Y	85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>						
'85		00%		00%		00%										
'91		00%		00%		00%										
'94		00%		00%		00%										
'99		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-				
									'91	0		-				
									'94	0		-				
									'99	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							
Opuntia spp.												
S	85	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	1	-	-	-	-	1	20	1
Y	85	2	-	-	-	-	-	-	-	133		2
	91	4	-	-	-	-	-	-	-	266		4
	94	-	-	-	-	-	-	-	-	0		0
	99	5	-	-	3	-	-	-	-	160		8
M	85	22	-	-	-	-	-	-	-	1466	3 4	22
	91	6	-	-	-	-	1	-	-	466	3 4	7
	94	7	-	-	-	-	-	-	-	140	3 7	7
	99	12	-	-	3	-	-	1	-	320	3 11	16
D	85	3	-	-	-	-	-	-	-	200		3
	91	2	1	-	-	-	-	-	-	200		3
	94	1	-	-	-	-	-	-	-	20		1
	99	6	-	-	-	-	-	-	6	120		6
X	85	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		33%		-48%				
'91		07%		00%		00%		-83%				
'94		00%		00%		00%		+73%				
'99		00%		00%		20%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	1799	Dec:	11%
									'91	932		21%
									'94	160		13%
									'99	600		20%
Pinus edulis												
S	85	4	-	-	-	-	-	-	-	266		4
	91	2	-	-	-	-	-	-	-	133		2
	94	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	1	-	-	-	-	40		2
Y	85	1	-	-	-	-	-	-	-	66		1
	91	1	-	-	-	-	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	0		0
	99	3	-	-	1	-	-	-	-	80		4
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%		+ 0%				
'91		00%		00%		00%						
'94		00%		00%		00%						
'99		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	66	Dec:	-
									'91	66		-
									'94	0		-
									'99	80		-

Trend Study 25B-3-99

Study site name: Sage Flat .

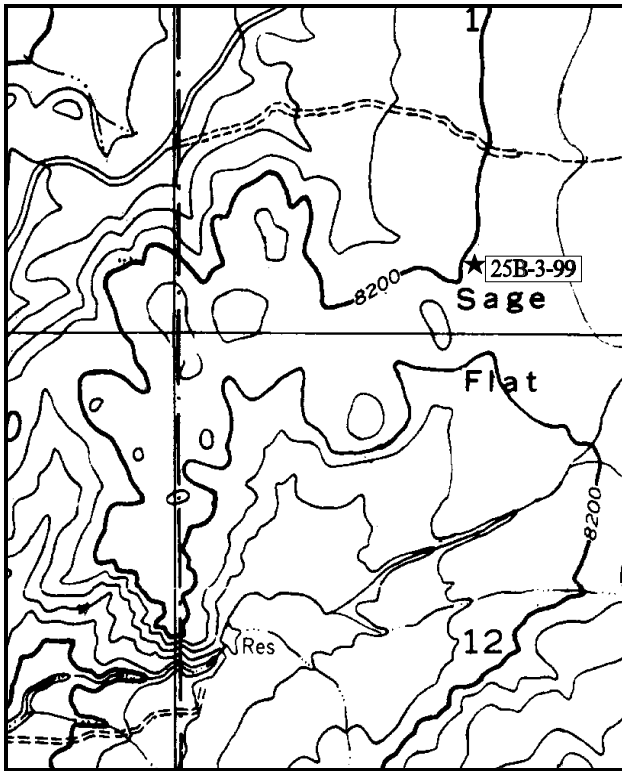
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11&95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

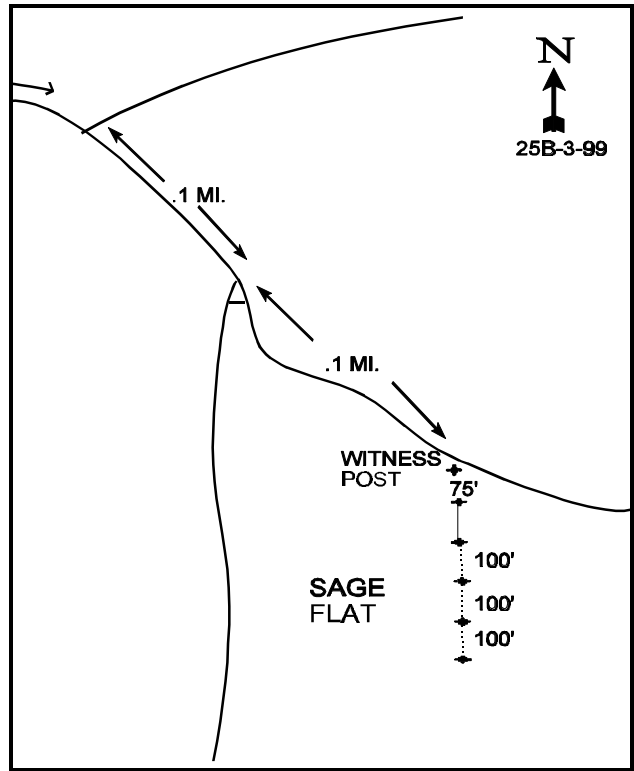
LOCATION DESCRIPTION

From Fremont travel north on SR 72 for 2.25 miles to a major fork, bear right and continue 2.8 miles on SR 72 to a cattleguard at the Forest Service boundary. One hundred yards beyond the cattleguard turn right. At 0.15 miles, a road forks off to the right. Go up this rough road 0.45 miles to a fork. Turn right and go 0.1 miles to another fork. Turn left at the fork and go 0.1 miles into the flat to a witness post on the right side of the road. The witness post and transect stakes are green steel fence posts with a white top. The frequency baseline starts 75' due south of the witness post.



Map Name: Loa 1 NE, Utah

Township 27S , Range 3E , Section 1



Diagrammatic Sketch

UTM 4259262.471 N, 453620.247 E

DISCUSSION

Trend Study No. 25B-3 (46-3)

The Sage Flat trend study is located in an open valley dominated by Wyoming big sagebrush. This part of Sage Flat is at an elevation of 8,200 feet with a southwest aspect and slope of less than 5%. The area has been heavily grazed by livestock since the area was settled. The past abuses have led to an almost monotypic shrub type with few herbaceous plants. The area is considered a priority for a chaining and seeding treatment by the Forest Service and Division of Wildlife Resources. The flat is thought to be an important deer concentration area in winter-spring and would be enhanced by more early season herbaceous species. A deer pellet group transect in the flat monitored since 1981 shows an increase in deer use, up to a high of 19 deer days use/acre (47 ddu/ha) in 1984-85. Since then, it has slowly decreased to 7 deer days use/acre (17 ddu/ha) in 1991-1992 (Jense et al. 1992). A pellet group transect read in conjunction with the vegetative transect in 1999 estimates 21 deer days use/acre (52 ddu/ha), 15 cow days use/acre (37 cdu/ha), and 6 elk days use/acre (15 edu/ha). By inspection of the pellet group quadrat frequency table, one can see that rabbit use of the area has more than doubled. It would not take very many rabbits to have a detrimental effect on the herbaceous component because it is so limited on this site.

Erosion is evident on the site. The soil surface is characteristically rough, composed of mounds of sandy soil. Plant pedestalling is abundant. Ground cover is provided only by the scattered sagebrush and underlying litter for there are few herbaceous plants. On average, about 50% of the soil surface is exposed and unprotected. The soil texture for the site is a loam, with a mildly alkaline pH (7.7). Effective rooting depth is moderate at more than 18 inches. Amounts of phosphorus (4.7ppm) and potassium (67.2ppm) in the soil is below what is considered necessary for normal plant growth and development. There are several small active gullies through the transect area. In 1994, small trees had been put into many of the small gullies to help them heal and help prevent further damage from high intensity summer storms.

Wyoming big sagebrush, the key species, accounted for 94% of the total shrub cover in 1999. Mature plants average 1-1/2 to 2 feet tall and more than 1-1/2 feet in diameter. The sagebrush is mostly moderately browsed and provides nearly all of big game winter forage on the site. The biotic potential or percentage of seedlings to the estimated population, was very high at 124% (1985). Since then it has gone from 7% in 1991, <1% in 1994, to 2% in 1999. The percentage of young plants in the population has been variable, but overall, increasing from 17% in 1985 to 43% in 1999, indicating good seedling survival. Percent decadence has been variable, from a high of 43% in 1985, to a low of 16% in 1994, and to a moderate level in 1999 of 24%. This would not be unexpected with the high density of the sagebrush (12,000 plants/acre) on the site. The intraspecific competition would be immense with as much cumulative drought as we have been experiencing since 1985.

The broom snakeweed appeared vigorous with a high number of seedlings and young in 1985. Currently ('99) it appears that they have decreased substantially from a high of 8,999 plants/acre in 1985 to 1,200 now. Black sagebrush is uncommon in the valley with the deeper soils, but is dominant up the slope with shallow soils along with mature pinyon and juniper.

There is a fair amount of western wheatgrass in the valley, a desirable species for the site, especially since it enhances water infiltration and also provides good forage. The other grass species occur only occasionally, as do a few forbs. Total cover for the herbaceous understory is poor, as it does not usually amount to more than 3 to 4%.

1985 APPARENT TREND ASSESSMENT

Soil trend appears downward, as more top soil is lost and gullies become deeper. The unstable soil makes it difficult for grass and forb seedlings to become established. The presence of undesirable increaser shrubs,

generally poor vigor of sagebrush, and low diversity and lack of herbaceous vegetation would indicate a downward vegetative trend. A chaining and seeding would be beneficial on the nearly flat areas of this valley. Also, further grazing restrictions may be necessary for recovery.

1991 TREND ASSESSMENT

Soil trend appears to be continuing downward with vegetative basal cover half what it was in 1985. Small pine trees have been set in the small gullies to help stabilize them. The key browse species have increased in density and decreased in percent decadency from 43% down to 24%. Wyoming big sagebrush now has a density of more than 12,000 plants per acre. The grasses have increased with the forbs also showing some change.

TREND ASSESSMENT

soil - continuing downward

browse - upward

herbaceous understory - upward because of the increases in the grass species, but still poor condition

1994 TREND ASSESSMENT

Soil is considered slightly declining at this time and still in very poor condition with 50% bare ground. There has been some effort to stabilize the small gullies that run through the sagebrush flat. The key shrub on this winter range is Wyoming big sagebrush. Biotic potential is less than 1% at this time, but the percent young age class is quite high at 39%. Percent decadence has steadily gone down since 1985, from 43% to 24% and is now 16%. Broom snakeweed density has decreased by over 62% since 1985. Trend for browse is upward. The trend for the herbaceous understory is stable, for the grasses make up 94% of the herbaceous understory and they are almost the same nested frequency values as in 1991.

TREND ASSESSMENT

soil - slightly downward

browse - upward

herbaceous understory - stable for grasses, the forbs went downward, but they only make up a very small portion of the herbaceous cover, total cover is still barely 4%

1999 TREND ASSESSMENT

Soil trend is stable and still in very poor condition with 47% bare ground. There has been some effort to stabilize the small gullies that run through the sagebrush flat but the gully plugs are not stopping continued gully erosion. The key shrub on this winter range is Wyoming big sagebrush. Biotic potential has slightly improved to 2%, but the percent young age class is quite high at 43%. Percent decadence had steadily gone down since 1985, from 43% to 24% and then 16%. However, it has now gone up again to 24%. This is still not alarming because of the relatively high density of the population and the amount of drought we have experienced since 1985. Broom snakeweed density have a decreased density again. They obviously cannot compete with the much more competitive sagebrush at these high densities with drought. Trend for browse is stable. The trend for the herbaceous understory is stable, for the grasses make up 94% of the herbaceous understory and they are almost the same nested frequency values as in 1991.

