

# UTAH BIG GAME RANGE TREND STUDIES 1995



**PUBLICATION NUMBER 98-1  
ANNUAL PERFORMANCE REPORT FOR FEDERAL AID PROJECT W-135-R-16**

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

**UTAH BIG GAME  
RANGE TREND STUDIES  
1995**

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Performance Report for Federal Aid Project W-135-R-16

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UTAH DEPARTMENT OF NATURAL RESOURCES  
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TABLE OF CONTENTS

	<u>Page</u>
Program Narrative . . . . .	iii
Remarks . . . . .	v
Map of Utah Deer Herd Units Surveyed in 1995. . . . .	vi
Methods . . . . .	vii
Report Format . . . . .	xv
Deer Herd Unit 8 North Slope . . . . .	1
Deer Herd Unit 9 Daggett . . . . .	41
Deer Herd Unit 11 Vernal . . . . .	136
Deer Herd Unit 12 South Slope . . . . .	232
Deer Herd Unit 13 Current Creek . . . . .	314
Deer Herd Unit 14 North Avintaquin . . . . .	367
Deer Herd Unit 15 Anthro Mountain . . . . .	413
Deer Herd Unit 16A North Book Cliffs. . . . .	456
Deer Herd Unit 16B South Book Cliffs. . . . .	558
Deer Herd Unit 34 Dolores . . . . .	634
List of References. . . . .	692

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 tied to the quality and quantity of forage in key areas. The Utah State Interagency Committee defined key areas as those areas "where deer or other big game have demonstrated a definite pattern of use during normal climatic conditions over a long period" (Utah Interagency Committee). 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 constitute the bulk of the trend studies, although there are certain herd units where summer range habitat 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 focus the attention of local interagency committees on the proper management of key big game areas throughout the state. The Division has adopted the 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 sufficient data to monitor range trend.

Objectives:

1. Continue to monitor range trend in all key areas within a DWR administrative region annually.
2. Classify every trend study site according to ecological site and identify habitat objectives based on site potential.
3. Prepare an annual report which will include herd unit descriptions, trend study narratives and herd unit evaluations for all herd units in a region annually.
4. Foster cooperative efforts among Interagency personnel with respect to trend study site selection, sharing trend data, development of trend monitoring procedures and data analysis, and the identification of management objectives for study sites.
5. Monitor vegetation in wildlife habitat improvement projects.
6. Use the information generated by this project to inform local interagency committees of key habitat areas that are declining in value for big game.

7. Propose management strategies that are designed to correct habitat limitations in key 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 1995 field season and reported in this publication involves the reading of interagency range trend studies in the DWR Northern Region, Northeastern, and Southeastern

The North Slope deer herd unit is within the Northern region and has 5 permanent vegetation studies which were established in 1988. The Dolores Triangle and South Bookcliff deer herd units are within the Southeastern region. Nine studies were read in the Dolores Triangle and 12 studies were read in the South Bookcliffs.

Herd units in the Northeastern region encompassed in this report include; Dagget (13 studies), Vernal (12 studies), South Slope (8 studies), Currant Creek (6 studies), North Avintaquin (5 studies), Anthro Mountain (5 studies), and the North Book Cliffs (14 studies).

The North Book Cliffs deer herd unit is in the Northern Region and 5 studies were read. These studies were established in 1988.

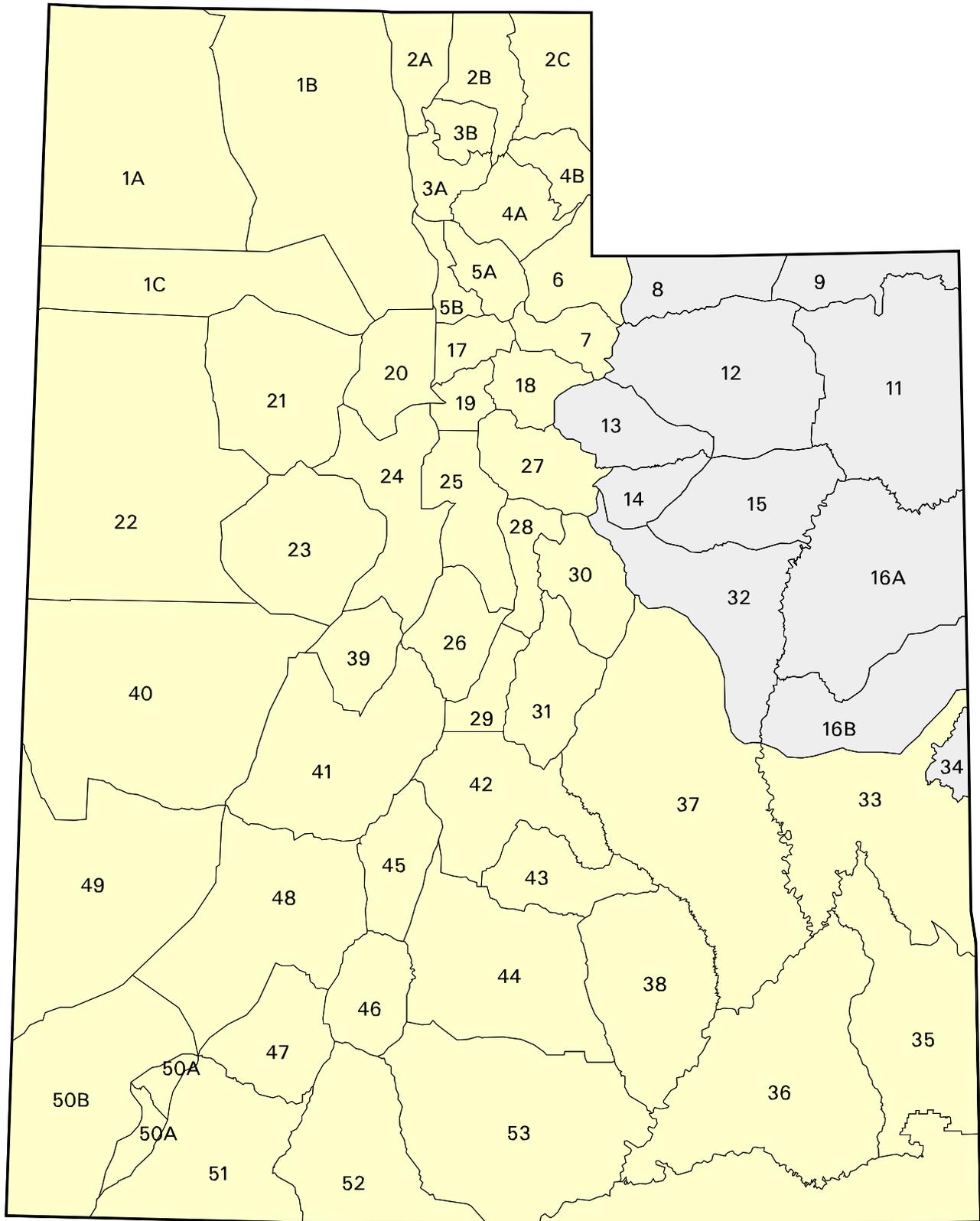
Information and/or assistance was provided by the following:

Ashley National Forest  
Duchesne Ranger District  
Roosevelt Ranger District  
Vernal Ranger District

Bureau of Land Management  
Grand Resource Area  
Grand Junction Resource Area  
Book Cliffs Resource Area

The information and assistance provided is greatly appreciated and adds to the value of this report.

# Management Units Surveyed in 1995



## RANGE TREND STUDY METHODS

Trend monitoring studies 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, the 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 the transects proper identification.

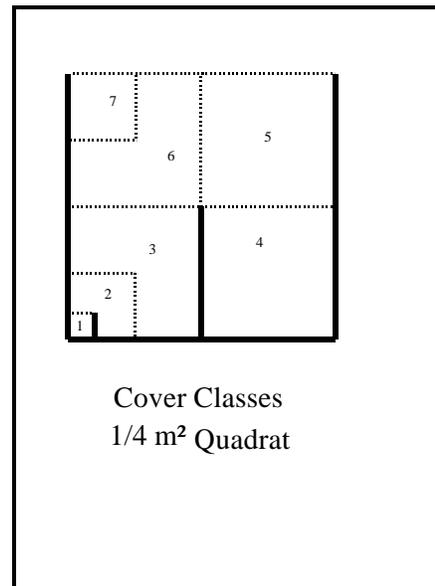
### Vegetative composition

Determining vegetational characteristics for each "key" area is determined by setting up 5 consecutive 100 ft base line 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 base line at random foot marks and centered on the 50 ft mark. A 1/4 m<sup>2</sup> 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.

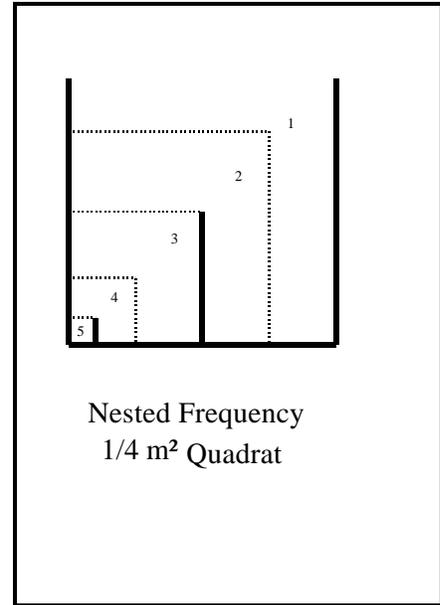
Currently, cover is determined using a slightly modified Daubenmire (1959) cover class method. The seven cover class are: 1) .01-1%, 2) 1.1-5%, 3) 5.1-25%, 4) 25.1-50%, 5) 50.1-75%, 6) 75.1-95%, 7) 95.1-100%.

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.



Higher nested frequency scores represent a higher abundance for that plant species. These values are used to help determine changes in trend and composition through time. It has been found to be a more sensitive measurement for changes taking place within plant communities than quadrat frequency (Mosley and others 1986). Plant cover and density values are not reliable indicators of trend 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 to give 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 "Vegetative 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. Strip frequency is determined by dividing each of the five 100 foot belts into 20 equal five foot segments, allowing 100 five foot segments. For example, if a species was rooted in 25 of the shrub strips, strip frequency for this species would be 25%. All shrubs rooted within each strip are counted and placed in the following 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.

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.

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 actual trends in shrub populations. Each 100<sup>th</sup> acre shrub strip is divided into 20, 5 foot segments. Presence or absence is determined for these strip segments to give a measure of shrub frequency. This larger sample will better reflect trends in the shrub populations. This data along with shrub cover is recorded in the browse trends table.

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 each end of the 5, 100 ft base lines. This allows sampling trees on a much larger scale. The strip method, used to estimate shrub density, can in most cases effectively estimate seedling and young tree densities.

#### TREND DETERMINATION

The methods described above rely on relative and absolute measurements of plant composition as determined from the frequency and density data. In addition, estimates of plant vigor, height, crown diameter, form class, and age class are utilized to characterize 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 determine trend on key browse species through time. These include:

- 1) changes in density or number of plants/acre
- 2) proportion of decadent plants
- 3) biotic potential or proportion of seedlings in population
- 4) proportion of young plants in population
- 5) proportion of individuals heavily browsed
- 6) proportion of plants in poor vigor
- 7) changes in height and crown diameter measurements
- 8) changes in browse composition
- 9) strip frequency values

Trends in herbaceous plants as a group or as a single "key" species are 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 these basic ground cover measurements and cover composition (herbs vs shrubs) between years as well as comparing photos and observer observations between readings. On newly established studies, a more subjective or apparent assessment is made from qualitative comparisons.