TREND ASSESSMENT

soil - stable, but still very poor

browse - stable

herbaceous understory - stable for grasses and slightly up for forbs, but still poor with 4% total cover

HERBACEOUS TRENDS --
Herd unit 25B, Study no: 3

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'85	'91	'94	'99	'85	'91	'94	'99	'04	'09
G	Agropyron smithii	a137	b182	b196	a133	45	64	65	53	2.41	1.15
G	Agropyron spicatum	a-	a-	a-	b62	-	-	-	24	-	.50
G	Bouteloua gracilis	a-	b10	b17	b16	-	3	6	5	.25	.36
G	Oryzopsis hymenoides	a5	a9	a6	b22	2	5	3	13	.21	.29
G	Poa secunda	5	-	-	-	4	-	-	-	-	-
G	Sitanion hystrix	b94	ab74	a57	a42	44	33	25	20	1.14	.66
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		241	275	276	275	95	105	99	115	4.03	2.98
Total for Grasses		241	275	276	275	95	105	99	115	4.03	2.98
F	Arabis spp.	-	-	-	2	-	-	-	2	-	.01
F	Cryptantha spp.	b11	c30	bc13	a-	5	15	8	-	.09	-
F	Cymopterus spp.	-	2	-	-	-	1	-	-	-	-
F	Erigeron pumilus	32	45	22	40	15	21	14	21	.12	.15
F	Hymenoxys richardsonii	4	1	-	2	2	1	-	1	.00	.15
F	Penstemon spp.	-	-	-	1	-	-	-	1	.00	.00
F	Phlox longifolia	b38	c64	a6	a13	14	30	3	8	.01	.04
F	Senecio multilobatus	-	1	-	-	-	1	-	-	-	-
F	Unknown forb-perennial	1	-	-	-	1	-	-	-	-	-
Total for Annual Forbs		0	0	0	0	0	0	0	0	0	0
Total for Perennial Forbs		86	143	41	58	37	69	25	33	0.23	0.35
Total for Forbs		86	143	41	58	37	69	25	33	0.23	0.35

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

BROWSE TRENDS --
Herd unit 25B, Study no: 3

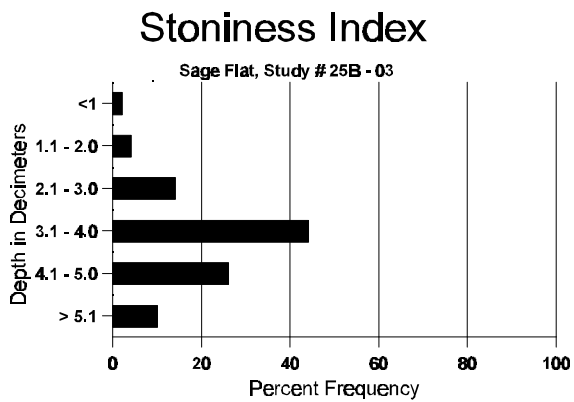
Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia frigida	7	13	.15	.30
B	Artemisia nova	0	3	-	.63
B	Artemisia tridentata wyomingensis	99	98	21.47	20.11
B	Ceratoides lanata	1	0	-	-
B	Chrysothamnus viscidiflorus	9	11	.01	.00
B	Coryphantha vivipara arizonica	0	3	-	-
B	Gutierrezia sarothrae	64	36	.69	.33
B	Opuntia spp.	0	0	-	-
Total for Browse		180	164	22.33	21.37

BASIC COVER --
Herd unit 25B, Study no: 3

Cover Type	Nested Frequency		Average Cover %			
	'04	'09	'85	'91	'94	'99
Vegetation	290	281	6.00	2.50	24.93	24.49
Rock	152	78	.50	.50	1.67	.54
Pavement	180	211	2.50	4.00	.98	4.90
Litter	368	342	30.00	27.00	18.25	19.50
Cryptogams	242	227	5.00	10.50	7.34	7.58
Bare Ground	367	346	56.00	55.50	50.48	46.57

SOIL ANALYSIS DATA --
Herd Unit 25B, Study # 03, Study Name: Sage Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.3	52.4 (17.2)	7.7	42.6	31.8	25.6	1.9	4.7	67.2	0.7



PELLET GROUP FREQUENCY --
Herd unit 25B, Study no: 3

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	'04	'09	
Rabbit	25	53	n/a
Elk	4	3	6 (15)
Deer	1	2	21 (52)
Cattle	4	2	15 (37)

BROWSE CHARACTERISTICS --

Herd unit 25B, Study no: 3

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	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	1	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	1	-	-	-	1	-	-	-	66	5	7	
	94	16	-	-	-	-	-	-	-	-	16	-	-	-	320	3	5	
	99	-	10	6	1	-	-	-	-	-	17	-	-	-	340	3	5	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	2	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			50%			00%			+59%							
'94		00%			00%			00%			+36%							
'99		44%			32%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	132		0%			
												'94	320		0%			
												'99	500		8%			
Artemisia nova																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	2	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40	6	10	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'99		57%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	0		0%			
												'94	0		0%			
												'99	140		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	5	6	7	8	9	1	2	3	4					
<i>Artemisia tridentata wyomingensis</i>																		
S	85	138	-	-	-	-	-	-	-	-	138	-	-	-	9200		138	
	91	13	-	-	1	-	-	-	-	-	13	1	-	-	933		14	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
Y	85	17	2	-	-	-	-	-	-	-	18	-	1	-	1266		19	
	91	69	7	-	16	-	-	3	-	-	88	6	1	-	6333		95	
	94	246	-	-	7	-	-	-	-	-	253	-	-	-	5060		253	
	99	135	121	-	2	-	-	-	-	-	258	-	-	-	5160		258	
M	85	5	28	11	-	-	-	-	-	-	43	-	1	-	2933	19	20	44
	91	28	12	3	-	1	1	-	-	4	49	-	-	-	3266	20	26	49
	94	290	-	-	2	-	-	-	-	-	289	1	2	-	5840	19	29	292
	99	44	121	30	2	-	-	-	-	-	197	-	-	-	3940	18	27	197
D	85	-	22	26	-	-	-	-	-	-	46	-	1	1	3200		48	
	91	22	11	3	-	-	1	-	-	9	33	4	3	6	3066		46	
	94	100	3	-	-	-	-	-	-	-	55	-	-	48	2060		103	
	99	34	68	21	-	9	9	-	-	-	96	-	-	45	2820		141	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	1000		50	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1580		79	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		47%			33%			04%			+42%							
'91		16%			11%			05%			+ 2%							
'94		.46%			00%			08%			- 8%							
'99		54%			10%			08%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	7399	Dec:	43%				
											'91	12665		24%				
											'94	12960		16%				
											'99	11920		24%				
<i>Ceratoides lanata</i>																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	2	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	-				
											'91	0		-				
											'94	20		-				
											'99	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																
Y	85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	-	-	20		1	
	99	2	-	1	-	-	-	-	-	-	-	-	60		3	
M	85	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	7	-	-	-	-	-	-	-	-	-	-	140	4	6	7
	99	2	-	-	-	-	-	-	-	-	-	-	40	4	6	2
D	85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	4	-	-	-	-	-	-	-	-	-	-	80		4	
	99	4	-	2	2	-	1	-	-	-	-	-	180		9	
X	85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	200		10	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>						
'85		00%		00%		00%										
'91		00%		00%		00%										
'94		00%		00%		00%				+14%						
'99		00%		29%		43%										
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	0%			
										'91	0		0%			
										'94	240		33%			
										'99	280		64%			
Coryphantha vivipara arizonica																
Y	85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>						
'85		00%		00%		00%										
'91		00%		00%		00%										
'94		00%		00%		00%										
'99		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-			
										'91	0		-			
										'94	0		-			
										'99	60		-			

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	'85	31	-	-	-	-	-	-	-	31	-	-	2066		31	
	'91	2	-	-	-	-	-	-	-	2	-	-	133		2	
	'94	3	-	-	-	-	-	-	-	3	-	-	60		3	
	'99	42	-	-	-	-	-	-	-	42	-	-	840		42	
Y	'85	24	-	-	-	-	-	-	-	24	-	-	1600		24	
	'91	59	3	-	-	-	3	-	-	65	-	-	4333		65	
	'94	13	-	-	-	-	-	-	-	13	-	-	260		13	
	'99	28	-	-	-	-	-	-	-	28	-	-	560		28	
M	'85	92	-	-	-	-	-	-	-	91	-	1	6133	7	5	92
	'91	67	6	1	2	1	-	-	-	77	-	-	5133	3	2	77
	'94	154	-	-	5	-	-	-	-	158	-	-	3180	5	5	159
	'99	30	-	-	-	-	-	-	-	30	-	-	600	6	6	30
D	'85	16	2	1	-	-	-	-	-	19	-	-	1266		19	
	'91	6	-	-	-	1	-	-	-	3	-	1	466		7	
	'94	16	-	-	-	-	-	-	-	16	-	-	320		16	
	'99	2	-	-	-	-	-	-	-	1	-	-	40		2	
X	'85	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'91	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'94	-	-	-	-	-	-	-	-	-	-	-	180		9	
	'99	-	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'85		01%		.74%		.74%		+ 9%								
'91		07%		.67%		03%		-62%								
'94		00%		00%		.53%		-68%								
'99		00%		00%		02%										
Total Plants/Acre (excluding Dead & Seedlings)										'85	8999	Dec:	14%			
										'91	9932		5%			
										'94	3760		9%			
										'99	1200		3%			
Opuntia spp.																
M	'85	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	0	3	9	0
	'99	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>								
'85		00%		00%		00%										
'91		00%		00%		00%										
'94		00%		00%		00%										
'99		00%		00%		00%										
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-			
										'91	0		-			
										'94	0		-			
										'99	0		-			

Trend Study 25B-4-99

Study site name: Solomon Basin .

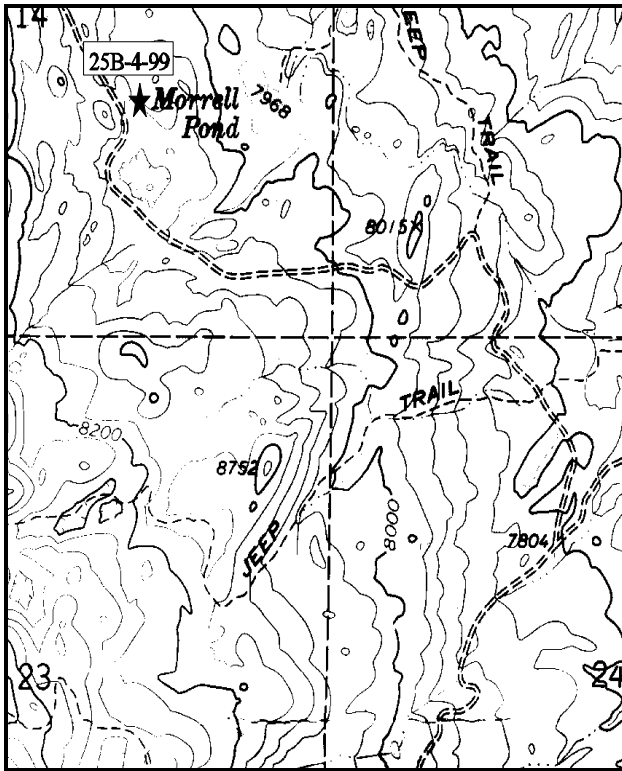
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 320°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft).

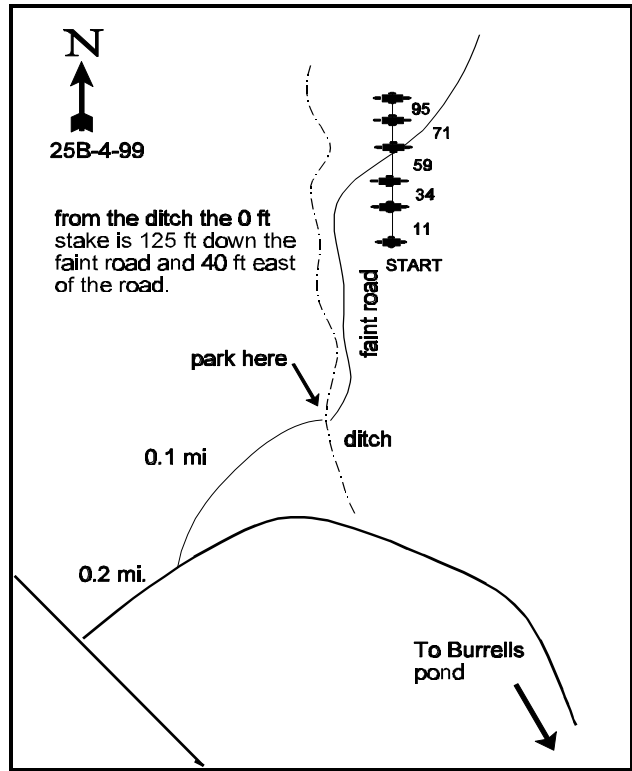
LOCATION DESCRIPTION

Travel north from Fremont on SR 72 for 7.3 miles to the Elkhorn-Torrey Road. Turn right and go 2.9 miles to a cattleguard. From the cattleguard go 1.7 miles to an intersection by Heart Lake. Turn left toward Meeks Lake and go 3.0 miles to a cattleguard. Go another 1.9 miles on the main road to an intersection. Stay left and go 0.9 miles toward Solomon Basin. Stay left again, bypassing the Morrell Pond Road and continue 0.55 miles, passing a doughnut-shaped pond. Take a sharp right turn here and go 0.2 miles to another fork. Bear left (the right fork takes you to Morrells Pond) and drive less than 0.1 miles to a ditch. Park here (very faint) and walk down the ditch for approximately 125 feet. The 0-foot stake is approximately 40 feet east of the ditch and marked with browse tag #26.



Map Name: Geyser Peak, Utah

Township 26S , Range 4E , Section 14



Diagrammatic Sketch

UTM 4266794.909 N, 461694.276 E

DISCUSSION

Trend Study No. 25B-4 (46-4)

The Solomon Basin study samples important deer winter range on the gently rolling terrain of Solomon Basin. The initial site had to be relocated in 1994 because of a new road that went through the middle of the original transect. This new site is located between two low parallel ridges, within a moderately shallow and narrow ravine. The elevation is 8,000 feet. Slope varies from 0% to 20%, but on average it is about 5%. Aspect of the site is generally east, with the transect running to the north. The site is dominated by mature pinyon and in the vicinity are stands of aspen and open sagebrush flats. There is a pond nearby, which would tend to concentrate grazing in the area. This has a prevailing effect on the vegetative composition. The area is considered important to both livestock and wildlife. Pellet group data from the site in 1999 estimate 19 deer and 42 cow days use/acre (47 ddu/ha, 104 cdu/ha. Only one elk pellet group was encountered.

Besides being over grazed by sheep and cattle since the early 1900's, the area is also recognized as a key wintering area for deer. Heavy year-long livestock grazing historically has led to deterioration of the range and watershed values until the establishment of a management plan and rest-rotation grazing in 1967. There are several projects proposed by the Forest Service for the basin, including chaining and seeding pinyon-juniper woodlands and sagebrush treatments. Treatment of the mature pinyon-juniper community is a priority in the DWR management plan in order to provide more herbaceous spring forage and improve protective ground cover.

Excessive livestock trampling, removal of herbaceous vegetation, and rocky soil has led to soil loss. Erosion is not severe, but appears continual. The soil is moderately deep with an effective rooting depth of almost 19 inches with a neutral pH (7.3). The soil texture is a clay loam. Soil phosphorus was low at only 4.6 ppm, where 10 ppm is considered minimal for normal plant growth and development. Rock-pavement cover is relatively low at only about 14%. Litter accumulation occurs mostly under the pinyon, juniper, and sagebrush.

The dominant overstory is a mixture of mature pinyon pine with a few scattered juniper. The key browse species are mountain big sagebrush and black sagebrush. Together they contribute to over 50% of the browse cover. The plants on average have only received light to moderate use. The browse species that appear to be more preferred are Eriogonum, snowberry, Utah serviceberry, and winterfat. It is difficult to determine how much of the hedging has been done by deer, as cattle turn to browse when herbaceous plants are not available or scarce. Broom snakeweed and several species of rabbitbrush appear to be stable except for rubber rabbit brush which seems to be increasing. Pinyon and juniper also appear to be slowly invading.

Herbaceous plants are scattered throughout the sagebrush, pinyon and juniper. Even though there are about 10 species of grasses on the site, three species (blue grama, Salina wildrye, and Kentucky bluegrass) make of 95% of the total grass cover. Kentucky bluegrass is a valuable species because it is sod forming and somewhat resistant to grazing, however it is an increaser with moderate to heavy livestock grazing pressure. Along with the other grass species, they provide a small amount of fall forage. Forbs also have a low density and provide little forage. Other than dandelion (an increaser), Pingue hymenoxys (also an increaser) is the most common forb on the site.

1994 APPARENT TREND ASSESSMENT

The original study site had to be relocated because the road was moved and put through the middle of the baseline. Therefore, the data collected for the first site (1985 and 1991) are not included here so that there will be no confusion by trying to unknowingly compare the two sites. Soil trend would be considered stable at this time, but only in fair condition with 31% bare ground and only 30% litter cover. The two most abundant key browse species on the site are black sagebrush and mountain big sagebrush. The basic trend for

the original site since 1985 is that black sagebrush are slowly increasing while mountain big sagebrush was decreasing. The loss of mountain big sagebrush would be more significant because they are about three times taller than black sagebrush, making them more available for winter use. Trend for browse on the relocated site appears stable. They are both about equal in the amount of cover each contributes to the total browse cover. The trend for the herbaceous understory also appears stable without any previous data.

1999 TREND ASSESSMENT

Trend for soil is stable at this time, with little changes in percent bare soil and litter cover. The ratio of bare soil to protective cover is slightly better, but still poor at less than 1:2. The two most abundant browse species on the site are black sagebrush and mountain big sagebrush. The basic trend for the new site is that black sagebrush appears to be slowly increasing, while mountain big sagebrush is slowly decreasing. The mountain big sagebrush would be more effected by the extended drought since 1985 than black sagebrush. The loss of mountain big sagebrush would be more significant in that they are about three times taller than black sagebrush, making them more available for winter use with moderately deep snow. Trend for browse would still be stable with some losses to mountain big sagebrush, but gains to black sagebrush. They are both about equal in the amount of cover each contributes to the total browse cover. As indicated by the lower sum of nested frequency values, the trend for the herbaceous understory is down for both grasses and forbs.

TREND ASSESSMENT

soil - stable, but only fair condition

browse - stable overall

herbaceous understory - slightly down

HERBACEOUS TRENDS --

Herd unit 25B, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
G	Agropyron smithii	-	1	-	1	-	.00
G	Agropyron spicatum	-	4	-	2	-	.03
G	Bouteloua gracilis	56	*35	20	13	.78	1.45
G	Carex spp.	23	16	7	5	.16	.12
G	Elymus salina	201	*168	69	54	5.25	4.33
G	Festuca ovina	10	3	2	1	.18	.03
G	Oryzopsis hymenoides	16	*3	9	1	.09	.15
G	Poa fendleriana	-	*6	-	3	-	.06
G	Poa pratensis	65	76	20	19	2.55	5.40
G	Poa secunda	7	*-	3	-	.01	-
G	Sitanion hystrix	11	12	5	5	.05	.12
G	Stipa columbiana	4	-	2	-	.03	-
G	Stipa comata	6	-	2	-	.03	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		399	324	139	104	9.16	11.73
Total for Grasses		399	324	139	104	9.16	11.73

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'99	'94	'99	'94	'99
F	<i>Antennaria rosea</i>	5	*5	1	1	.15	.38
F	<i>Androsace septentrionalis</i> (a)	-	2	-	1	-	.00
F	<i>Arabis demissa</i>	-	*5	-	3	-	.01
F	<i>Artemisia ludoviciana</i>	3	4	1	1	.03	.15
F	<i>Astragalus convallarius</i>	6	6	2	3	.01	.04
F	<i>Astragalus miser</i>	-	1	-	1	-	.00
F	<i>Aster</i> spp.	5	18	3	8	.01	.36
F	<i>Astragalus</i> spp.	11	1	5	1	.02	.00
F	<i>Castilleja linariaefolia</i>	7	3	4	2	.02	.03
F	<i>Cirsium</i> spp.	9	9	4	5	.07	.22
F	<i>Cryptantha</i> spp.	11	3	6	3	.05	.04
F	<i>Erigeron pumilus</i>	18	4	7	3	.03	.01
F	<i>Eriogonum racemosum</i>	-	-	-	-	-	.00
F	<i>Hymenoxys richardsonii</i>	57	38	29	22	.62	.69
F	<i>Lesquerella</i> spp.	3	-	1	-	.00	-
F	<i>Machaeranthera canescens</i>	36	*11	13	6	.38	.49
F	<i>Microsteris gracilis</i> (a)	3	-	1	-	.00	-
F	<i>Penstemon</i> spp.	2	4	1	3	.00	.04
F	<i>Phlox longifolia</i>	11	9	5	3	.02	.01
F	<i>Schoenocrambe linifolia</i>	7	*-	4	-	.04	-
F	<i>Senecio multilobatus</i>	-	3	-	1	-	.00
F	<i>Sphaeralcea coccinea</i>	4	2	2	2	.01	.03
F	<i>Taraxacum officinale</i>	18	*52	6	14	.49	1.85
F	Unknown forb-perennial	-	1	-	1	-	.00
Total for Annual Forbs		3	2	1	1	0.00	0.00
Total for Perennial Forbs		213	179	94	83	2.00	4.40
Total for Forbs		216	181	95	84	2.00	4.41

* Indicates significant difference at % = 0.10

BROWSE TRENDS --
Herd unit 25B, Study no: 4

Type	Species	Strip Frequency		Average Cover %	
		'94	'99	'94	'99
B	<i>Amelanchier utahensis</i>	9	5	.63	.03
B	<i>Artemisia frigida</i>	1	1	-	-
B	<i>Artemisia nova</i>	39	57	4.28	6.84
B	<i>Artemisia tridentata tridentata</i>	-	-	-	.15
B	<i>Artemisia tridentata vaseyana</i>	24	32	3.94	6.58
B	<i>Atriplex canescens</i>	0	0	-	-
B	<i>Ceratoides lanata</i>	9	0	.21	-
B	<i>Cercocarpus ledifolius</i>	0	8	-	.18
B	<i>Chrysothamnus nauseosus</i>	17	18	2.23	3.11
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	50	42	2.21	1.47
B	<i>Cowania mexicana stansburiana</i>	0	2	-	.15
B	<i>Coryphantha vivipara arizonica</i>	0	1	-	.00
B	<i>Eriogonum corymbosum</i>	22	21	.88	1.17
B	<i>Gutierrezia sarothrae</i>	53	49	1.27	1.00
B	<i>Juniperus osteosperma</i>	0	1	.15	.15
B	<i>Opuntia spp.</i>	2	2	.01	-
B	<i>Pediocactus simpsonii</i>	0	2	-	.03
B	<i>Pinus edulis</i>	0	13	3.49	4.09
B	<i>Symphoricarpos oreophilus</i>	5	8	.16	.48
B	<i>Tetradymia canescens</i>	14	17	.10	.24
B	<i>Yucca harrimaniae</i>	0	2	-	.18
Total for Browse		245	281	19.60	25.92