The following tables and partial tables have been taken from Herd Unit 33-1 vegetative trends summary to help illustrate some basic comparisons that can be made with the data. The "vegetative trends" table summarizes average cover, quadrat frequency, and nested frequency data for individual grass and forb species. The table contains all the grass species found on site 33-1. The 1987 readings included only nested and quadrat frequency data for perennial species. The 1994 trend studies have data for all perennial and annual species as well as cover estimates for individual species. Grasses had a combined total cover of 11.52%. *Agropyron cristatum* for example, had a sum of nested frequency of 135. By 1994, the sum of nested frequency value declined to 106. The asterisk indicates that the change was statistically significant. Quadrat frequency also indicated a decline from 55 to 39. Cover was estimated at 2.46% for *A. cristatum*. Trend for this grass is down due to a significant decline in nested frequency. In 1987, perennial grasses had a sum of nested frequency value of 560. This value declined to 485 by 1994, indicating a slightly downward trend for grasses on this site.

VEGETATIVE TRENDS --

Herd unit 33, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '94
		'87	'94	'87	'94	
G	Agropyron cristatum	135	*106	55	39	2.46
G	Bouteloua gracilis	15	19	5	6	1.07
G	Bromus inermis	75	*67	31	27	.63
G	Koeleria cristata	61	*3	23	1	.03
G	Oryzopsis hymenoides	-	3	-	1	.00
G	Poa bulbosa	220	*256	81	85	7.14
G	Poa fendleriana	-	*16	-	7	.06
G	Sitanion hystrix	6	1	3	1	.00
G	Stipa comata	48	*14	21	7	.11
Total for Grasses		560	485	219	174	11.52

\* indicates a significant difference at  $\alpha$  .10

The browse trends table below summarizes strip frequency and cover for all shrub species. Three of the shrubs found on site 33-1 are listed. Wyoming sagebrush, for example has a strip frequency of 86 out of a possible 100. Cover is estimated at 16.28%.

BROWSE TRENDS --

Herd unit 30A, Study no: 1

Type	Species	Strip Frequency	Average Cover %
		'94	'94
B	Amelanchier utahensis	18	2.25
B	Artemisia tridentata wyomingensis	86	16.28
B	Chrysothamnus viscidiflorus	71	3.62
Total for Browse		175	22.15

The basic cover table summarizes nested frequency and average cover of vegetation, rock, pavement, litter, cryptogams, and bare ground. Average cover for the previous method used ('87) adds up to only 100%, while cover with the current method ('94) can estimate several layers of plant and ground cover and will usually exceed 100%. For vegetation cover, the previous method only sampled basal vegetative cover (15.25) while the new method estimates projected vegetational cover (33.38). 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 33, Study no: 1

Cover Type	Nested Frequency '94	Average Cover %	
		'87	'94
Vegetation	333	15.25	33.38
Rock	10	0	.02
Pavement	18	0	.03
Litter	387	61.00	46.05
Cryptograms	111	3.50	1.50
Bare Ground	301	20.25	32.20

The soil analysis table summarizes data for the site. 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, 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., 61.2°F), with the average depth (in inches) as the lower measurement (18.3). Chemical and textural characteristics are also listed and were determined by a soils laboratory analysis of a composite sample taken near each of the 5 baseline starting stakes.

SOIL ANALYSIS DATA --

Herd Unit 33, Study no: 01

Effective rooting depth (inches)	Temp EF (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
19.7	61.2 (18.3)	8.2	43.6	34.4	28.0	1.6	15.5	700.8	.61

The descriptive terms to use 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

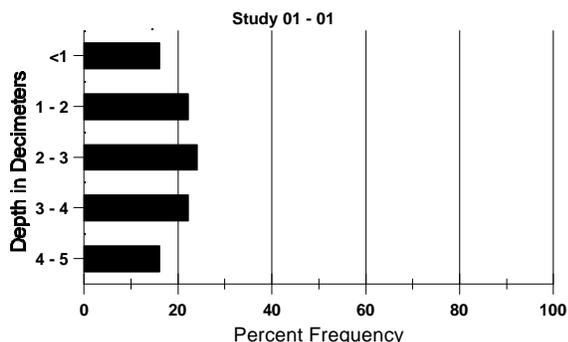
Percent organic matter (%OM) refers to the amount of organic matter in the top 12 inches of soil. Parts per million of phosphorus and potassium are also included. Values for phosphorus and potassium less than 10 ppm and 70 ppm respectively may be limiting to vegetation growth.

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 get a better awareness 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 there is from 1 to >5 decimeters.

### Stoniness Index



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 1992. For example in 1994, rabbit pellet groups were found in 44% of the quadrats placed on study 33-1, indicating the relative amount of rabbit use. With future readings, this data can help characterize changes in wildlife patterns use on the site.

PELLET GROUP FREQUENCY --  
Herd unit 36, Study no: 1

Type	Quadrat Frequency '94
Rabbit	44
Elk	28
Deer	14

The following is part of a browse table which summarizes characteristics of shrubs on study 33-1. Total plants/acre for Wyoming big sagebrush, excluding seedlings (S) and dead (X) was 3,199 in 1987 and 4,800 in 1994. Seedlings are excluded from the population estimate because with summer drought, they may all die by late fall causing great fluctuations in population estimates from year to year. Since 1992, a much larger shrub sample is utilized to better characterize

the shrub populations. Therefore, changes in density do not necessarily indicate changes in trend. Especially those species that are clumped and/or have discontinuous distributions. This is where smaller samples can either over estimate or under estimate populations depending where they were sampled. Other characteristics like percent decadency, vigor, percent heavy hedging, biotic and reproductive potential, etc. should be given more weight in determining shrub trend. The following data on Wyoming big sagebrush shows the proportion of decadent shrubs (abbreviated as Dec: in the table) in the population increased from 12% in 1987 to 42% by 1994. This kind of change in percent decadence has not been unusual with prolonged drought since 1986. More seedlings were encountered in 1994, yet the number of young plants remained about the same. Only 2% of the sagebrush displayed poor vigor or were classified as dying in 1987, this increased to 10% by 1994. This 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 8% in 1987 to only 2% by 1994. 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 gone from 42% in 1987 down to 13% in 1994. This is determined by dividing the number of shrubs in form classes 2 and 5 by the total number of shrubs sampled. The average height of sagebrush and crown diameter has increased from 13" x 17" to 18" x 32" indicating large healthy plants. Considering all these factors, trend for sagebrush is stable to slightly up due to an improved biotic potential (number of seedlings), lack of heavy use, good vigor, and the moderately high decadency rate is tolerable for only 10% of the decadent plants are classified as having poor vigor or dying.

BROWSE CHARACTERISTICS --  
Herd unit 33, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata wyomingensis																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	45	-	-	2	-	-	-	-	-	-	-	-	-	940		47	
Y	87	2	1	1	-	-	-	-	-	-	-	-	-	4		4		
	94	10	-	-	-	-	-	-	-	-	-	-	-	10		10		
M	87	20	15	3	-	-	-	-	-	-	-	-	-	37	-	1	38	
	94	96	26	3	4	-	-	-	-	-	-	-	-	121	-	8	129	
D	87	2	4	-	-	-	-	-	-	-	-	-	-	6		6		
	94	94	4	2	1	-	-	-	-	-	-	-	-	85	-	3	101	
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-		0		
	94	-	-	-	-	-	-	-	-	-	-	-	-	-		120	6	
Total Plants/Acre (excluding Dead & Seedlings)												'87	3199	Dec:	12%			
												'94	4800		42%			

Management background information, photos, 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 line and a close-up picture of a quadrat from each belt are used 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.

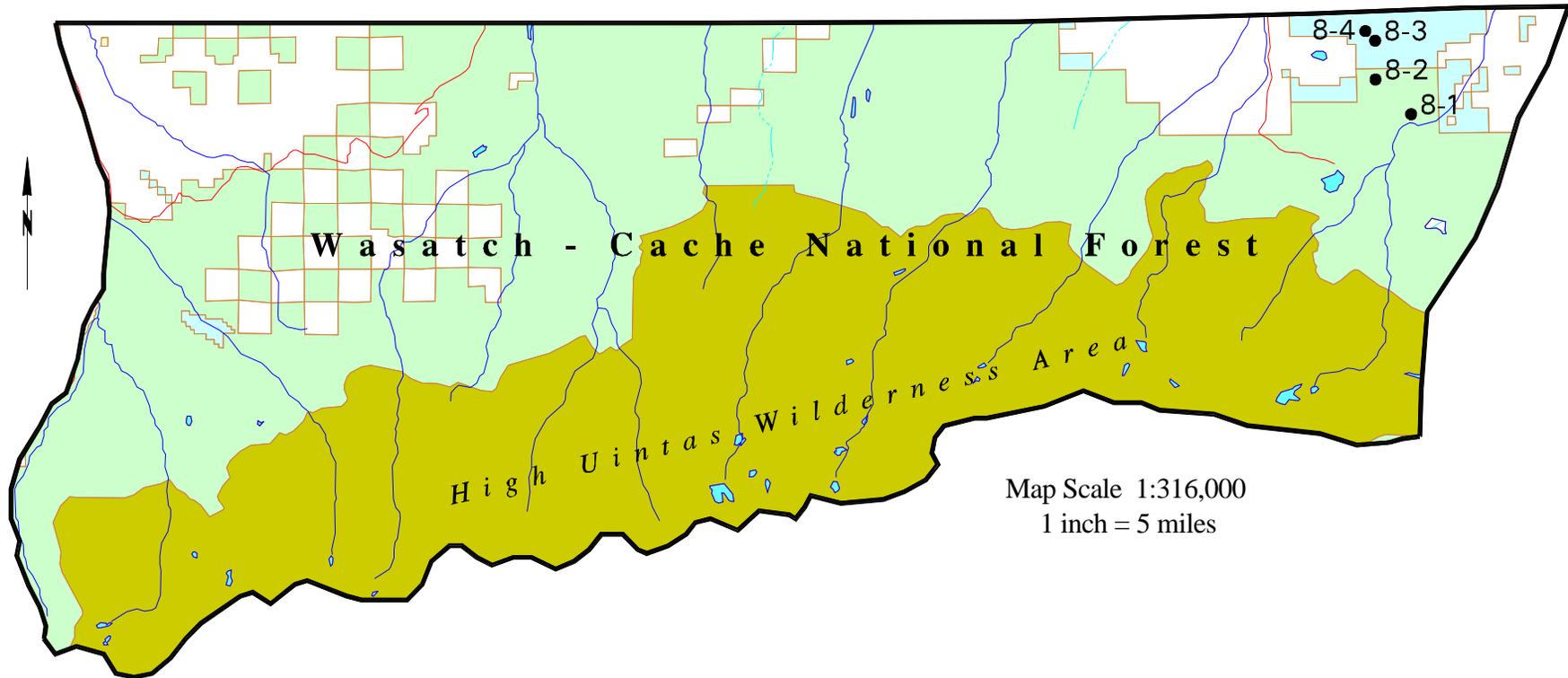
Other types of sampling have been added to the overall trend survey methodology because it was felt that more information was needed with regard to the soils. Now we measure soils for: effective soil depth, amount of rock in the upper soil profile (stoniness index), and soil temperature at approximately 21 inches in depth. A composite soil sample is taken from each of the vegetative sampling belts. Soil analysis includes: pH, texture analysis (percent sand, silt, and clay), percent organic matter, and amounts of trace elements (phosphorus, potassium, and electrical conductivity).