CANOPY COVER --
Herd unit 25B, Study no: 4

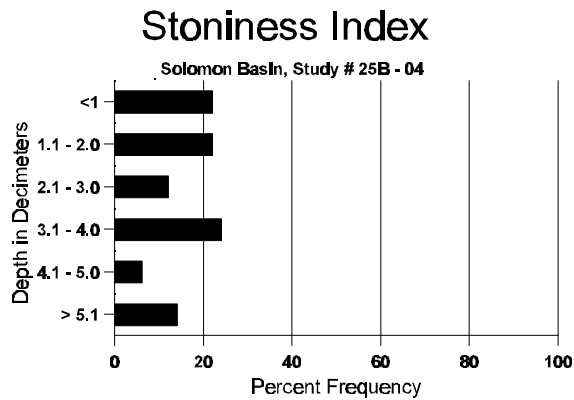
Species	Percent Cover '99
<i>Amelanchier utahensis</i>	2
<i>Pinus edulis</i>	8

BASIC COVER --
Herd unit 25B, Study no: 4

Cover Type	Nested Frequency		Average Cover %	
	'94	'99	'94	'99
Vegetation	339	340	27.32	38.12
Rock	255	169	5.05	2.79
Pavement	340	328	4.77	10.95
Litter	448	420	29.63	31.77
Cryptogams	9	23	.30	.43
Bare Ground	377	351	31.40	29.84

SOIL ANALYSIS DATA --
Herd Unit 25B, Study # 04, Study Name: Solomon Basin

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.7	52.0 (16.4)	7.3	44.2	20.2	35.6	2.0	4.6	208.0	0.5



PELLET GROUP FREQUENCY --
Herd unit 25B, Study no: 4

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha) 09
	'94	'99	
Rabbit	5	12	n/a
Elk	-	1	1 (2)
Deer	11	6	19 (47)
Cattle	1	9	42 (104)

BROWSE CHARACTERISTICS --
Herd unit 25B, Study no: 4

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>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	94	11	1	1	-	-	-	-	-	-	13	-	-	-	260	33	42	13
	99	-	1	-	-	1	-	-	-	-	2	-	-	-	40	50	57	2
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	3	-	-	-	-	-	1	-	1	1	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		07%			07%			00%			-57%							
'99		33%			00%			33%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	280	Dec:	0%			
												'99	120		50%			
<i>Artemisia frigida</i>																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	1	2	2
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	6	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-50%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	40	Dec:	-			
												'99	20		-			
<i>Artemisia nova</i>																		
S	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	7	-	-	-	-	-	2	-	-	9	-	-	-	180		9	
Y	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
	99	43	-	-	1	-	-	1	-	-	45	-	-	-	900		45	
M	94	149	5	1	-	-	-	-	-	-	155	-	-	-	3100	10	16	155
	99	111	35	2	4	-	-	2	-	-	154	-	-	-	3080	8	17	154
D	94	40	5	-	-	-	-	-	-	-	33	-	-	12	900		45	
	99	14	16	4	1	-	-	-	-	-	33	1	-	1	700		35	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		05%			.48%			06%			+12%							
'99		22%			03%			.42%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	4140	Dec:	22%			
												'99	4680		15%			

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>Artemisia tridentata vaseyana</i>																	
Y	94	27	-	-	-	-	-	-	-	-	27	-	-	-	540		27
	99	5	-	-	-	-	-	-	-	-	3	-	-	-	100		5
M	94	42	1	-	-	-	-	-	-	-	43	-	-	-	860	19 28	43
	99	43	11	-	-	-	-	-	-	-	53	1	-	-	1080	23 36	54
D	94	5	-	-	-	-	-	-	-	-	2	-	-	3	100		5
	99	5	1	2	1	-	-	-	-	-	6	1	-	2	180		9
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		01%			00%			04%			- 9%						
'99		18%			03%			03%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	1500	Dec:	7%		
												'99	1360		13%		
<i>Atriplex canescens</i>																	
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	28 23	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	37 32	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-		
												'99	0		-		
<i>Ceratoides lanata</i>																	
M	94	3	11	5	-	-	-	-	-	-	19	-	-	-	380	6 6	19
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		58%			26%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	380	Dec:	-		
												'99	0		-		
<i>Cercocarpus ledifolius</i>																	
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	3	-	-	-	-	-	-	-	3	-	-	-	60		3
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	99	-	-	14	-	1	3	-	-	-	18	-	-	-	360	4 7	18
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'94		00%			00%			00%									
'99		19%			81%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-		
												'99	420		-		

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				
Cercocarpus montanus																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15	24	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	0		-			
Chrysothamnus depressus																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	12	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	0		-			
Chrysothamnus nauseosus																		
S	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
M	94	28	-	1	-	-	-	-	-	-	29	-	-	-	580	27	29	29
	99	29	-	-	-	-	-	-	-	-	29	-	-	-	580	34	39	29
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	6	-	-	-	-	-	-	-	-	3	-	1	2	120			6
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			03%			00%			+22%							
'99		00%			00%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	640	Dec:	3%			
												'99	820		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>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
	99	16	-	-	-	-	-	-	-	-	16	-	-	-	320		16	
M	94	104	3	3	-	-	-	-	-	-	110	-	-	-	2200	9 16	110	
	99	65	-	-	-	-	-	-	-	-	65	2	-	-	1340	12 16	67	
D	94	15	1	-	-	-	-	-	-	-	9	-	-	7	320		16	
	99	17	-	-	1	-	-	-	-	-	12	-	-	6	360		18	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		03%			02%			05%			-26%							
'99		00%			00%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2720	Dec:	12%			
												'99	2020		18%			
<i>Cowania mexicana stansburiana</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		50%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	0%			
												'99	40		100%			
<i>Coryphantha vivipara arizonica</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20	1 4	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	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						
<i>Eriogonum corymbosum</i>																		
S	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	94	2	-	5	4	6	-	-	-	-	11	6	-	-	340		17	
	99	22	1	-	-	-	-	-	-	-	23	-	-	-	460		23	
M	94	22	27	6	20	20	21	-	-	-	116	-	-	-	2320	4	8	116
	99	36	19	9	2	-	3	-	-	-	69	-	-	-	1380	9	16	69
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	12	1	-	-	-	-	-	-	-	11	-	-	2	260		13	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		40%			24%			00%			-21%							
'99		20%			11%			02%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	2660	Dec:	0%				
											'99	2100		12%				
<i>Gutierrezia sarothrae</i>																		
S	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	94	23	-	-	-	-	-	-	-	-	23	-	-	-	460		23	
	99	21	-	-	-	-	-	-	-	-	21	-	-	-	420		21	
M	94	186	-	-	1	-	-	-	-	-	187	-	-	-	3740	6	5	187
	99	179	-	1	-	-	-	-	-	-	180	-	-	-	3600	7	7	180
D	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-6%							
'99		00%			.49%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	4280	Dec:	2%				
											'99	4020		0%				
<i>Juniperus osteosperma</i>																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	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%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	0	Dec:	-				
											'99	20		-				
<i>Opuntia spp.</i>																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	1	2	2
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+0%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'94	40	Dec:	-				
											'99	40		-				

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>Pediocactus simpsonii</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	3	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	3	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	40		-			
<i>Pinus edulis</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	6	-	-	-	-	-	1	-	-	7	-	-	-	140			7
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	13	-	-	-	-	-	-	-	-	12	1	-	-	260			13
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	1	-	-	1	-	-	-	20	-	-	1
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	280		-			
<i>Ribes spp.</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	35	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	0		-			
<i>Symphoricarpos oreophilus</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	1	-	-	2	-	-	-	40			2
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	1	-	-	-	-	-	-	-	3	-	-	-	60			3
M	94	5	-	1	-	-	-	-	-	-	6	-	-	-	120	15	23	6
	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200	16	28	10
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	1	-	-	-	-	-	-	-	-	1	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			17%			00%			+57%							
'99		07%			00%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	120	Dec:	0%			
												'99	280		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>Tetradymia canescens</i>																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	6	-	-	-	-	-	-	-	-	4	2	-	-	120		6	
M	94	20	-	-	2	-	-	-	-	-	21	-	1	-	440	10 17	22	
	99	15	-	1	1	-	-	-	-	-	17	-	-	-	340	10 15	17	
D	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	99	2	1	-	-	3	-	-	-	-	4	-	-	2	120		6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			08%			+10%							
'99		14%			03%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	520	Dec:	4%			
												'99	580		21%			
<i>Yucca harrimaniae</i>																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	9	-	-	-	-	-	-	-	-	9	-	-	-	180	13 16	9	
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	0	Dec:	-			
												'99	180		-			

Trend Study 25B-5-99

Study site name: Polk Creek .

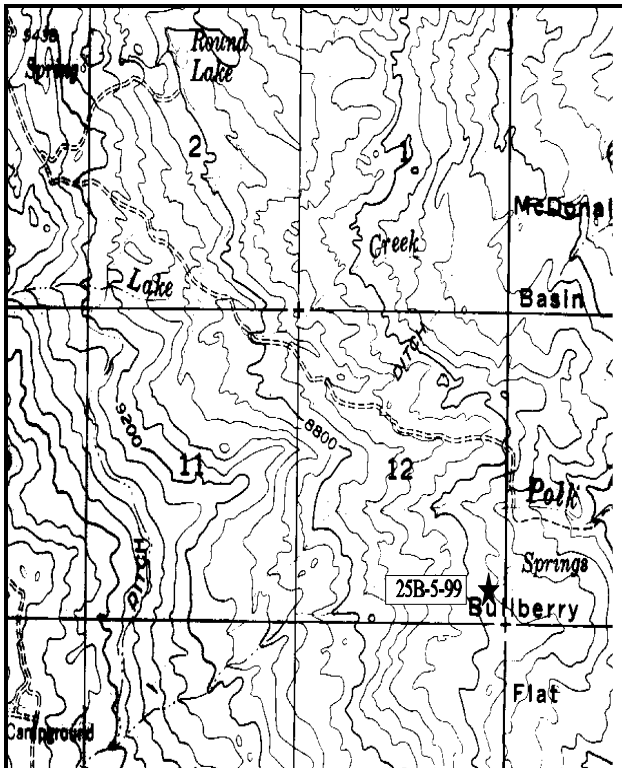
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

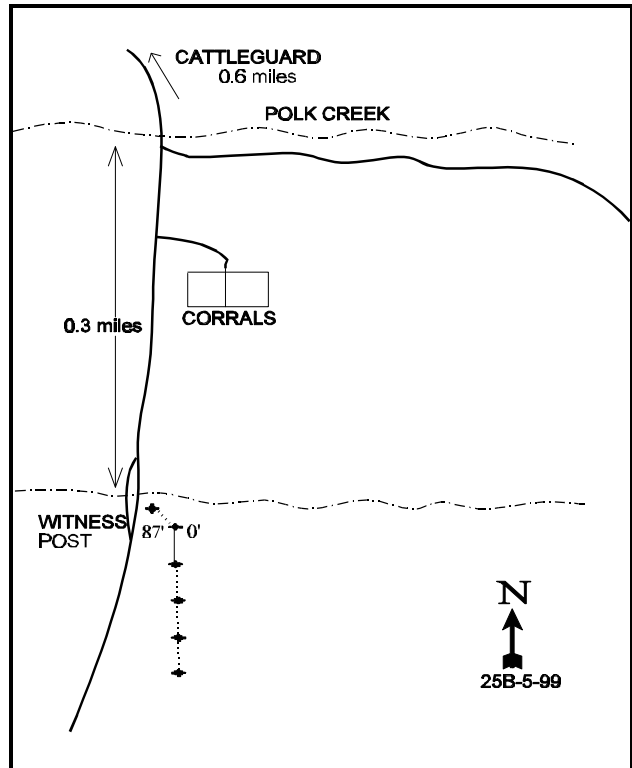
LOCATION DESCRIPTION

Travel north from Fremont on SR 72 for 7.3 miles to the Elkhorn-Torrey Road. Turn right and go 2.9 miles to a cattleguard. From the cattleguard go 1.75 miles to an intersection by Heart Lake. Take the right fork (#206) and go 0.4 miles toward Cathedral Valley. At the intersection, turn left (#22) toward Cathedral Valley. Proceed 0.5 miles to another fork (Round Lake turnoff). Stay right and go 2.6 miles to a cattleguard. From the cattleguard, proceed 0.6 miles down to Polk Creek. Immediately after crossing the creek, turn right on the Polk Creek Trail. Go 0.3 miles past a camp and some corrals on your left to another creek. Cross the creek, then look 110 feet beyond the creek (along the left fork of the road) for a steel rebar witness post on the left side of the road. The frequency baseline of the study starts 84 feet east (81°M) of the witness post. The 0-foot baseline stake has a red browse tag #7060 attached.



Map Name: Torrey, Utah

Township 27S , Range 4E , Section 12



Diagrammatic Sketch

UTM 4257779.777 N, 463955.104 E

DISCUSSION

Trend Study No. 25B-5 (46-5)

The Polk Creek study is on the east side of Thousand Lake Mountain. The site begins level, then to gently sloping (11%), with a northeast aspect. The range type is mixed mountain brush. Although the site is moderately high at 8,400 feet in elevation and probably above the limits for a severe winter range, it is still utilized fairly heavily by deer in winter. The pellet group transect done in 1999 in conjunction with the sampled baseline, indicated that there was 20 deer days use/acre (49 ddu/ha), 7 cow days use/acre (18 cdu/ha), and less than one elk days use/acre (2 edu/ha). As part of a three pasture, rest-rotation system of the Thousand Lake Cattle Allotment, the Polk Creek unit is grazed the first half of the season one year, the last half of the next season, and rested the third year.

Soil depth is variable, depending on the location on the slope. Effective rooting depth varies from shallow (8-10 inches) and rocky on the slope, to 16-18 inches with good litter cover in the flat (first hundred feet). Overall average effective rooting depth is 11 inches. The soil has a neutral pH (6.8) and a sandy clay loam texture. There is some erosion, especially along washes and trails near the bottom of the slope. There is also movement of rocks and a higher concentration of pavement on the upper portions of the transect.

There is a variety of browse species present (almost 20), however black sagebrush and bitterbrush are the key species by virtue of their numbers and utilization. Together they currently ('99) make up 76% of the total browse cover. Black sagebrush is the most numerous making up 36% of the browse cover in 1999 with utilization varying from light to moderate. The plants in the flat appeared more vigorous than those on the rocky dry hillside because of the effectiveness of precipitation on the flat versus the steeper slope. The proportion of the population that are mature healthy plants varies from 61% (1994) to 50% (1999). Percent decadency has remained fairly constant from 37% (1985) to a low of 33% (1999). Biotic potential for black sagebrush has varied greatly through time, which is not unusual in unpredictably dry climates. It is currently at 7%, with the percent young age class a 16%. This will easily replace those that are dying within the population.

The bitterbrush population currently ('99) makes up 38% of the shrub cover and shows good vigor. Percent decadency fluctuates from year to year, but is low now at 10%. The plants show anywhere from light, moderate, and heavy hedging. There was a high number of seedlings (biotic potential) in 1985 which has gone down to only 1% currently ('99). Bitterbrush on this site are a prostrate form, averaging a little over one-foot in height with a crown of more than three feet. They appear to spread by layering. Other shrub species include broom snakeweed, several species of rabbitbrush, snowberry, gray horsebrush, squawbush, and a few basin big sagebrush. None of these displayed more than light to moderate use and appeared to have stable populations. The pinyon appear to be slowly increasing into the flatter areas.

Grass species show moderate diversity, but only fair forage production, as they only make up 12% (1994) to 17% (1999) of the total cover. The most common grass species are: blue grama, sedge, and bottlebrush squirreltail which could provide some spring-fall forage. Utilization appeared moderate from the recent cattle grazing in 1994. Forbs are fairly common in the bottom and under the protective cover of sagebrush. However, none are very valuable as forage and several are low value increasers. All the forbs together provide little forage and only provide 2% to 5% cover.

1985 APPARENT TREND ASSESSMENT

Aside from the small washes on the flat, the soil appears stable. The bitterbrush population appears to be increasing with a very high percentage of seedlings and young and few decadent plants. The black sagebrush may be slightly decreasing.

1991 TREND ASSESSMENT

There are still signs of soil movement, e.g. loss of pavement cover mostly due to soil movement. There was an increase in vegetative basal cover. The trend for soil is slightly downward at this time. Both key browse species (black sagebrush and bitterbrush) have increased their respective densities. Bitterbrush has almost doubled its density with a increase in percent decadency from 3 to 36%. Most of the more important grass and forb species have also shown increased numbers.

TREND ASSESSMENT

soil - slightly downward

browse - slightly upward

herbaceous understory - slightly upward

1994 TREND ASSESSMENT

There is continuing signs of some soil movement, especially on the steeper slopes. Percent bare ground has gone down from the reading of 1991 and even slightly lower than that of 1985. Percent litter cover has decreased, as it has throughout the state with the extended drought we have been experiencing. Soil trend is considered stable to slightly improving at this time. There are two key browse species on this site, black sagebrush and bitterbrush. The black sagebrush's trend is up with increased densities, fairly stable rate of decadency, and decreasing use. The bitterbrush density has bounced around somewhat, but this could be partially explained because the plants are an ecotype that can reproduce by layering, which can make counting them difficult. But, those that have been utilized moderately have now decreased to only 2%, while percent decadency has also decreased to only 3%. Browse trend for the key species is up. The herbaceous understory has noted decreases in nested frequency values for both grasses and forbs. Trend for the understory is down.

TREND ASSESSMENT

soil - stable to slightly improving

browse - up

herbaceous understory - down

1999 TREND ASSESSMENT

There is continuing signs of some soil movement, especially on the steeper slopes. Percent bare ground has continued to go down from the reading of 1991. It is now at its lowest value since the study began in 1985. Percent litter cover has increased substantially with increases in precipitation. Soil trend is considered slightly improved at this time. There are two key browse species on this site, black sagebrush and bitterbrush. The black sagebrush's trend is stable, a stable densities, fairly stable rate of decadency, and continuing decrease in use. The bitterbrush density has bounced around somewhat, but this can mostly be explained because the plants are an ecotype that can reproduce by layering, which can make counting their density difficult. But, those that have been utilized moderately has fluctuated from year to year with no notable harm. Browse trend for the key species is stable. The herbaceous understory trend has stabilized. The sum of nested frequency has stabilized, while percent cover for the herbaceous understory has increased with increases in precipitation.

TREND ASSESSMENT

soil - slightly improving

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 25B, Study no: 5

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'85	'91	'94	'99	'85	'91	'94	'99	'04	'09
G	<i>Agropyron smithii</i>	a-	a-	a ³	b ¹⁶	-	-	1	7	.03	.13
G	<i>Bouteloua gracilis</i>	ab ¹⁰⁶	b ¹⁰⁵	b ¹⁰²	a ⁷²	45	49	46	34	1.81	1.50
G	<i>Carex</i> spp.	b ¹⁷⁶	b ¹⁸⁶	a ⁸⁶	a ¹⁰²	58	59	32	38	1.01	3.33
G	<i>Festuca ovina</i>	a-	a-	a-	b ⁹	-	-	-	3	-	.21
G	<i>Poa fendleriana</i>	32	20	35	7	13	6	15	6	.51	.10
G	<i>Sitanion hystrix</i>	cb ¹⁵²	c ¹⁸⁰	ab ¹¹³	a ⁹⁹	61	68	44	43	1.26	2.81
G	<i>Sporobolus cryptandrus</i>	a-	a-	b ⁷	a-	-	-	3	-	.04	-
G	<i>Stipa comata</i>	ab ⁷	a ⁵	a ⁷	b ³²	5	3	4	13	.04	.94
G	<i>Stipa</i> spp.	a-	b ¹⁸	a-	a-	-	8	-	-	-	-
G	<i>Stipa lettermani</i>	-	-	-	5	-	-	-	2	-	.30
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		473	514	353	342	182	193	145	146	4.73	9.34
Total for Grasses		473	514	353	342	182	193	145	146	4.73	9.34
F	<i>Antennaria parvifolia</i>	6	1	3	-	3	1	2	-	.01	-
F	<i>Androsace septentrionalis</i> (a)	-	-	-	1	-	-	-	1	-	.00
F	<i>Arabis demissa</i>	12	11	2	15	6	4	1	5	.00	.17
F	<i>Artemisia ludoviciana</i>	b ⁸	b ⁶	a-	ab ¹	4	3	-	1	-	.00
F	<i>Astragalus convallarius</i>	b ³	a-	a-	a-	3	-	-	-	-	-
F	<i>Aster</i> spp.	a-	b ⁸	a-	ab ³	-	3	-	1	-	.00
F	<i>Astragalus</i> spp.	ab ⁴	a-	b ⁷	a-	2	-	3	-	.01	-
F	<i>Castilleja chromosa</i>	-	5	1	-	-	2	1	-	.00	-
F	<i>Chenopodium album</i> (a)	-	-	-	2	-	-	-	1	-	.00
F	<i>Chaenactis douglasii</i>	b ⁶	b ⁵	ab ¹	a-	3	3	1	-	.00	-
F	<i>Comandra pallida</i>	13	7	16	14	5	2	6	6	.18	.42
F	<i>Cryptantha</i> spp.	a ¹⁵	a ¹⁴	b ⁴⁰	a ¹⁴	6	6	20	9	.32	.07
F	<i>Cymopterus</i> spp.	-	4	-	-	-	2	-	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	a-	b ⁹	-	-	-	4	-	.02
F	<i>Eriogonum alatum</i>	-	3	-	7	-	1	-	4	-	.12
F	<i>Eriogonum cernuum</i> (a)	-	-	1	-	-	-	1	-	.00	-
F	<i>Erigeron pumilus</i>	37	15	21	16	14	8	10	8	.10	.11
F	<i>Eriogonum racemosum</i>	24	22	17	28	12	11	9	13	.04	.53
F	<i>Gayophytum ramosissimum</i> (a)	-	-	1	7	-	-	1	3	.00	.06
F	<i>Hymenoxys richardsonii</i>	ab ⁹	a ⁵	b ²⁴	b ¹⁴	6	2	12	5	.41	.45
F	<i>Lepidium</i> spp. (a)	-	-	a-	b ⁸	-	-	-	5	-	.02
F	<i>Lithospermum incisum</i>	-	-	-	-	-	-	-	-	.00	-
F	<i>Lupinus</i> spp.	1	-	-	-	1	-	-	-	-	-
F	<i>Lygodesmia spinosa</i>	c ⁵⁵	cb ⁵⁸	ab ³²	a ²⁴	26	28	17	14	.70	1.16
F	<i>Machaeranthera canescens</i>	a ³	ab ⁸	a ⁵	b ²⁵	2	5	3	11	.04	.20