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 (<sup>2</sup>U.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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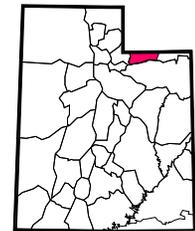
# Deer Management Unit 8 –1995 Transect Locations



## LEGEND

- |                                                                                    |                             |                                                                                     |                          |
|------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------------|
|  | Forest Service Land         |  | Transect Location        |
|  | State Land                  |  | Primary / Secondary Road |
|  | High Uintas Wilderness Area |  | Perennial Stream         |
|  | Private Land                |  | Intermittent Stream      |
|  | Water Body                  |                                                                                     |                          |

## MAP LOCATION



## DEER HERD UNIT 8 - NORTH SLOPE

### BOUNDARY DESCRIPTION

Summit County - Boundary begins at the Utah-Wyoming state line and Highway SR-150; then south on this highway to the Summit-Duchesne county line; east along this county line to the Burnt Fork-Sheep Creek drainage divide; north along this divide to the Burnt Fork-Birch Creek drainage divide; north along this drainage divide to the Utah-Wyoming state line; west along the state line to SR-150 and beginning point.

### Herd Unit Description

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

In previous reports, the six study sites in this unit were included in Herd Unit 9 - Daggett. The study areas in herd unit 8 focus around Widdop Mountain and the Bald Range which are just west of the herd units eastern boundary and Burnt Fork-Birch Creek drainage divide. This area is important winter range for elk which summer on the north slope of the High Uintas. According to the 1995 Big Game Harvest summary (Evans et. al 1995), there is approximately 365,000 acres of summer range on the unit, 88% of which are administered by the U.S. Forest Service. Private land owners control 11% while the State of Utah administers 1%. There is about 35,100 acres of winter range with the majority (44%) owned by private land owners and another 42% administered by the Forest Service. The State owns 7%.

Management objectives on the unit include maintaining a high country buck hunt, winter 300 deer on the unit and maintain a minimum of 15 bucks/100 does. Buck harvests peaked in the late 1970's when over 600 bucks were taken off the unit. Between 1989 and 1992, an average of only 337 bucks were harvested. The harsh winter of 1992-93 caused a large decline in the buck harvest. During the 1993 hunt, only 109 bucks were harvested. The target winter population for elk on the unit is 300 in Utah and as many elk as permitted by elk management plans wintering in Wyoming.

To meet a need for vegetative trend data on key elk winter ranges on the North Slope of the Uintah Mountains east of Beaver Creek, six new Interagency range trend studies were established in the area in September 1988. The key areas are found on the mountain mahogany slopes of Phil Pico Mountain, Bald Range, Widdop Mountain, and Jessen Butte. These areas are mostly public land, although there is a considerable amount of private land in the Birch Creek and Beaver Creek drainages below the U.S. Forest boundary. The state of Utah owns several large properties, containing the study areas on Phil Pico Mountain (#9-18) and the Bald Range (#8-3 & 4). The study sites on Widdop Mountain (#8-1 & 2), including Telephone Hollow (#8-6), are on the Wasatch National Forest. The site on Phil Pico Mountain is in deer herd unit #9 and will be discussed in that section.

These sites receive moderate to heavy elk winter use and light to moderate deer use in the winter with some summer use. Three of the five sites showed light use by moose. The antelope use the area year round, winter use is dependent on weather conditions. All areas are permitted for livestock grazing. While the valleys are often heavily used by cattle, on-site observations indicate light use

or no use on the steep, mountain brush hillsides. All range trend studies in Herd Unit 8 sample the true (birchleaf) mountain mahogany range type. These studies provide a good representation of a majority of the key elk winter range in the area. Except for Widdop Mountain which is situated on a north Slope, the remainder of the study sites are located on south-facing slopes. These slopes tend to be moderately steep with very rocky soil, typical of the dry, coarse, shallow soils often occupied by mountain mahogany.

TREND STUDY 8-1-95(25-14)

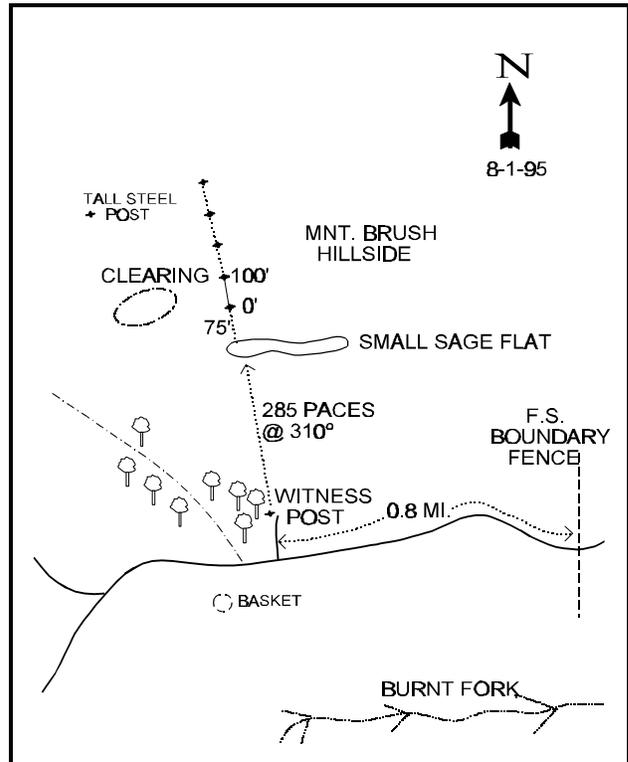
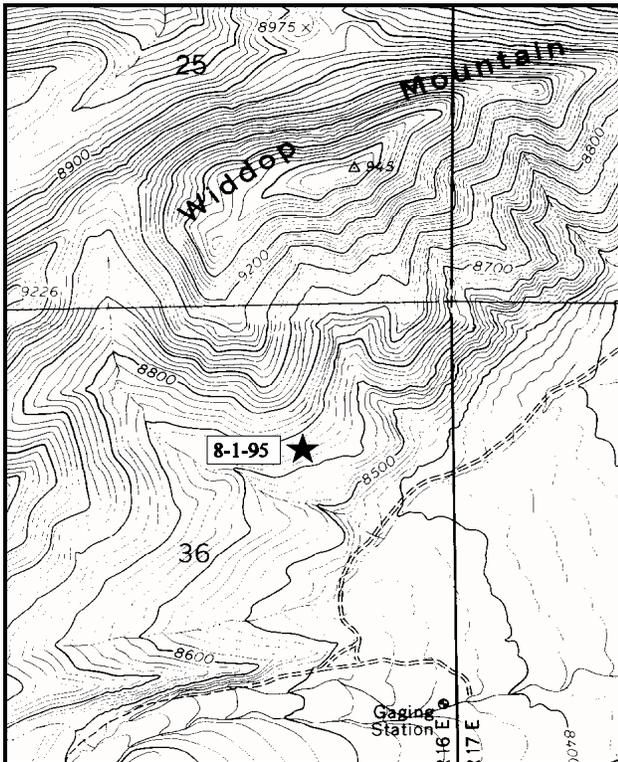
Study site name: Widdop Mountain South Slope. Range type: True Mtn Mahogany.

Compass bearing: frequency baseline 167 degrees.

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

LOCATION DESCRIPTION

From the 4-way intersection south of Gregory Basin (described in study #8-15-95 location description) continue east for .7 miles to the FS boundary fence. Go .9 miles (past study #8-15) to another FS fence. Continue 1.8 miles to a gate. Go through the gate and .4 miles to a fork. Bear right. Go 2.3 miles SW back to a FS boundary fence. Proceed .8 miles to a faint fork. Turn right and pull up about 50 yards along a small drainage. Stop by a witness post (tall green fencepost) next to a clump of aspens. From here, hike NW 1 mile up the slope. The 0-foot baseline stake is marked by browse tag #7155.



Map Name: Hoop Lake

Diagrammatic Sketch

Township 3N, Range 16E, Section 36 UTM COOR. 5-78-064E 12 45-33-828N

## DISCUSSION

### Trend Study No. 8-1

This study is located on the south side of Widdop Mountain. The open, mountain mahogany slope overlooks large sagebrush parks in the Burnt Fork drainage. The land is administered by the Wasatch National Forest. The cows tend to stay in the valley bottom near water, so livestock use is light on the brushy mountain slopes. These slopes receive the most use from wintering elk as evidenced by the higher quadrat frequency of elk pellet-groups. There was also indications of light use for moose and moderately high use by deer.

The elevation at the study site is 8,650 feet. It is on a steep (26%) south-facing, well-drained slope. The soil is a moderately deep, rocky, silt loam. Soil movement is minimal, due to uniform cover from vegetation and litter. The bunch grasses provide good cover and abundant litter. Litter cover is moderately high (48%). Due to the rocky nature of the soil, about 20% of the cover is provided by rocks and erosion pavement. Percent bare soil has decreased slightly from almost 13% down to about 11%.

True mountain mahogany is the key browse species with an estimated density of 4,320 plants/acre in 1995. This is a decrease from 1988, but is more reflective of the greatly increased sample size and much better distribution for sampling shrubs than anything else. This palatable shrub averaged just over two feet in height in 1988 and no plants on the site were taller than four feet during that year. Height appeared to be limited mainly by repeated use as twig elongation was concentrated in the center of the plants. However, shrub vigor was generally good and seed production was abundant in 1988. Over half, 53%, of the population was classified as young and 6% as seedlings.

During the 1995 reading, the proportion of mature plants increased while the number of all other form classes declined. The biggest decline was in the number of young plants which were abundant in 1988. The young plants counted in 1988, likely got started during the favorable wet years of 1983 and 1984. Drought conditions that followed reduced the seedling and young population to its present condition. Reproductive potential (proportion of seedlings to the population) is currently low at 1%, but the proportion of young is adequate at 27%. Average height and crown of the mature plants is now 3.6 ft by 5 ft, a large increase from 1988. The proportion of plants displaying heavy hedging has remained fairly stable at 39% in 1988 and 34% in 1995. Vigor is generally good, but some of the mature plants sampled in 1995 showed insect damage from caterpillars.

Compared to the dominant mahogany, little forage is contributed by other browse species, e.g. mountain big sagebrush, black sagebrush, snowberry, serviceberry, and winterfat. These species make up less than five percent of the browse cover. Patches of sagebrush tend to dominate level spots on the hillside. Smaller plants like low rabbitbrush, horsebrush, and especially broom snakeweed, are fairly common, but unimportant as forage.

The abundant and well-established grasses provide 34% of the vegetation cover. Bluebunch wheatgrass is especially dense on this site. A small sedge is also very common. A good variety of forbs are present on the site. None are noteworthy except for the indigenous thistle increasing in the open spots and the palatable, and apparently preferred, low penstemon and flax.

### 1995 TREND ASSESSMENT

Since ground cover was estimated differently in 1995 than in 1988, care should be taken when directly comparing basic vegetation cover from the earlier readings. In 1988, a point system was used to estimate cover. As a result, only basal

vegetation cover was estimated. In 1995, aerial cover for vegetation was estimated for all ground cover categories which usually can total more 100%. Refer to the methods section of this report for further information on the method changes.

Ground cover characteristics haven't changed a great deal on this site. Percent bare ground has declined slightly while litter cover has gone down moderately due to drought. Erosion does not appear to be a problem on the site due to the abundant herbaceous vegetation which provides 44% of the vegetative cover. The high values for nested frequency for vegetation and litter (347 and 388 out of a possible 400) suggest a well dispersed cover. Trend for soil is currently considered stable. Trend for the key browse species, true mountain mahogany is mixed. On the positive side, percent decadency is less than one percent, but it was already low at 5% in 1988. The proportion of shrubs displaying heavy hedging has also declined while generally showing good vigor. On the slightly downward side, the numbers of seedlings and young have declined, but this is not critical for a fairly long-lived species. The large number of young plants and noted decline is likely due to the wet years in the early to mid 1980's followed by several years of drought. This trend is common throughout the herd unit and in other areas of the state. Trend for browse on the site is considered stable due to the low decadency rate, adequate reproductive potential (27%), stable vigor, and reduced heavy hedging.

Trend for the herbaceous understory is slightly down due to a decline in sum of nested frequency for both grasses and forbs. This is also a common trend throughout the state during these drought years. Nested frequency of bluebunch wheatgrass increased significantly while frequency of most of the other perennial grasses declined.

TREND ASSESSMENT

soil - stable

browse - stable but reduced reproductive potential

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 8, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'88	'95	'88	'95	
G	Agropyron dasystachyum	-	3	-	1	.03
G	Agropyron spicatum	233	*286	86	94	9.56
G	Bromus inermis	-	10	-	3	.06
G	Carex spp.	188	*136	76	57	3.57
G	Koeleria cristata	60	*45	26	21	.58
G	Leucopoa kingii	23	24	11	10	.09
G	Oryzopsis hymenoides	65	*59	33	26	1.72
G	Stipa comata	40	*6	19	3	.09
Total for Grasses		609	569	251	215	15.72
F	Arabis spp.	-	3	-	1	.03
F	Aster chilensis	10	4	4	3	.06
F	Astragalus spp.	3	-	2	-	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	<i>Calochortus flexuosus</i>	-	*7	-	4	.07
F	<i>Chaenactis douglasii</i>	-	1	-	1	.00
F	<i>Chenopodium leptophyllum</i>	-	2	-	2	.01
F	<i>Cirsium</i> spp.	59	*48	32	25	1.62
F	<i>Comandra pallida</i>	1	1	1	1	.03
F	Cruciferae	14	-	8	-	-
F	<i>Cryptantha</i> spp.	42	*90	21	37	1.04
F	<i>Descurainia pinnata</i>	-	54	-	23	.22
F	<i>Hymenoxys acaulis</i>	2	-	2	-	-
F	<i>Lesquerella alpina</i>	40	*19	20	11	.05
F	<i>Leucelene ericoides</i>	21	*10	8	4	.02
F	<i>Linum lewisii</i>	2	5	2	2	.03
F	<i>Lithospermum ruderales</i>	8	26	4	15	.39
F	<i>Machaeranthera grindelioides</i>	4	18	2	10	.20
F	<i>Penstemon humilis</i>	96	*38	48	19	.24
F	<i>Phlox hoodii</i>	51	*34	24	16	.42
F	<i>Senecio multilobatus</i>	30	*6	13	3	.01
F	<i>Taraxacum officinale</i>	-	*10	-	6	.03
F	<i>Zigadenus paniculatus</i>	4	6	3	2	.01
Total for Forbs		387	382	194	185	4.52
B	<i>Amelanchier alnifolia</i>	2	5	1	2	1.06
B	<i>Artemisia frigida</i>	10	*-	4	-	.03
B	<i>Artemisia nova</i>	-	2	-	2	.66
B	<i>Artemisia tridentata vaseyana</i>	5	-	2	-	-
B	<i>Ceratoides lanata</i>	-	2	-	2	.01
B	<i>Cercocarpus montanus</i>	151	*115	63	47	21.65
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	1*	*12	1	8	.48
B	<i>Eriogonum microthecum</i>	15	*9	5	3	.12
B	<i>Gutierrezia sarothrae</i>	81	*26	34	11	.62
B	<i>Purshia tridentata</i>	-	3	-	1	.03
B	<i>Symphoricarpos oreophilus</i>	4	4	2	1	.15
B	<i>Tetradymia canescens</i>	7	*18	6	7	.81
Total for Browse		276	196	118	84	25.66

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

BASIC COVER --

Herd unit 8, Study no: 1

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	347	8.00	39.14
Rock	219	3.75	6.31
Pavement	266	18.50	13.45
Litter	388	57.00	47.96
Cryptograms	3	0	.00
Bare Ground	224	12.75	10.57

PELLET GROUP FREQUENCY --

Herd unit 8, Study no: 1

Type	Quadrat Frequency '95
Rabbit	1
Moose	4
Elk	40
Deer	20

BROWSE CHARACTERISTICS --

Herd unit 8, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	1	1	-	2	1	-	-	-	5	-	-	-	100	27	31	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	200		-			
<i>Artemisia frigida</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	3	1	-	2	-	-	-	-	-	6	-	-	-	120	3	8	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	140		-			
<i>Artemisia nova</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	3	1	-	-	-	-	-	-	-	4	-	-	-	80	8	15	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	120		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200	9 15	3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6 12	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	-			
												'95	0		-			
<i>Ceratoides lanata</i>																		
M	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	5 4	1	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40	6 4	2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	40		-			
<i>Cercocarpus montanus</i>																		
S	88	3	-	-	-	-	-	3	-	-	6	-	-	-	400		6	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	12	17	9	5	1	-	13	-	-	56	-	1	-	3800		57	
	95	41	15	-	3	-	-	-	-	-	59	-	-	-	1180		59	
M	88	-	12	25	-	1	-	-	-	-	37	-	-	1	2533	26 38	38	
	95	3	20	3	-	60	70	-	-	-	93	60	3	-	3120	43 61	156	
D	88	-	1	5	-	-	-	-	-	-	6	-	-	-	400		6	
	95	-	-	-	1	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	6733	Dec:	5%			
												'95	4320		0%			
<i>Chrysothamnus Greenei</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	88	1	-	-	3	-	-	-	-	-	4	-	-	-	266	10 11	4	
	95	31	-	-	2	-	-	-	-	-	33	-	-	-	660	9 12	33	
D	88	-	1	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Total Plants/Acre (excluding Dead & Seedlings)												'88	398	Dec:	16%			
												'95	820		0%			
<i>Eriogonum microthecum</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580	4 10	29	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	600		-			

A G E	YR	Form Class (No. of 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	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	120	-	-	10	-	-	-	-	-	130	-	-	-	8666	7 5	130	
	95	38	-	-	-	-	-	-	-	-	38	-	-	-	760	7 6	38	
D	88	-	-	-	1	-	-	-	-	-	-	-	-	66		1		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Total Plants/Acre (excluding Dead & Seedlings)												'88	9465	Dec:	0%			
												'95	780		0%			
<i>Purshia tridentata</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	1	-	-	-	-	-	-	-	1	-	-	20		1		
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Symphoricarpos oreophilus</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	3	-	-	1	-	-	-	-	-	4	-	-	80	8 21	4		
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	80		-			
<i>Tetradymia canescens</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	66		1		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	88	2	3	-	1	-	-	-	-	-	6	-	-	400		6		
	95	4	-	-	-	-	-	-	-	-	4	-	-	80		4		
M	88	3	-	-	2	-	-	2	-	-	6	-	1	466	7 7	7		
	95	51	2	-	7	-	-	-	-	-	60	-	-	1200	6 8	60		
Total Plants/Acre (excluding Dead & Seedlings)												'88	866	Dec:	-			
												'95	1280		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 8, Study no: 1

Species	Percent of Total	
	'88	'95
<i>Amelanchier alnifolia</i>	0	2
<i>Artemisia frigida</i>	0	2
<i>Artemisia nova</i>	0	1
<i>Artemisia tridentata</i> <i>vaseyana</i>	2	0
<i>Ceratoides lanata</i>	.37	.47
<i>Cercocarpus montanus</i>	38	51
<i>Chrysothamnus greenei</i>	0	.23
<i>Chrysothamnus</i> <i>viscidiflorus</i> <i>viscidiflorus</i>	2	10
<i>Eriogonum microthecum</i>	0	7
<i>Gutierrezia sarothrae</i>	53	9
<i>Purshia tridentata</i>	0	.23
<i>Symphoricarpos</i> <i>oreophilus</i>	0	.95
<i>Tetradymia canescens</i>	5	15

TREND STUDY 8-2-95(25-15)

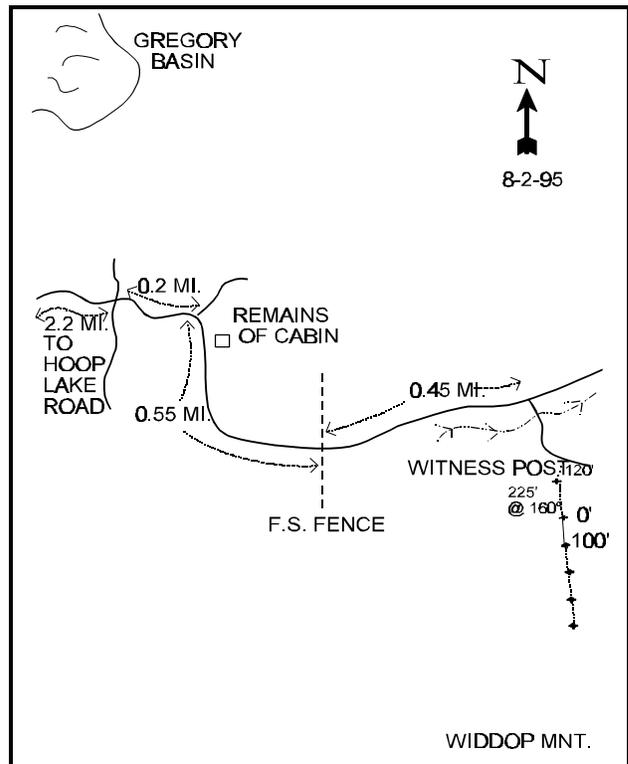
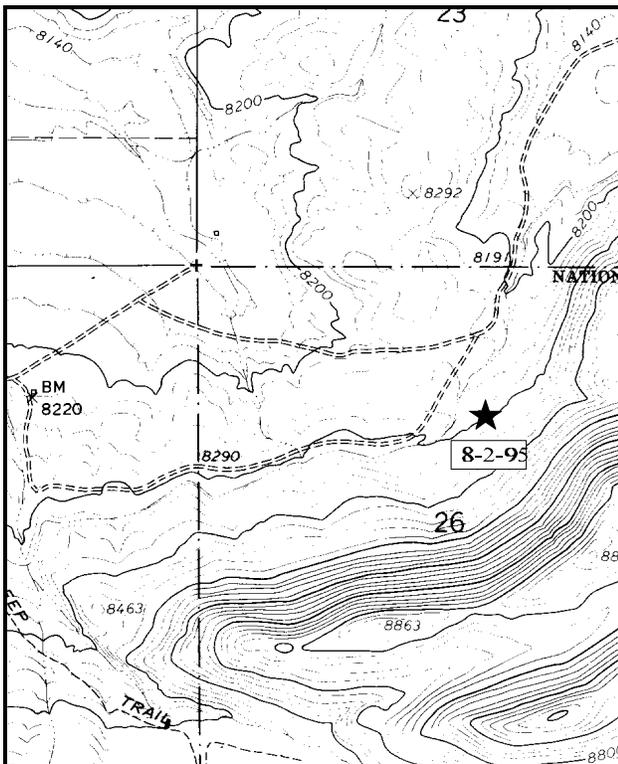
Study site name: Widdop Mountain North Slope . Range type: True Mtn Mahogany .

Compass bearing: frequency baseline 160 degrees.

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

LOCATION DESCRIPTION

Two miles south of the Wyoming-Utah state line, on the Hoop Lake Road along the Middle Fork of Beaver Creek, turn east towards Gregory Basin. Go .6 miles to a private property fence. Continue east 1.1 miles, past a cabin, to a fence. Go .1 miles to a fork, continue straight. Go .4 miles to an old 4-way intersection (A - see map). Continue straight east .2 miles to an old cabin, bear right. Proceed .55 miles to the FS boundary fence. Go along the bottom .45 miles to a faint fork. Bear right and go across the stream. Drive east .1 more mile towards the base of Widdop Mountain. On the south side of the road, look for a witness post in the sagebrush. The 0-foot baseline stake is 225 feet south (160°) the witness post.