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'85	'91	'94	'99	'85	'91	'94	'99	'04	'09
F	Oenothera spp.	-	-	1	-	-	-	1	-	.00	-
F	Penstemon humilis	-	1	3	3	-	1	1	1	.03	.03
F	Phlox longifolia	9	24	10	14	5	11	6	7	.03	.06
F	Polygonum douglasii (a)	-	-	3	1	-	-	2	1	.01	.00
F	Potentilla spp.	-	1	-	-	-	1	-	-	-	-
F	Senecio multilobatus	_b 25	_a 1	_a 1	_c 62	14	1	1	27	.00	1.71
F	Sphaeralcea coccinea	3	-	1	3	1	-	1	1	.03	.03
F	Taraxacum officinale	_a -	_b 5	_a -	_{ab} 3	-	3	-	1	-	.00
F	Tragopogon dubius	-	3	-	3	-	1	-	1	-	.00
F	Unknown forb-perennial	2	-	-	-	1	-	-	-	-	-
F	Zigadenus paniculatus	1	-	-	-	1	-	-	-	-	-
Total for Annual Forbs		0	0	5	28	0	0	4	15	0.01	0.12
Total for Perennial Forbs		236	207	185	249	115	99	95	115	1.94	5.10
Total for Forbs		236	207	190	277	115	99	99	130	1.96	5.23

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

BROWSE TRENDS --
Herd unit 25B, Study no: 5

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia nova	98	95	15.72	14.35
B	Artemisia tridentata tridentata	0	1	-	-
B	Artemisia tridentata vaseyana	3	9	.53	.84
B	Ceratoides lanata	2	0	.00	-
B	Cercocarpus ledifolius	0	2	-	.00
B	Chrysothamnus depressus	15	15	.12	.15
B	Chrysothamnus nauseosus	9	10	.72	.09
B	Chrysothamnus viscidiflorus lanceolatus	54	46	1.80	1.28
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	-	.15
B	Gutierrezia sarothrae	23	16	.10	.16
B	Juniperus osteosperma	0	2	-	.63
B	Opuntia spp.	4	4	.18	.15
B	Pediocactus simpsonii	0	3	-	.00
B	Pinus edulis	0	13	4.33	5.49
B	Purshia tridentata	47	47	10.00	15.23
B	Rhus trilobata trilobata	0	0	-	-
B	Symphoricarpos oreophilus	5	7	-	.41
B	Tetradymia canescens	20	28	.44	.79
Total for Browse		280	298	33.96	39.76

CANOPY COVER --
Herd unit 25B, Study no: 5

Species	Percent Cover '09
Pinus edulis	5

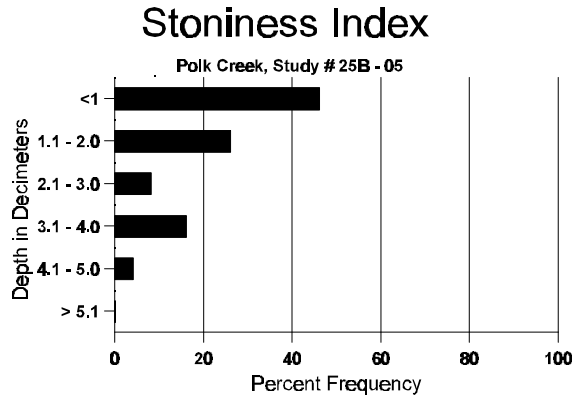
BASIC COVER --
Herd unit 25B, Study no: 5

Cover Type	Nested Frequency		Average Cover %			
	'04	'09	'85	'91	'94	'99
Vegetation	310	288	8.75	11.00	38.57	48.68
Rock	277	222	4.75	6.25	17.39	18.85
Pavement	293	240	17.25	7.75	9.53	8.58
Litter	369	368	54.25	53.50	30.89	43.84
Cryptogams	6	15	0	.75	.05	.15
Bare Ground	251	204	15.00	20.75	13.78	8.48

SOIL ANALYSIS DATA --

Herd Unit 25B, Study # 05, Study Name: Polk Creek

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	51.0 (12.3)	6.8	53.8	22.5	23.6	2.2	12.7	198.4	0.5



PELLET GROUP FREQUENCY --

Herd unit 25B, Study no: 5

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	04	09	
Rabbit	23	32	n/a
Elk	7	2	1 (2)
Deer	23	9	20 (49)
Cattle	4	7	7 (17)

BROWSE CHARACTERISTICS --

Herd unit 25B, 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	'85	14	-	-	-	-	-	-	-	-	14	-	-	-	933		14
	'91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	'94	243	-	-	13	-	-	-	-	-	256	-	-	-	5120		256
	'99	32	-	-	8	-	-	-	-	-	40	-	-	-	800		40
Y	'85	7	2	-	-	-	-	-	-	-	9	-	-	-	600		9
	'91	15	5	-	1	1	-	2	-	-	22	1	1	-	1600		24
	'94	23	-	-	-	-	-	-	-	-	23	-	-	-	460		23
	'99	74	-	-	-	-	-	1	-	-	75	-	-	-	1500		75
M	'85	19	33	3	-	-	-	-	-	-	53	-	2	-	3666	7 9	55
	'91	30	12	2	3	1	-	2	-	-	47	3	-	-	3333	8 14	50
	'94	238	16	-	19	5	-	-	-	-	275	3	-	-	5560	10 21	278
	'99	143	63	6	17	-	-	1	-	-	230	-	-	-	4600	11 19	230
D	'85	7	11	19	-	-	-	-	-	-	25	-	2	10	2466		37
	'91	22	13	-	1	1	-	1	-	-	21	3	-	14	2533		38
	'94	141	10	-	4	-	-	-	-	-	115	-	-	40	3100		155
	'99	102	28	2	21	-	-	-	-	-	102	-	-	51	3060		153
X	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	600		30
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	2000		100
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		46%			22%			14%			+10%						
'91		29%			02%			13%			+18%						
'94		07%			00%			09%			+ 0%						
'99		20%			02%			11%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	6732	Dec:	37%			
											'91	7466		34%			
											'94	9120		34%			
											'99	9160		33%			
Artemisia tridentata tridentata																	
D	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	0	Dec:	0%			
											'91	0		0%			
											'94	0		0%			
											'99	20		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		1	2										
<i>Artemisia tridentata vaseyana</i>																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	2	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	5	-	-	-	-	-	-	-	5	-	-	-	100	-	-	5	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	1	-	-	-	-	1	-	-	-	66	11	7	1	
	94	5	-	-	-	-	-	-	-	5	-	-	-	100	21	30	5	
	99	8	1	-	-	-	-	-	-	9	-	-	-	180	20	27	9	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	3	-	-	-	-	-	-	-	3	-	-	-	200	-	-	3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>										
'85		00%		00%		00%												
'91		00%		00%		00%		-62%										
'94		00%		00%		00%		+64%										
'99		07%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)										'85		0		Dec:		0%		
										'91		266				75%		
										'94		100				0%		
										'99		280				0%		
<i>Ceratoides lanata</i>																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	94	3	-	-	-	-	-	-	-	3	-	-	-	60	6	4	3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>										
'85		00%		00%		00%												
'91		00%		00%		00%												
'94		00%		00%		00%												
'99		00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)										'85		0		Dec:		-		
										'91		0				-		
										'94		60				-		
										'99		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						
Cercocarpus ledifolius																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	3	-	1	-	-	-	-	4	-	-	-	80	5	6	4
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'99		20%			80%			00%										
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	0%					
										'91	0		0%					
										'94	0		0%					
										'99	100		20%					
Chrysothamnus depressus																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	2	1	-	1	-	-	1	-	-	5	-	-	-	333			5
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	15	-	-	-	-	-	-	-	-	15	-	-	-	1000	3	6	15
	91	-	5	4	-	-	-	-	-	-	9	-	-	-	600	3	6	9
	94	9	-	-	10	-	-	2	-	-	21	-	-	-	420	5	10	21
	99	7	5	5	2	-	1	3	-	-	23	-	-	-	460	4	7	23
D	85	5	1	-	-	-	-	-	-	-	5	-	1	-	400			6
	91	2	5	11	1	1	1	3	-	-	20	-	-	4	1600			24
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		05%			00%			05%			+42%							
'91		32%			42%			11%			-83%							
'94		00%			00%			00%			+13%							
'99		21%			25%			00%										
Total Plants/Acre (excluding Dead & Seedlings)										'85	1466	Dec:	27%					
										'91	2533		63%					
										'94	420		0%					
										'99	480		0%					

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			
Chrysothamnus nauseosus																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	15	19
	99	5	-	1	-	-	-	-	-	-	6	-	-	-	120	22	28
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	6	-	-	-	-	-	-	-	-	5	-	-	1	120		6
	99	2	1	-	-	-	-	-	-	-	3	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'94		00%			00%			08%			- 8%						
'99		09%			09%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%		
												'91	0		0%		
												'94	240		50%		
												'99	220		27%		

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 lanceolatus												
S	85	1	-	-	-	-	-	-	1	66		1
	91	-	-	-	-	-	-	-	-	0		0
	94	3	-	-	-	-	-	-	3	60		3
	99	6	-	-	-	-	-	-	6	120		6
Y	85	1	-	-	-	-	-	-	1	66		1
	91	-	-	-	-	-	-	-	-	0		0
	94	5	-	-	-	-	-	-	5	100		5
	99	4	-	-	-	-	-	-	4	80		4
M	85	12	-	-	-	-	-	-	12	800	7 5	12
	91	-	-	-	1	-	-	-	1	66	4 13	1
	94	89	-	-	9	-	-	-	98	1960	18 27	98
	99	74	1	-	5	-	-	-	80	1600	10 15	80
D	85	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	3	-	-	-	-	-	-	3	60		3
	99	2	-	-	1	-	-	-	2	60		3
X	85	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>							
'85		00%	00%	00%	-92%							
'91		00%	00%	00%	+97%							
'94		00%	00%	00%	-18%							
'99		01%	00%	01%								
Total Plants/Acre (excluding Dead & Seedlings)									'85	866	Dec:	0%
									'91	66		0%
									'94	2120		3%
									'99	1740		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>Gutierrezia sarothrae</i>													
S	85	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	0		0	
	94	5	-	-	-	-	-	-	-	5		5	
	99	14	-	-	4	-	-	-	-	18		18	
Y	85	6	-	-	-	-	-	-	-	6		6	
	91	9	-	-	-	-	-	-	-	9		9	
	94	24	-	-	-	-	-	-	-	24		24	
	99	2	-	-	-	-	-	-	-	2		2	
M	85	58	-	-	-	-	-	-	-	58	6	4	58
	91	6	3	-	1	-	-	1	-	11	4	5	11
	94	21	-	-	1	-	-	-	-	22	5	5	22
	99	27	-	-	-	-	-	-	-	27	7	8	27
D	85	9	1	-	-	-	-	-	-	9	-	1	10
	91	-	1	-	-	-	-	-	-	1	-	-	1
	94	-	-	-	-	-	-	-	-	-	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	0
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>				<u>%Change</u>					
'85		01%	00%	01%				-72%					
'91		19%	00%	00%				-34%					
'94		00%	00%	00%				-37%					
'99		00%	00%	00%									
Total Plants/Acre (excluding Dead & Seedlings)									'85	4932	Dec:	14%	
									'91	1399		5%	
									'94	920		0%	
									'99	580		0%	
<i>Juniperus osteosperma</i>													
Y	85	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	2		2	
% Plants Showing		<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>				<u>%Change</u>					
'85		00%	00%	00%									
'91		00%	00%	00%									
'94		00%	00%	00%									
'99		00%	00%	00%									
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-	
									'91	0		-	
									'94	0		-	
									'99	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					
Opuntia spp.													
Y	85	5	-	-	-	-	-	-	5	333		5	
	91	-	-	-	-	-	-	-	-	0		0	
	94	2	-	1	-	-	-	-	3	60		3	
	99	-	-	-	-	-	-	-	-	0		0	
M	85	1	-	-	-	-	-	-	1	66	1 5	1	
	91	-	-	-	3	-	-	2	5	333	4 5	5	
	94	3	-	-	-	-	-	-	3	60	3 6	3	
	99	4	-	-	-	-	-	-	4	80	5 16	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'85		00%			00%			00%		-17%			
'91		00%			00%			00%		-64%			
'94		00%			17%			00%		-33%			
'99		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'85	399	Dec:	-
										'91	333		-
										'94	120		-
										'99	80		-
Pediocactus simpsonii													
Y	85	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	2	40		2	
M	85	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	0	- -	0	
	94	-	-	-	-	-	-	-	-	0	2 3	0	
	99	1	-	-	-	-	-	-	1	20	- -	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>		<u>%Change</u>			
'85		00%			00%			00%					
'91		00%			00%			00%					
'94		00%			00%			00%					
'99		00%			00%			00%					
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-
										'91	0		-
										'94	0		-
										'99	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			
Pinus edulis																	
S	'85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4
	'91	2	-	-	-	-	-	3	-	-	5	-	-	-	333		5
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	8	-	-	1	-	-	1	-	-	10	-	-	-	200		10
Y	'85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4
	'91	3	-	-	-	-	-	-	-	3	-	-	-	200		3	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'99	8	-	-	1	-	-	-	-	9	-	-	-	180		9	
M	'85	1	-	-	-	-	-	-	-	1	-	-	-	66	69	128	1
	'91	1	-	-	1	-	-	-	-	2	-	-	-	133	81	87	2
	'94	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'99	3	-	-	1	-	-	-	-	4	-	-	-	80	-	-	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
		'85 00%			'85 00%			'85 00%			+ 0%						
		'91 00%			'91 00%			'91 00%									
		'94 00%			'94 00%			'94 00%									
		'99 00%			'99 00%			'99 00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	332	Dec:	-			
											'91	333		-			
											'94	0		-			
											'99	260		-			