Map Name: Hoop Lake

Diagrammatic Sketch

Township 3N , Range 16E , Section 26

UTM COOR. 5-76-322E 12 45-35-522N

## DISCUSSION

### Trend Study No. 8-2

Located on the opposite side of the mountain from the previous study #8-1, this study also samples a true mountain mahogany type. Although located on a northerly exposure, this hillside receives considerable use by elk in the winter. However, pellet-group frequency is half that of study 8-1. Excellent thermal and escape cover is provided by a nearby dense conifer stand. There is evidence of use by moose, and transitional use by deer. This Forest Service land is bordered by state and private lands, and is grazed by both cattle and sheep. On the study site, there is evidence of light to moderate cattle grazing pressure.

This site on Widdop Mountain faces to the northwest. It is very steep at the top, but more gentle towards the bottom where the study is located. The site has a slope of approximately 22% and an elevation of 8,300 feet.

Just below the study site, black sagebrush is more dominant on the more shallow soils. Under the mountain mahogany, the soil appears deeper, but more rocky. It is a fine-textured loamy soil. Litter and vegetative cover are more than adequate to minimize erosion.

The slope is dominated by true mountain mahogany, associated with snowberry, pockets of black sagebrush, and occasionally mountain big sagebrush and serviceberry. These secondary browse which comprise about 38% of the browse cover, only show light to moderately use. Population density of mountain mahogany was estimated at 24,332 plants/acre in 1988. Similar to site #1, the majority of the population consisted of young plants (89%) which became established during years of above average precipitation, but shortly afterward died during the extended drought. Mature plants numbered 2,066 plants/acre and averaged about two feet in height. Twelve percent of the population displayed heavy utilization with generally good vigor. During the 1995 reading, there were an estimated 6,880 plants/acre. The drop in density is from the great reduction in the number of young plants encountered. Seedlings also declined from 6,600 in 1988 to 2,440 by 1995, but is still high with a biotic potential of 35%. The number of mature plants have increased to 53%, but this can be attributed to the large losses to the young age class. The proportion of shrubs displaying heavy hedging have decreased from 65% down to 30%. Vigor is still good and percent decadency is very low at only 2%.

Grasses are diverse and abundant, accounting for nearly 13% cover. Needle-and-thread and bluebunch wheatgrass are the prominent understory bunch grasses. Since 1988, bluebunch wheatgrass has increased in nested frequency while needle-and-thread has declined. A sedge is also abundant and has increased significantly in nested frequency. Forbs are diverse on the site with 26 species encountered in 1995. The herbs combined account for 34% of the total vegetation cover. Desirable species include yellow Indian paintbrush, Lewis flax and low penstemon.

### 1995 TREND ASSESSMENT

Even with drought conditions, ground cover characteristics have improved on this site. Percent bare ground has declined from 12% to 6% and percent litter cover has remained steady at 57%. There is more than adequate ground cover to control erosion. Trend for soil is up. The browse trend is stable for most of the palatable species, especially so for the key species, true mountain mahogany. The large numbers of seedlings and young estimated in 1988 were likely inflated because due to above average precipitation in the mid 1980's in conjunction with the much smaller sample size used in 1988. The number of mature plants increased in 1995 and percent decadence remained low at two percent. The proportion of

mature plants displaying heavy hedging declined from 65% to 30%. The numbers of seedlings and young declined, but are still adequate to maintain the population.

Secondary browse species, serviceberry, black sagebrush, mountain big sagebrush and snowberry provide additional forage. These species generally display stable to improving trends with light to moderate use.

The herbaceous trend is mixed. Nested frequency of grasses has remained stable while nested frequency of forbs declined. This is a common trend during drought conditions. Combined nested frequency of grasses and forbs have declined slightly indicating a slightly downward trend.

TREND ASSESSMENT

soil - up

browse - stable to slightly improving

herbaceous understory - slightly down, mostly attributed to lower forb nested frequency values

VEGETATIVE TRENDS --  
Herd unit 8, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron spicatum	151	*154	55	61	2.74
G	Bromus inermis	-	3	-	2	.01
G	Carex spp.	59	*115	32	45	2.68
G	Koeleria cristata	-	*29	-	13	.16
G	Leucopoa kingii	26	*9	12	3	.04
G	Oryzopsis hymenoides	-	3	-	1	.15
G	Poa fendleriana	104	*17	42	7	.28
G	Poa secunda	-	*32	-	14	.14
G	Stipa comata	174	*148	63	53	6.46
Total for Grasses		514	510	204	199	12.68
F	Allium spp.	-	3	-	1	.00
F	Antennaria rosea	17	39	7	16	.25
F	Androsace septentrionalis	-	1	-	1	.00
F	Arabis spp.	33	*23	18	12	.08
F	Arenaria congesta	96	*101	42	44	1.25
F	Astragalus convallarius	-	3	-	1	.03
F	Astragalus spp.	17	*25	10	11	.20
F	Castilleja flava	21	10	12	7	.11
F	Carduus nutans	-	5	-	4	.02
F	Chenopodium leptophyllum	-	8	-	3	.01
F	Crepis acuminata	5	-	4	-	-
F	Cruciferae	2	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	<i>Cryptantha</i> spp.	4	-	2	-	-
F	<i>Erigeron eatonii</i>	90	*32	39	16	.08
F	<i>Eriogonum umbellatum</i>	24	25	12	12	.62
F	<i>Heuchera parvifolia</i>	8	1	5	1	.03
F	<i>Hymenoxys acaulis</i>	-	7	-	2	.03
F	<i>Lesquerella</i> spp.	46	*8	23	7	.03
F	<i>Linum lewisii</i>	2	10	1	5	.10
F	<i>Lupinus</i> spp.	21	*-	10	-	-
F	<i>Lychnis drummondii</i>	-	2	-	1	.00
F	<i>Machaeranthera canescens</i>	-	8	-	4	.19
F	<i>Penstemon humilis</i>	92	90	44	38	1.05
F	<i>Penstemon</i> spp.	-	3	-	1	.00
F	<i>Petradoria pumila</i>	3	-	3	-	-
F	<i>Phlox austromontana</i>	144	*133	57	57	3.98
F	<i>Phlox longifolia</i>	143	*75	55	36	.40
F	<i>Potentilla gracilis</i>	-	*21	-	11	.08
F	<i>Taraxacum officinale</i>	-	1	-	1	.00
F	<i>Zigadenus paniculatus</i>	36	32	17	19	.12
Total for Forbs		804	666	362	311	8.72
B	<i>Amelanchier utahensis</i>	10	16	4	7	1.14
B	<i>Artemisia nova</i>	28	28	14	15	1.20
B	<i>Artemisia tridentata vaseyana</i>	4	-	2	-	.41
B	<i>Cercocarpus montanus</i>	176	*158	71	66	19.55
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	72	*70	40	30	3.75
B	<i>Eriogonum microthecum</i>	77	*78	33	40	2.24
B	<i>Gutierrezia sarothrae</i>	43	*19	20	8	.11
B	<i>Mahonia repens</i>	1	-	1	-	-
B	<i>Quercus gambelii</i>	3	-	1	-	-
B	<i>Symphoricarpos oreophilus</i>	104	*148	50	57	13.37
B	<i>Tetradymia canescens</i>	9	12	5	7	.34
Total for Browse		527	529	241	230	42.15

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 8, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	359	12.75	53.54
Rock	159	2.75	2.89
Pavement	166	15.25	3.31
Litter	397	57.25	57.47
Cryptograms	25	0	.15
Bare Ground	205	12.00	6.32

PELLET GROUP FREQUENCY --

Herd unit 8, Study no: 2

Type	Quadrat Frequency '95
Moose	8
Elk	19
Deer	4

BROWSE CHARACTERISTICS --

Herd unit 8, Study no: 2

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier utahensis</i>																		
S	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	4	1	-	2	-	-	-	-	-	6	-	1	-	466		7	
	95	6	6	-	4	-	-	-	-	-	16	-	-	-	320		16	
M	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66	39	31	1
	95	-	1	-	4	6	2	-	-	-	13	-	-	-	300	39	42	15
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	1	-	-	1	-	-	-	1	-	-	1	40		2	
Total Plants/Acre (excluding Dead & Seedlings)											'88	598	Dec:	11%				
											'95	660		6%				
<i>Artemisia frigida</i>																		
M	88	3	-	-	1	-	-	-	-	-	3	-	1	-	266	5	4	4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)											'88	266	Dec:	-				
											'95	0		-				

A G E	YR	Form Class (No. of 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	19	-	-	-	-	-	-	-	-	19	-	-	-	1266		19	
	95	9	-	-	2	-	-	-	-	-	11	-	-	-	220		11	
Y	88	25	1	-	2	-	-	-	-	-	9	17	2	-	1866		28	
	95	7	4	-	3	-	-	-	-	-	14	-	-	-	280		14	
M	88	33	2	-	3	-	-	1	-	-	38	1	-	-	2600	10 7	39	
	95	35	20	1	13	-	-	-	-	-	69	-	-	-	1380	8 13	69	
D	88	12	1	-	-	-	-	-	-	-	11	-	2	-	866		13	
	95	3	-	-	1	-	-	-	-	-	3	-	-	1	80		4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
Total Plants/Acre (excluding Dead & Seedlings)											'88	5332	Dec:	16%				
											'95	1740		4%				
<i>Artemisia tridentata vaseyana</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	1	-	3	-	-	-	-	-	4	-	-	-	80	12 11	4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	80		-				
<i>Cercocarpus montanus</i>																		
S	88	36	-	2	47	-	-	14	-	-	98	-	1	-	6600		99	
	95	72	3	7	40	-	-	-	-	-	122	-	-	-	2440		122	
Y	88	146	59	22	45	1	-	52	-	-	323	-	2	-	21666		325	
	95	59	42	8	40	4	-	-	-	-	153	-	-	-	3060		153	
M	88	2	9	20	-	-	-	-	-	-	31	-	-	-	2066	25 18	31	
	95	3	18	21	15	93	34	-	-	-	184	-	-	-	3680	26 37	184	
D	88	3	3	2	-	-	-	1	-	-	8	-	1	-	600		9	
	95	-	-	-	-	4	3	-	-	-	6	-	-	1	140		7	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)											'88	24332	Dec:	2%				
											'95	6880		2%				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	88	31	1	-	1	-	-	-	-	-	28	1	4	-	2200		33	
	95	9	-	-	2	-	-	-	-	-	11	-	-	-	220		11	
M	88	21	-	-	2	-	-	4	-	-	27	-	-	-	1800	11 9	27	
	95	161	-	-	33	-	-	-	-	-	194	-	-	-	3880	13 15	194	
D	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)											'88	4066	Dec:	1%				
											'95	4100		0%				

A G E	YR	Form Class (No. of 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>Echinocactus</i> spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	4	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Eriogonum microthecum</i>																		
S	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	7	-	-	2	-	-	-	-	-	9	-	-	-	180			9
Y	88	55	-	-	7	-	-	1	-	-	37	-	25	1	4200			63
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	88	71	2	-	14	-	-	5	-	-	92	-	-	-	6133	6	7	92
	95	219	2	-	23	-	5	-	-	-	249	-	-	-	4980	8	11	249
D	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	10466	Dec:	1%			
												'95	5060		0%			
<i>Gutierrezia sarothrae</i>																		
S	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	23	-	-	1	-	-	-	-	-	24	-	-	-	1600			24
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
M	88	44	-	-	1	-	-	-	-	-	45	-	-	-	3000	5	3	45
	95	29	-	-	1	-	-	-	-	-	30	-	-	-	600	6	5	30
D	88	2	-	-	-	-	-	-	-	-	1	-	1	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	4733	Dec:	2%			
												'95	740		0%			
<i>Mahonia repens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	4	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
<i>Symphoricarpos oreophilus</i>																		
S	88	4	1	-	1	-	-	-	-	-	6	-	-	-	400			6
	95	4	-	-	5	-	-	-	-	-	9	-	-	-	180			9
Y	88	23	7	-	1	-	-	2	-	-	32	-	1	-	2200			33
	95	25	2	3	9	-	-	3	-	-	42	-	-	-	840			42
M	88	33	2	-	4	-	-	-	-	-	38	-	1	-	2600	11	10	39
	95	126	12	6	70	1	-	-	-	-	215	-	-	-	4300	12	31	215
D	88	12	-	3	2	-	-	-	-	-	14	-	-	3	1133			17
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	5933	Dec:	19%			
												'95	5140		0%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	-	-	-	-	-	-	-	-	-	4	-	-	4	
Y	88	25	1	-	-	-	-	-	-	-	-	-	-	26	-	-	26	
	95	6	-	-	-	-	-	-	-	-	-	-	-	6	-	-	6	
M	88	12	3	-	2	-	-	-	-	-	-	-	-	17	-	-	17	
	95	25	7	-	6	-	-	-	-	-	-	-	-	38	-	-	38	
D	88	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	2999	Dec:	4%			
												'95	880		0%			

PERCENT BROWSE COMPOSITION--  
Herd unit 8, Study no: 2

Species	Percent of Total	
	'88	'95
Amelanchier utahensis	1	3
Artemisia frigida	.45	0
Artemisia nova	9	7
Artemisia tridentata vaseyana	0	.31
Cercocarpus montanus	41	27
Chrysothamnus viscidiflorus viscidiflorus	7	16
Echinocactus spp.	0	0
Eriogonum microthecum	18	20
Gutierrezia sarothrae	8	3
Mahonia repens	0	.23
Symphoricarpos oreophilus	10	20
Tetradymia canescens	5	3

TREND STUDY 8-3-95(25-16)

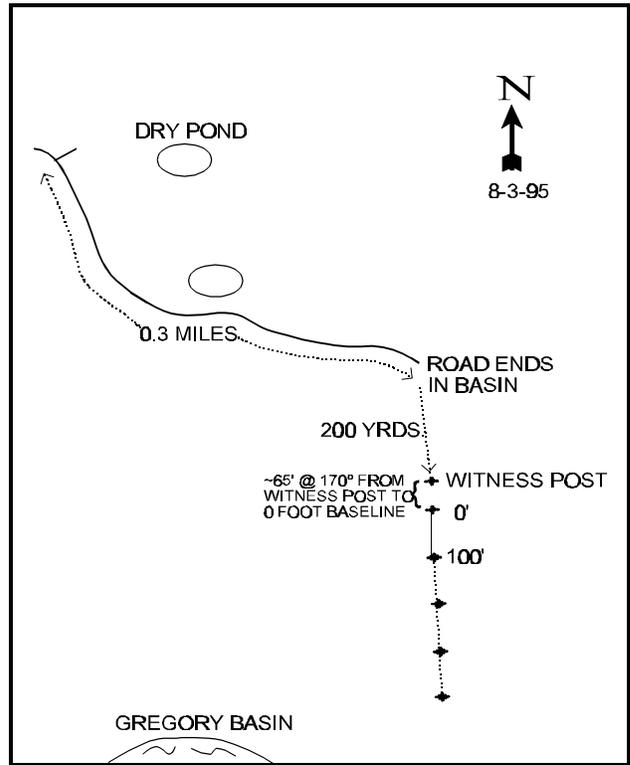
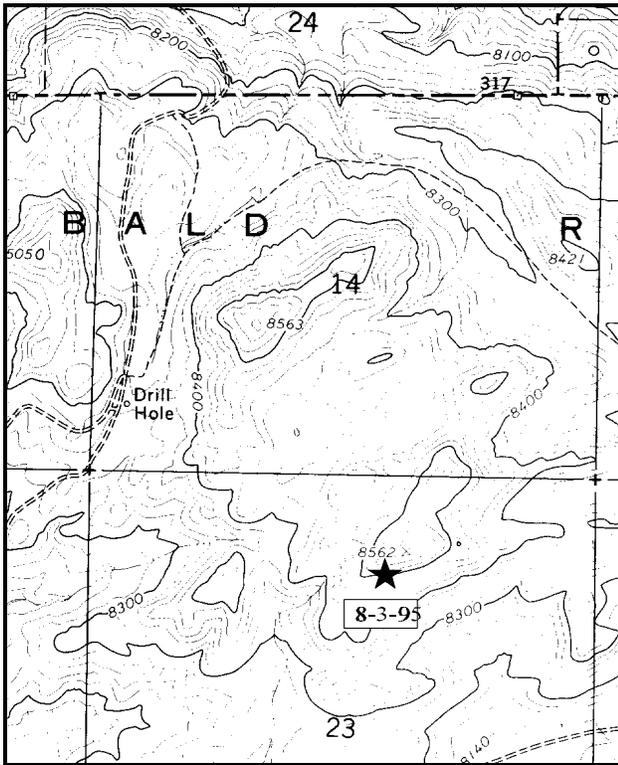
Study site name: Bald Range South. Range type: True Mtn Mahogany.

Compass bearing: frequency baseline 170 degrees.

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

LOCATION DESCRIPTION

From the Bald Range study #9-17-95, proceed southeasterly across the basin, past another dry pond, for about .3 miles to where the road ends. From the end of the road, walk about 200 yards up the ridge to the south (it is also possible to drive up) to the top. A witness post is located on the rocky top. The study is on the south-facing slope. It is 13 paces at 170 degrees true to the 0-foot baseline stake. Density plot #1 is 60 feet from the 0-foot baseline stake, bearing 80°. Both the frequency and density studies run southerly down the slope and are marked by 18 inch steel fenceposts.



Map Name: Hoop Lake

Diagrammatic Sketch

Township 3N, Range 16E, Section 23 UTM COOR. 5-76-311E 12 45-37-416N

## DISCUSSION

### Trend Study No. 8-3

The appropriately named Bald Range consists of low, rolling sagebrush/grass hills with patches of mountain brush mostly on south slopes. The open range, owned by the State of Utah, is mostly utilized by cattle and antelope. The mountain mahogany slopes also appear to be important to wintering elk. There was only light cattle use on the study site, which is located on a steep (42%), south-facing slope overlooking Gregory Basin. Elevation on the ridge, one of the highest in the range, is just over 8,500 feet.

The soil surface is extremely rocky. A large number of rocks occur with the soil profile, resulting in variable soil depth. Black sagebrush thrives on the more shallow soils. Vegetative and litter cover are generally good, but rock and smaller pavement fragments cover 36% of the surface. Total protective ground cover is good at 94%, leaving only six percent bare soil. Soil erosion is not currently a problem on this slope, yet soil movement down slope in the form of pedestaling on the uphill side of shrubs is evident due to the steep slope.

True mountain mahogany dominates the slopes and makes up 70% of the total browse cover. Estimated density was 7,066 plants/acre in 1988 and 5,740 in 1995. Sixty-six percent of the population consisted of young plants in 1988, a high proportion similar to many of the mahogany sites in the unit. Mature plants averaged just over two feet in height with 73% of them displaying heavy hedging in 1988. Vigor was good and percent decadency low at two percent. During the 1995 reading, there was an estimated 3,720 mature plants/acre, but now only 30% of them were classified as heavily hedged. The number of seedlings and young are lower than in 1988, but adequate to maintain the population. The population change is mostly due to the increased sample size and much better sampling distribution used in 1995 and a die off of the young young age class plants due to drought.

Other valuable browse include serviceberry, black sagebrush, and snowberry. Mature serviceberry average nearly three feet in height. These shrubs are lightly to moderately utilized. Patches of black sage are common and show more heavy use in 1995. Currently, 30% of the mature and decadent plants display heavy use. Percent decadency has declined from 31% to 14%. Snowberry accounts for 10% of the browse cover on the site. With the new larger sample used in 1995, more snowberry was picked up than during the previous reading. Currently there is an estimated 700, mostly mature plants/acre, 23% of which are heavily utilized.

Increasers have tough competition from the well-established grass understory. Bluebunch wheatgrass, Carex, and Sandberg bluegrass are common and vigorous. They have been lightly grazed by cattle. Forbs are diverse and moderately abundant, but contain few valuable forage species.

### 1995 TREND ASSESSMENT

Protective ground cover has increased slightly on the site from 93% to 94%. Litter cover has declined due to drought while rock and pavement cover have remained stable at 36%. Active erosion is not a problem on the site, but some down slope soil movement is evident and unavoidable on the site due to the steep slope. Trend for soil is currently stable. Trend for the key browse species, true mountain mahogany, is slightly up even with the decline in population density which is more of a reflection of a much larger sample size. The number of seedlings and young are lower, but still excellent and adequate to maintain the population. Percent decadency is less than one percent and the proportion of mature shrubs heavily hedged declined from 73% to 30%. Secondary browse species,

serviceberry, black sagebrush, and snowberry, all exhibit heavier use, yet exhibit stable population trends. Trends for perennial grasses and forbs are both down slightly due to reduced sum of nested frequencies. All grasses except Indian ricegrass and Sandberg bluegrass, declined in quadrat and nested frequency. Forbs are diverse and contain only a few useful species.

TREND ASSESSMENT

soil - stable

browse - slightly up

herbaceous understory - slightly down with continued drought

VEGETATIVE TRENDS --

Herd unit 8, Study no: 3

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron spicatum	271	*244	94	90	4.05
G	Carex spp.	133	*107	56	52	2.49
G	Koeleria cristata	20	*11	13	6	.25
G	Oryzopsis hymenoides	18	25	10	12	.53
G	Poa fendleriana	50	*6	21	4	.07
G	Poa secunda	67	*109	32	49	1.54
G	Stipa comata	3	2	2	1	.00
Total for Grasses		562	504	228	214	8.95
F	Arabis spp.	-	3	-	2	.01
F	Astragalus gilviflorus	-	*33	-	14	1.01
F	Aster spp.	-	*14	-	6	.62
F	Astragalus spp.	3	-	2	-	-
F	Carduus nutans	-	3	-	2	.01
F	Castilleja spp.	14	*-	5	-	-
F	Chenopodium leptophyllum	-	*9	-	4	.02
F	Cirsium spp.	27	15	11	8	.16
F	Cruciferae	7	-	4	-	-
F	Cryptantha spp.	1	*35	1	16	.16
F	Descurainia pinnata	-	165	-	63	1.03
F	Erigeron eatonii	7	-	3	-	-
F	Erigeron pumilus	27	*-	11	-	-
F	Hymenoxys acaulis	44	*16	22	8	.14
F	Hymenopappus filifolius	-	1	-	1	.03
F	Lesquerella alpina	88	*44	40	21	.10
F	Leucelene ericoides	-	*26	-	11	.13
F	Microsteris gracilis	-	20	-	6	.27
F	Penstemon humilis	114	*72	52	31	1.04