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				
Purshia tridentata																	
S	'85	14	-	1	-	-	-	-	-	-	15	-	-	-	1000		15
	'91	1	1	-	-	-	-	3	-	-	5	-	-	-	333		5
	'94	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
	'99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	'85	5	5	-	-	-	-	-	-	-	10	-	-	-	666		10
	'91	1	2	-	1	-	-	-	-	-	4	-	-	-	266		4
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	1	3	2	-	-	-	3	-	-	9	-	-	-	180		9
M	'85	-	5	12	-	-	-	-	-	-	16	-	1	-	1133	13 41	17
	'91	3	1	4	1	9	3	1	3	-	25	-	-	-	1666	7 21	25
	'94	116	3	1	2	-	-	-	-	-	122	-	-	-	2440	12 36	122
	'99	20	2	3	-	19	26	-	-	4	74	-	-	-	1480	15 43	74
D	'85	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1
	'91	3	-	1	-	3	2	8	-	-	17	-	-	-	1133		17
	'94	1	-	2	1	-	-	-	-	-	4	-	-	-	80		4
	'99	2	-	-	1	4	-	2	-	-	3	-	-	6	180		9
X	'85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		36%			46%			04%			+39%						
'91		33%			22%			00%			-18%						
'94		02%			02%			00%			-27%						
'99		30%			38%			07%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	1865	Dec:	4%			
											'91	3065		37%			
											'94	2520		3%			
											'99	1840		10%			
Rhus trilobata trilobata																	
M	'85	-	1	-	-	-	-	-	-	-	1	-	-	-	66	12 20	1
	'91	-	-	-	-	1	-	-	-	-	1	-	-	-	66	18 23	1
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		100%			00%			00%			+ 0%						
'91		100%			00%			00%									
'94		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'85	66	Dec:	-			
											'91	66		-			
											'94	0		-			
											'99	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	85	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	0		0	
M	85	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	0	-	0	
	94	5	-	-	-	-	-	-	100	13	23	5
	99	4	2	-	-	-	-	-	140	19	26	7
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%						
'91		00%		00%		00%						
'94		00%		00%		00%		+14%				
'99		29%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	0	Dec:	-
									'91	0		-
									'94	120		-
									'99	140		-
Tetradymia canescens												
Y	85	3	-	-	-	-	-	-	3		3	
	91	-	-	-	1	-	-	-	1		1	
	94	2	-	-	-	-	-	-	2		2	
	99	6	-	-	1	-	-	-	7		7	
M	85	7	-	-	-	-	-	-	7	5	4	7
	91	3	1	-	2	2	-	2	10	7	4	10
	94	16	-	-	4	-	-	-	20	9	11	20
	99	16	3	1	3	-	-	-	23	9	10	23
D	85	3	-	-	-	-	-	-	3		3	
	91	1	1	-	-	-	2	-	4		4	
	94	1	-	-	1	-	-	-	1		2	
	99	3	2	-	-	-	-	-	4		5	
X	85	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	20		1	
	99	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'85		00%		00%		00%		+13%				
'91		27%		00%		00%		-52%				
'94		00%		00%		04%		+31%				
'99		14%		03%		03%						
Total Plants/Acre (excluding Dead & Seedlings)									'85	866	Dec:	23%
									'91	998		27%
									'94	480		8%
									'99	700		14%

Trend Study 25B-6-99

Study site name: Little Deer Peak .

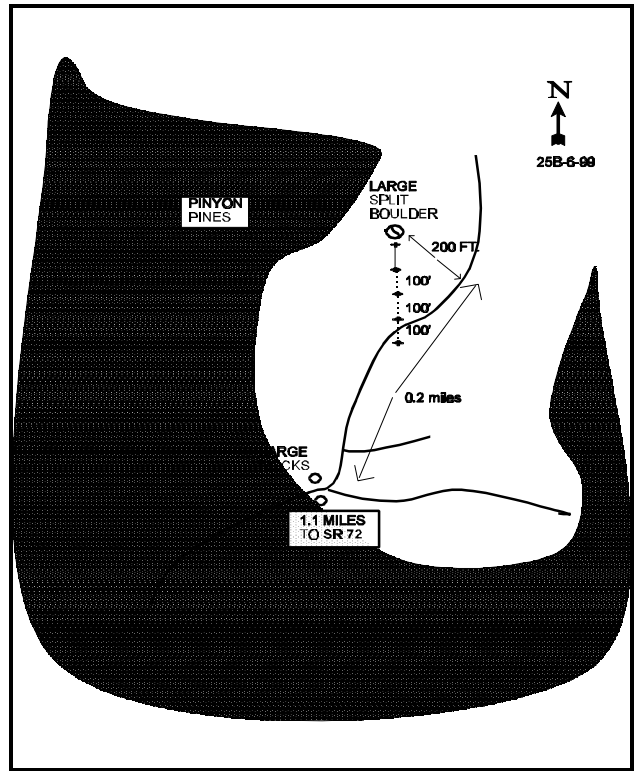
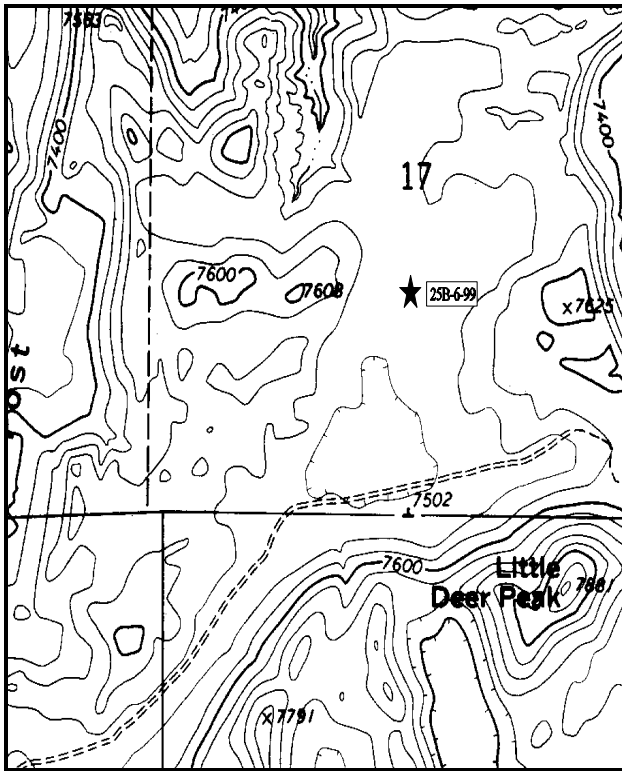
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 160°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Salina, go 37.5 miles east on I-70 to a rest area. From the rest area, go approximately 3 miles east on the frontage road to Fremont Junction. Turn south on SR 72 and drive 4.1 miles to a left turn across from Frying Pan Flat. Go left down this road for 1.1 miles to a fork between 2 large boulders. Take the left fork 0.05 miles to another fork. Go left 0.2 miles to a large split boulder which is 200 feet to the left of the road. The 0-foot baseline stake is 15 feet south of the split boulder and has a red browse tag #7082 attached.



Map Name: John's Peak, Utah

Diagrammatic Sketch

Township 24S , Range 5E , Section 17

UTM 4285555.495 N, 466676.983 E

DISCUSSION

Trend Study No. 25B-6 (45-3)

The Little Deer Peak transect samples a sagebrush flat of about 260 acres that is surrounded by low hills with pinyon-juniper cover. The flat has a slope of a little over 1% and an elevation of 7,560 feet. Range type is Wyoming big sagebrush-grass. Two species of grass make up about 99% of the total grass cover. The BLM grazing allotment is for cattle from March 16 to May 31. Grazing pressure appears to have been heavy in the past, as a warm season grass dominates the area by contributing 84% of the total grass cover. It has not received much use since 1982 and there were no recent signs of livestock or big game use in 1985. No deer pellet groups were found on the study area in 1985, but in 1991 there were 5 deer days use/acre (12 ddu/ha) and 9 elk days use/acre (22 edu/ha) estimated. In 1999, the pellet group transect showed 31 deer days use/acre (76 ddu/ha), 41 elk days use/acre (100 edu/ha), and 7 cow days use/acre (18 cdu/ha). There is good cover on the slopes nearby.

The soil texture is a sandy clay loam with a neutral pH (7.3). Infiltration is poor, as evidenced by the puddles that formed from small amounts of rain which fall on the site. Effective rooting depth is just over 12 inches with little surface rock and pavement cover. Although there is a fair amount of vegetative cover, there is inadequate litter cover. Much of the litter comes from dead sagebrush. Pavement and rock accounts for <10% of the ground cover. Thirty-seven percent of the surface was bare soil in 1985, which increased to 42% in 1991, then went down to 38% in 1999. It appears that the bare interspaces have been subject to soil loss and compaction from trampling. Moderate pedestalling is evident for grasses and shrubs. Many of the large bare areas present are the result of red harvester ant activities. Some areas are denuded of vegetation up to 20 feet in diameter. Grasshoppers were also present in moderately high numbers in 1991. The large patches of blue grama appear to grow on the more clay soils where the soil penetrometer had readings 4-5 inches more shallow. There was a noticeable caliche layer at approximately 12 inches in depth which could be restrictive to plant roots.

Wyoming big sagebrush is the most abundant browse plant, providing 82% of the total browse cover in 1999. The plants are scrubby and stunted and look very similar to black sagebrush in stature. Average size is only 12 inches high with about a 16 to 24 inch crown. Initially in 1985, 21% of the big sagebrush plants had poor vigor with over 42% being heavily hedged. When they were sampled in 1991, these numbers were respectively 6% with poor vigor and 8% heavily hedged. By 1999, those with poor vigor remained at 6%, while those with heavy use decreased to only 2%. Percentage of young plants present in the population has been quite variable through the years, currently it is at 11%. Low rabbitbrush makes up a good proportion of the browse population, however it only makes up 8% of the browse cover. The plants are vigorous and the population appears to be stable at this time. Other increaser species like broom snakeweed are indicators of a disturbed site.