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Phlox hoodii	55	*96	25	34	1.25
F	Senecio multilobatus	4	-	1	-	-
F	Trifolium spp.	45	*-	18	-	-
F	Unknown forb-perennial	-	14	-	7	.11
F	Zigadenus paniculatus	85	*8	42	4	.02
Total for Forbs		521	574	237	238	6.15
B	Amelanchier alnifolia	3	6	3	3	1.92
B	Artemisia frigida	3	-	2	-	-
B	Artemisia nova	24	*33	12	14	1.76
B	Cercocarpus montanus	120	*110	53	47	15.09
B	Chrysothamnus viscidiflorus viscidiflorus	20	*10	8	5	.40
B	Eriogonum microthecum	15	*-	5	-	.04
B	Gutierrezia sarothrae	31	*-	16	-	-
B	Symphoricarpos oreophilus	27	*18	11	9	2.15
B	Tetradymia canescens	-	3	-	1	.15
Total for Browse		243	180	110	79	21.53

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

BASIC COVER --

Herd unit 8, Study no: 3

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	348	10.50	31.44
Rock	321	17.50	21.27
Pavement	290	18.75	14.93
Litter	388	45.75	35.20
Cryptograms	6	.25	.01
Bare Ground	241	7.25	5.98

PELLET GROUP FREQUENCY --

Herd unit 8, Study no: 3

Type	Quadrat Frequency '95
Rabbit	4
Elk	27
Deer	5

BROWSE CHARACTERISTICS --  
 Herd unit 8, Study no: 3

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	25	27	1
	95	-	-	1	10	2	2	-	-	-	15	-	-	-	300	31	45	15
D	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	132	Dec:	50%			
												'95	340		0%			
AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	7	1
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	8	4	2
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	-			
												'95	40		-			
<i>Artemisia nova</i>																		
Y	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	22	3	-	1	-	-	1	-	-	27	-	-	-	1800	9	11	27
	95	26	23	26	4	4	-	-	-	-	83	-	-	-	1660	7	14	83
D	88	9	4	-	1	-	-	-	-	-	14	-	-	-	933			14
	95	5	5	3	1	-	-	-	-	-	6	-	-	8	280			14
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	280			14
Total Plants/Acre (excluding Dead & Seedlings)												'88	2933	Dec:	31%			
												'95	1940		14%			
<i>Ceratoides lanata</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	4	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			

A G E	YR	Form Class (No. of 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>Cercocarpus montanus</i>																		
S	88	6	-	-	-	-	-	1	-	-	7	-	-	-	466		7	
	95	7	-	-	3	-	-	-	-	-	10	-	-	-	200		10	
Y	88	16	21	13	4	-	-	16	-	-	70	-	-	-	4666		70	
	95	32	30	24	12	1	-	-	-	-	99	-	-	-	1980		99	
M	88	1	8	24	-	-	-	-	-	-	33	-	-	-	2200	26	26	33
	95	-	26	18	5	100	37	-	-	-	183	-	3	-	3720	28	44	186
D	88	-	1	2	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	1	-	1	-	-	-	-	1	-	1	-	40		2	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	7066	Dec:	2%				
											'95	5740		0%				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	8	-	-	1	-	-	1	-	-	10	-	-	-	666	8	8	10
	95	29	1	-	-	-	-	-	-	-	30	-	-	-	600	8	11	30
Total Plants/Acre (excluding Dead & Seedlings)											'88	799	Dec:	-				
											'95	600		-				
<i>Eriogonum microthecum</i>																		
Y	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	10	-	-	-	-	-	-	-	-	9	-	1	-	666	6	7	10
	95	20	1	-	5	-	-	-	-	-	26	-	-	-	520	6	10	26
Total Plants/Acre (excluding Dead & Seedlings)											'88	732	Dec:	-				
											'95	540		-				
<i>Gutierrezia sarothrae</i>																		
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	14	1	-	-	-	-	-	-	-	15	-	-	-	1000	5	5	15
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	6	4
Total Plants/Acre (excluding Dead & Seedlings)											'88	1200	Dec:	-				
											'95	80		-				
<i>Symphoricarpos oreophilus</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	3	4	-	-	-	-	-	7	-	-	-	140		7	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	15	15	1
	95	2	3	5	18	-	-	-	-	-	26	-	2	-	560	9	23	28
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-				
											'95	700		-				

A G E	YR	Form Class (No. of 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	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Y	88	1	2	-	-	-	-	-	-	-	-	-	-	200		3		
	95	1	-	-	-	-	-	-	-	-	-	-	-	20		1		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	6	1	1	-	-	-	-	-	-	-	1	9	180	8	11	9	
Total Plants/Acre (excluding Dead & Seedlings)													'88	200	Dec:	-		
													'95	200		-		

PERCENT BROWSE COMPOSITION--  
Herd unit 8, Study no: 3

Species	Percent of Total	
	'88	'95
Amelanchier alnifolia	1	3
Artemisia frigida	2	.39
Artemisia nova	22	19
Ceratoides lanata	0	.19
Cercocarpus montanus	53	56
Chrysothamnus viscidiflorus viscidiflorus	6	6
Eriogonum microthecum	6	5
Gutierrezia sarothrae	9	.78
Symphoricarpos oreophilus	.50	7
Tetradymia canescens	2	2

TREND STUDY 8-4-95(25-17)

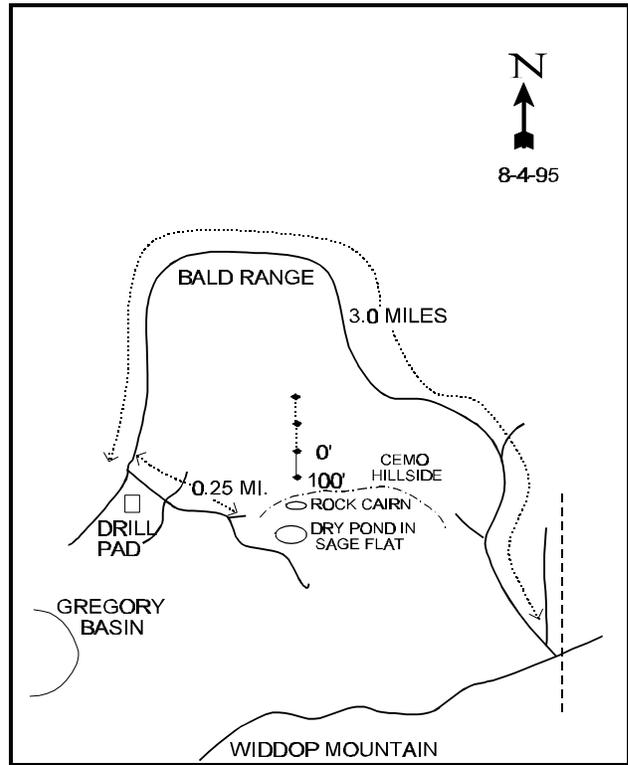
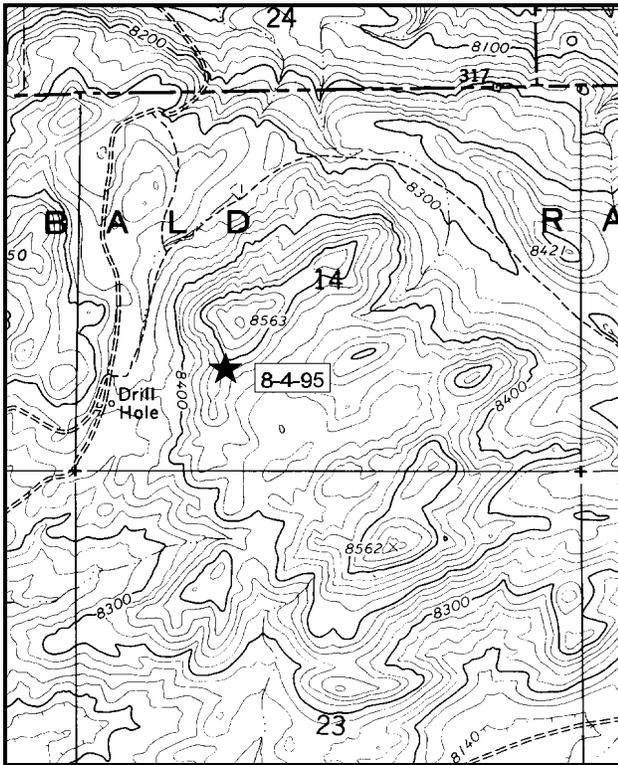
Study site name: Bald Range . Range type: True Mtn. Mahogany .

Compass bearing: frequency baseline 176 degrees.

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

LOCATION DESCRIPTION

From the Hoop Lake-Beaver Creek Road, turn off east towards Gregory Basin. Go .6 miles to a gate onto private land. Continue past the cabins for 1.1 miles to a fence. Go along a canal .5 miles to the 4-way intersection. Proceed east .7 miles to a cattleguard at the boundary, and .9 miles more to the eastern FS boundary fence. Continue 1.8 miles to another fence. Just on the west side of the fence, make a 45° turn to the left and follow the jeep road NW up the drainage about .5 miles to a fork at the top. Continue on the main jeep road 2.55 miles to an old drill pad. Just past the pad, turn left onto a faint road that goes east about .25 miles to the top of a ridge. From the ridge, walk about .1 miles along the edge of the sage and mahogany to a rock cairn. From there it is 13 paces north to the 100 foot baseline stake. The 0-foot baseline stake is marked by browse tag #9076.



Map Name: Hoop Lake

Diagrammatic Sketch

Township 3N , Range 16E , Section 14 UTM COOR. 5-75-833E 12 45-37-880N

## DISCUSSION

### Trend Study No. 8-4

This study is located one-half mile northwest of the Bald Range South study. It also samples a south-facing mountain mahogany slope. At the time the study was established, the area was exceptionally dry. Water often limits livestock grazing in the area. Cattle use this state land in spring, when the nearby stock ponds contain water. Elk sign is concentrated on the rocky, windswept ridges where they bed down. The mahogany type provides the bulk of the forage. There is little deer sign because the high elevation (8,470 feet) is not suited for deer winter range.

The slope is not as steep as the previous study site, however, it is still fairly steep at about 22%. The soil is moderately shallow and rocky. The sandy loam soil has a high percentage of coarse fragments on the surface and throughout the profile. The surface is loose and easily disturbed. Trampling can have deleterious effects, with recurrent open interspaces that lack litter and vegetative cover displaying moderate erosion. Rock and erosion pavement cover almost 24% of the ground surface. This site has a higher proportion of bare soil (13%) than other mountain mahogany sites in the area.

The true mountain mahogany on this site had a heavily hedged growth form, poor leader growth and fair seed production in 1988. Now, it shows a moderate growth form with average leader growth and seed production. Population density was estimated at 5,599 plants/acre in 1988 and 3,340 in 1995. A majority (54%) of the shrubs sampled in 1988 were young, 83% of the population displayed heavy use, and 17% were decadent. During the 1995 reading, percent decadency was estimated at less than 1% and heavy use was evident on only 31% of the shrubs. Nearly 20 percent of the mature mahogany were classified as chlorotic. Overall, vigor is poor on 14% of the population in 1995 compared to 5% in 1988.

Other desirable browse are limited to a few scattered serviceberry, a moderate population of black sagebrush, and a low number of snowberry. The population of black sagebrush did not show much evidence of use in 1988, but did demonstrate more moderate use in 1995. Percent decadency has decreased from 23% down to only 6% now. The large increase in the population estimate is because of the much larger sample size and better distribution of the samples implemented in 1995, giving a much better population estimate. Broom snakeweed was very common in 1988 and appeared to be increasing. This short lived shrub declined considerably during the following drought years and now has a population density of only 480 plants/acre which is 97% less than that found in 1988.

Grass composition is very similar to other mahogany sites on the unit. The dominant grasses include bluebunch wheatgrass, a Carex, and Indian ricegrass. Nested frequency of bluebunch wheatgrass and Carex increased significantly since 1988, while Indian ricegrass significantly declined. Forbs are diverse but like site #3, contain only a few useful species.