Quadrat frequency and diversity of herbaceous species is low. Two species of grass, blue grama and bottlebrush squirreltail, are fairly common. However, blue grama dominates by providing 84% of the grass cover in 1999. There are a few scattered sedges on site that were not sampled in 1991 or 1999. Scarlet globemallow and low fleabane are the only common forbs and they can not provide much usable forage.

1985 APPARENT TREND ASSESSMENT

The soil trend appears to be stable. Although there is a lot of bare soil exposed, the area is very level and no gullies are present. Vegetative trend appears downward as the Wyoming big sagebrush appears to be declining. There are no desirable species to move in and replace it. The herbaceous species provide little forage and include several species of increasers.

1991 TREND ASSESSMENT

Soil trend would have to be considered slightly downward, not because of increase in soil erosion, but because of the increase in bare soil and decrease in basal plant cover. This could turn around with an increase in precipitation. The key browse species, Wyoming big sagebrush, has lost 47% of its population since 1985. Percent decadency has decreased from 35 to 29%. This would indicate that the initially high densities and the extended drought have thinned out the sagebrush thereby lowering the percentage of the population classified as being in poor vigor from 21% down to only 6%. Low rabbitbrush has more than doubled it's density in the interim. There is very low diversity of species for the grasses and forbs. It has stayed about the same, with some gains and some losses for both groups of plants.

TREND ASSESSMENT

soil - slightly down

browse - down

herbaceous understory - stable, but still very poor condition

1999 TREND ASSESSMENT

Soil trend would be considered stable with a decrease in percent bare ground, but still in poor condition overall. With the sample size for browse being increased by more than three times, the browse density will be changed somewhat. The key browse species, Wyoming big sagebrush, now has a density of 6,200 plants/acre. What is more important to note for changes in trend is that percent decadency has stayed about the same; percent young is still moderately high at 11%; the percentage of the decadent class that were classified as dying has remained almost unchanged since 1985; those classified with poor vigor have gone from 21% and remained stable at 6%; the number of plants with heavy use has decreased from 42% to 8%, now it is only 2%. All these changed characteristics would indicate a slightly improving trend for sagebrush on this site. There is very low diversity of species for the grasses and forbs. It has stayed about the same, with some gains and some losses for both groups of plants.

TREND ASSESSMENT

soil - stable, but poor condition

browse - slightly improving

herbaceous understory - stable, but still very poor condition

HERBACEOUS TRENDS --

Herd unit 25B, Study no: 6

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % (99)
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	-	-	-	-	-	-	.00
G	Bouteloua gracilis	a286	b321	a278	96	97	95	14.19
G	Carex spp.	b9	a-	a-	5	-	-	-
G	Oryzopsis hymenoides	a-	b11	a-	-	5	-	-
G	Sitanion hystrix	a92	a115	b188	40	52	77	2.71
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		387	447	466	141	154	172	16.92
Total for Grasses		387	447	466	141	154	172	16.92

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Arabis spp.	a-	a-	b7	-	-	3	.01
F	Astragalus spp.	b6	a-	a-	3	-	-	-
F	Chaenactis douglasii	1	-	-	1	-	-	-
F	Draba spp. (a)	-	-	1	-	-	1	.00
F	Erigeron pumilus	b33	c50	a8	14	24	4	.07
F	Penstemon comarrhenus	3	-	-	2	-	-	-
F	Penstemon spp.	2	6	2	1	4	1	.00
F	Sphaeralcea coccinea	a105	ab119	b152	46	48	60	1.43
Total for Annual Forbs		0	0	1	0	0	1	0.00
Total for Perennial Forbs		150	175	169	67	76	68	1.52
Total for Forbs		150	175	170	67	76	69	1.52

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

BROWSE TRENDS --

Herd unit 25B, Study no: 6

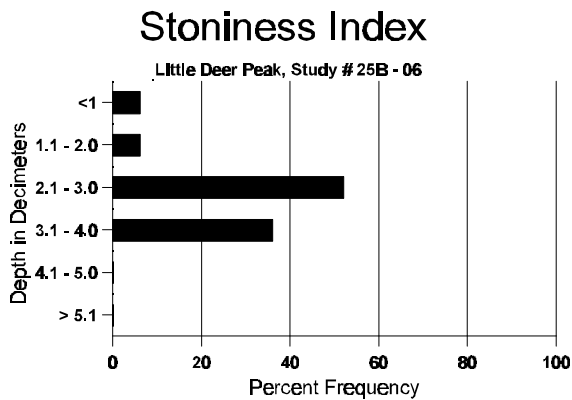
Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	9	.09
B	Artemisia nova	1	-
B	Artemisia tridentata wyomingensis	84	13.93
B	Chrysothamnus viscidiflorus viscidiflorus	62	1.35
B	Echinocereus triglochidatus	4	-
B	Gutierrezia sarothrae	50	1.60
B	Leptodactylon pungens	4	-
B	Opuntia spp.	12	.01
B	Pediocactus simpsonii	2	-
B	Pinus edulis	0	-
Total for Browse		228	17.00

BASIC COVER --
Herd unit 25B, Study no: 6

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	321	17.50	14.75	34.75
Rock	91	2.00	2.00	2.86
Pavement	218	13.50	7.25	4.82
Litter	328	29.00	32.25	23.83
Cryptogams	69	1.25	1.75	1.10
Bare Ground	336	36.75	42.00	38.14

SOIL ANALYSIS DATA --
Herd Unit 25B, Study # 06, Study Name: Little Deer Peak

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.5	54.0 (12.5)	7.3	49.8	25.2	24.9	1.4	13.1	153.6	0.5



PELLET GROUP FREQUENCY --
Herd unit 25B, Study no: 6

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	41	n/a
Elk	17	41 (101)
Deer	12	31 (77)
Cattle	1	7 (17)

BROWSE CHARACTERISTICS --

Herd unit 25B, Study no: 6

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	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	10	10
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66	2	6
	99	8	2	2	1	-	-	-	-	-	13	-	-	-	260	5	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+ 0%						
'91		00%			100%			00%			+78%						
'99		13%			13%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-		
												'91	66		-		
												'99	300		-		
Artemisia nova																	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	5	-	-	-	-	-	-	-	-	-	-	-	5	100		5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			100%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%		
												'91	0		0%		
												'99	100		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>Artemisia tridentata wyomingensis</i>														
S	85	1	-	-	-	-	-	1	66		1			
	91	-	-	-	-	-	-	-	0		0			
	99	4	-	-	5	-	-	-	9		9			
Y	85	3	16	15	-	-	-	-	32	-	2	2266		34
	91	4	-	-	-	-	-	-	4	-	-	266		4
	99	26	8	-	-	-	-	-	33	1	-	680		34
M	85	14	18	28	-	-	-	-	50	6	4	4000	10 15	60
	91	30	10	3	5	-	-	3	50	1	-	3400	10 16	51
	99	100	76	6	-	-	-	-	179	3	-	3640	12 24	182
D	85	2	31	17	-	-	-	-	26	-	14	3333		50
	91	12	5	3	2	-	-	-	17	-	-	1466		22
	99	65	26	-	3	-	-	-	75	-	-	1880		94
X	85	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	1020		51
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'85		45%		42%		21%		-47%						
'91		19%		08%		06%		+17%						
'99		35%		02%		06%								
Total Plants/Acre (excluding Dead & Seedlings)									'85	9599	Dec:	35%		
									'91	5132		29%		
									'99	6200		30%		
<i>Chrysothamnus viscidiflorus viscidiflorus</i>														
S	85	-	-	-	-	-	-	-	-	-	-	0		0
	91	1	-	-	-	-	-	-	1	-	-	66		1
	99	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	21	2	-	-	-	-	-	23	-	-	1533		23
	91	23	3	-	1	-	-	2	29	-	-	1933		29
	99	12	-	-	-	-	-	-	12	-	-	240		12
M	85	44	1	-	-	-	-	-	45	-	-	3000	9 10	45
	91	27	21	6	6	-	-	12	72	-	-	4800	3 6	72
	99	144	4	-	3	-	-	-	146	-	5	3020	6 10	151
D	85	-	-	-	-	-	-	-	-	-	-	0		0
	91	2	4	4	2	-	-	3	10	1	-	1000		15
	99	9	4	-	1	-	-	-	7	-	-	280		14
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>						
'85		04%		00%		00%		+41%						
'91		24%		09%		03%		-54%						
'99		05%		00%		07%								
Total Plants/Acre (excluding Dead & Seedlings)									'85	4533	Dec:	0%		
									'91	7733		13%		
									'99	3540		8%		

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				
Echinocereus triglochidatus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	1	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	100		-			
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	17	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	8	1	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	137	-	-	1	-	-	-	-	-	138	-	-	-	2760	6	9	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		.68%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	2940		-			
Leptodactylon pungens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	7	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			25%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	0		0%			
												'99	80		25%			

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									
Opuntia spp.																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	3	-	-	-	-	-	-	-	3	-	-	-	200	5	7	3
	91	-	-	-	-	-	2	-	-	2	-	-	-	133	2	9	2
	99	15	-	-	-	-	1	-	-	15	-	-	1	320	3	9	16
D	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'85		00%		00%		00%		-34%									
'91		00%		00%		00%		+65%									
'99		00%		00%		11%											
Total Plants/Acre (excluding Dead & Seedlings)										'85	200	Dec:	0%				
										'91	133		0%				
										'99	380		5%				
Pediocactus simpsonii																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	0	1	3	0
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'85		00%		00%		00%											
'91		00%		00%		00%											
'99		00%		00%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	40		-				
Pinus edulis																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>									
'85		00%		00%		00%											
'91		00%		00%		00%											
'99		00%		00%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'85	0	Dec:	-				
										'91	0		-				
										'99	0		-				

SUMMARY

WILDLIFE MANAGEMENT UNIT 25B (46) - THOUSAND LAKE

The extended drought has continued to effect soil and range conditions on a state-wide basis through the 1994 readings. With the 1999 data, vegetative cover has generally increased, but litter cover has been slow to recover from the low values of 1994. Soil trends are stable on 4 of the 6 sites and up slightly at Horse Valley (#25B-2) and Polk Creek (#25B-5). Even with stable soil trends soil conditions at Horse Valley, Sage Flat (#25B-3), and Little Deer Peak (#25B-6) are considered poor. Percent bare ground is 30% or greater on three sites, Sage Flat, Solomon Basin (#25B-4), and Little Deer Peak. Browse trends are stable on all sites except for a slightly upward trend at Little Deer Peak. All sites on this unit were classified as stable for the herbaceous understory trend except for Solomon Basin which displays a slightly downward trend. Even though most sites are showing stable trends for herbaceous species, many of the sites would have to be considered in poor condition because of the low frequencies and low diversity of species on these sites.

Site	Category	1991	1994	1999
25B-1 Thousand Lake	soil	0	NR	0
	browse	+	NR	0
	herbaceous understory	0/+	NR	0
25B-2 Horse Valley	soil	-	0	+
	browse	-	-	0
	herbaceous understory	0	-	0
25B-3 Sage Flat	soil	-	-	0
	browse	+	+	0
	herbaceous understory	+	0	0
25B-4 Solomon Basin	soil	NR	NR	0
	browse	NR	NR	0
	herbaceous understory	NR	NR	-
25B-5 Polk Creek	soil	-	0/+	+
	browse	+	+	0
	herbaceous understory	+	-	0
25B-6 Little Deer Creek	soil	-	NR	0
	browse	-	NR	+
	herbaceous understory	0	NR	0

(+) upward trend, (-) downward trend, (0) stable trend, (0/-) stable to slightly down trend, (0/+) stable to slightly upward trend, (NR) not read

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