### 1995 TREND ASSESSMENT

Basic ground cover characteristics have improved slightly on the site. Protective ground cover has increased from 83% to 88%. Litter cover declined slightly which is typical for an extended drought. Trend for soil is considered currently stable. Trend for the key browse species, true mountain mahogany, is stable. Biotic potential has increased (# seedlings) while the number of young plants has declined, but is still adequate. The number of decadent mahogany has declined as well as the proportion of shrubs displaying heavy use, from 83% down to 31%. Secondary preferred browse species, black sagebrush, displays a stable population trend. Another positive factor is the significant decline in the population of

broom snakeweed. The herbaceous understory is very similar to other sites in the unit. Grass composition is good while forbs contain several low growing weedy species. Sum of nested frequency for grasses increased slightly, while sum of nested frequency for perennial forbs declined, but forbs only make up 28% of the herbaceous cover. Combined sum of nested frequency for grasses and forbs declined slightly, but not enough to suggest a downward trend. Currently trend for herbaceous understory is considered stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 8, Study no: 4

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	37	50	17	20	.44
G	Agropyron spicatum	158	*217	64	80	3.98
G	Carex spp.	94	*136	43	58	3.55
G	Koeleria cristata	54	*22	27	9	.22
G	Oryzopsis hymenoides	96	*65	40	33	1.89
G	Poa secunda	27	27	13	13	.21
G	Stipa comata	49	*27	23	13	.22
Total for Grasses		515	544	227	226	10.53
F	Antennaria rosea	13	8	5	4	.21
F	Arabis spp.	2	3	1	2	.01
F	Astragalus gilviflorus	-	*51	-	24	.64
F	Astragalus spp.	5	-	3	-	-
F	Carduus nutans	-	1	-	1	.00
F	Chenopodium leptophyllum	-	*10	-	5	.05
F	Cirsium spp.	26	*12	13	6	.11
F	Cryptantha spp.	-	1	-	1	.03
F	Descurainia pinnata	-	*78	-	31	.31
F	Eriogonum umbellatum	-	8	-	3	.09
F	Haplopappus acaulis	7	15	3	7	.37
F	Hymenoxys acaulis	-	6	-	3	.04
F	Ipomopsis aggregata	4	-	2	-	-
F	Lappula occidentalis	-	1	-	1	.00
F	Lesquerella alpina	45	*76	23	37	.23
F	Leucelene ericoides	-	1	-	1	.00
F	Lepidium spp.	-	3	-	1	.00
F	Lithospermum ruderales	-	6	-	3	.01

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Machaeranthera grindelioides	6	*6	3	4	.09
F	Penstemon humilis	150	*79	71	41	.50
F	Phlox hoodii	61	*75	24	32	1.21
F	Phlox longifolia	77	*-	32	-	-
F	Senecio multilobatus	3	-	1	-	-
F	Trifolium dasyphyllum	37	*-	16	-	-
F	Zigadenus paniculatus	65	*31	32	17	.16
Total for Forbs		501	471	229	224	4.11
B	Amelanchier alnifolia	1	-	1	-	-
B	Artemisia frigida	3	2	1	2	.03
B	Artemisia nova	34	*34	16	21	3.34
B	Cercocarpus montanus	95	*98	48	45	21.40
B	Chrysothamnus viscidiflorus viscidiflorus	14	*5	6	3	.54
B	Gutierrezia sarothrae	88	*8	40	6	.40
B	Symphoricarpos oreophilus	16	*18	9	8	.93
B	Tetradymia canescens	-	1	-	1	.18
Total for Browse		251	166	121	86	26.84

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 8, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	326	6.75	35.36
Rock	253	2.75	8.05
Pavement	291	27.50	15.50
Litter	385	46.00	39.70
Cryptograms	7	0	.21
Bare Ground	281	17.00	13.14

PELLET GROUP FREQUENCY --  
 Herd unit 8, Study no: 4

Type	Quadrat Frequency '95
Rabbit	1
Elk	21
Deer	8
Cattle	2

BROWSE CHARACTERISTICS --  
 Herd unit 8, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20	20	34	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Artemisia frigida</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	1	5	1
	95	2	-	-	3	-	-	-	-	-	5	-	-	-	100	2	5	5
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	100		-			
<i>Artemisia nova</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	88	5	-	-	1	-	-	1	-	-	7	-	-	-	466			7
	95	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200	9	8	3
	95	44	31	7	17	6	-	-	-	-	105	-	-	-	2100	8	14	105
D	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	95	6	1	-	-	1	-	-	-	-	3	-	-	5	160			8
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
Total Plants/Acre (excluding Dead & Seedlings)												'88	866	Dec:	23%			
												'95	2300		6%			

A G E	YR	Form Class (No. of 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>Cercocarpus montanus</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	4	-	-	12	-	-	-	-	-	16	-	-	-	320		16	
Y	88	15	26	5	-	-	-	-	-	-	46	-	-	-	3066		46	
	95	6	11	2	21	1	-	-	-	-	41	-	-	-	820		41	
M	88	-	4	19	-	-	-	-	-	-	23	-	-	-	1533	24	27	23
	95	-	9	1	-	77	38	-	-	-	97	4	24	-	2500	29	48	125
D	88	-	1	14	-	-	-	-	-	-	11	-	3	1	1000		15	
	95	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	5599	Dec:	17%				
											'95	3340		0%				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	4	-	-	-	-	-	1	-	-	5	-	-	-	333	7	10	5
	95	32	-	-	8	-	-	-	-	-	40	-	-	-	800	10	16	40
Total Plants/Acre (excluding Dead & Seedlings)											'88	666	Dec:	-				
											'95	800		-				
<i>Eriogonum microthecum</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40	8	14	2
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	40		-				
<i>Gutierrezia sarothrae</i>																		
Y	88	32	-	-	-	-	-	-	-	-	32	-	-	-	2133		32	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	256	-	-	-	-	-	-	-	-	256	-	-	-	17066	6	6	256
	95	22	-	-	-	-	-	-	-	-	22	-	-	-	440	5	6	22
Total Plants/Acre (excluding Dead & Seedlings)											'88	19199	Dec:	-				
											'95	480		-				
<i>Symphoricarpos oreophilus</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	88	1	2	-	-	-	-	-	-	-	3	-	-	-	200	10	15	3
	95	10	-	2	9	1	1	-	-	-	23	-	-	-	480	9	24	24
Total Plants/Acre (excluding Dead & Seedlings)											'88	200	Dec:	-				
											'95	580		-				

Tetradymia canescens																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133	9	6	2
	95	12	1	-	2	-	-	-	-	-	15	-	-	-	300	6	9	15
Total Plants/Acre (excluding Dead & Seedlings)													'88	199	Dec:	-		
													'95	300		-		

PERCENT BROWSE COMPOSITION--  
Herd unit 8, Study no: 4

Species	Percent of Total	
	'88	'95
Amelanchier alnifolia	0	.25
Artemisia frigida	.24	1
Artemisia nova	3	29
Cercocarpus montanus	21	42
Chrysothamnus viscidiflorus	2	10
Eriogonum microthecum	0	.50
Gutierrezia sarothrae	72	6
Symphoricarpos oreophilus	.74	7
Tetradymia canescens	.74	4

TREND STUDY 8-5-95(25-19)

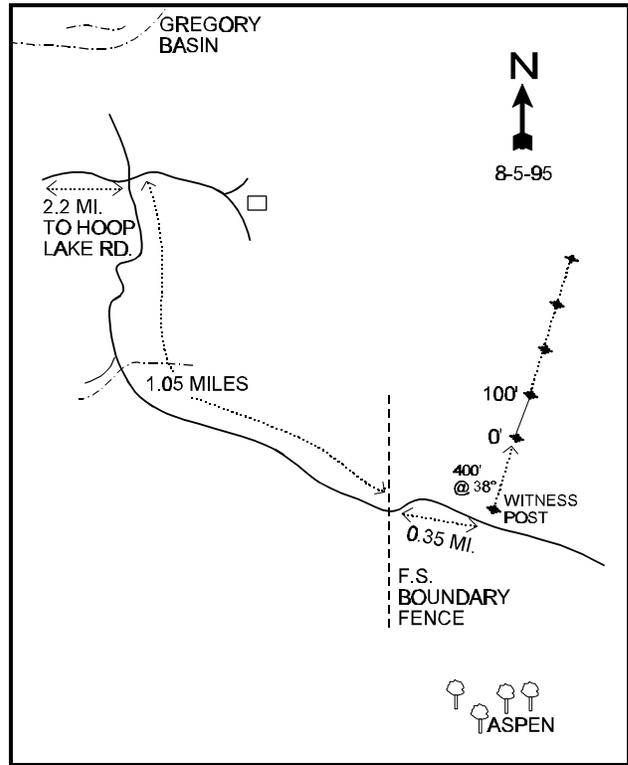
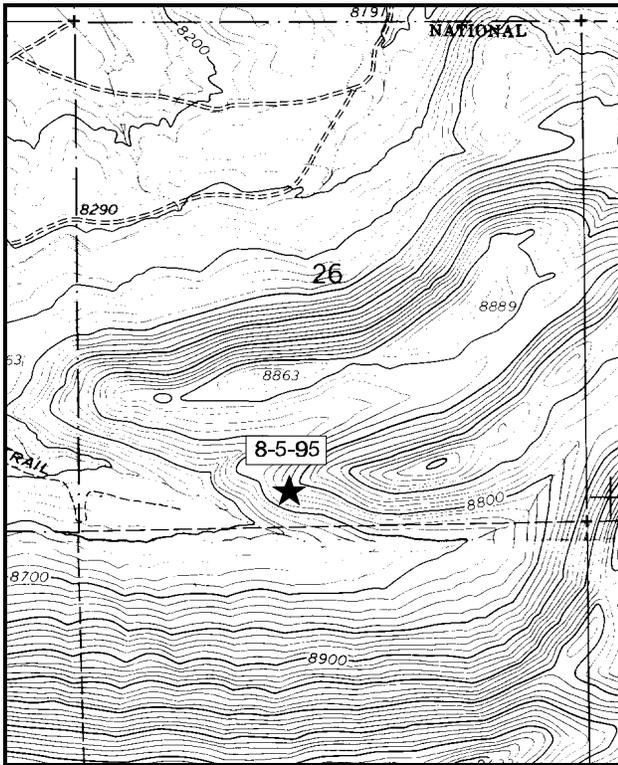
Study site name: Telephone Hollow . Range type: True Mtn. Mahogany .

Compass bearing: frequency baseline 218 degrees.

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

LOCATION DESCRIPTION

From the Hoop Lake Road along Beaver Creek, proceed east on the road to Gregory Basin. Go .6 miles to a gate at a private property line. Continue east 1.7 miles to the 4-way intersection described for study #9-15-95. Turn right and go .2 miles to a creek. Cross the creek and drive .85 miles to a gate at the FS boundary. Go through the gate and .35 miles to a witness post on the left side of the road. From the witness post, walk 84 paces NE (38/ true) to the 100-foot end of the baseline. There is a red browse tag, #7148, attached to the green fencepost marking the 0-foot end of the frequency baseline.



Map Name: Hoop Lake

Diagrammatic Sketch

Township 3N , Range 16E , Section 26

## DISCUSSION

### Trend Study No. 8-5

Telephone Hollow is located on the northeast side of Widdop Mountain, on land administered by the Forest Service. Access is through state and privately owned land. The study is located on the south-facing hillside with a slope of approximately 38% to 40% and an elevation of 8,750 feet. At this elevation, the valley is generally covered by snow through the winter and much of the spring. On the hillside, above the seeded hollow, the south slope is dominated by true mountain mahogany. These south slopes are important elk winter range and are also commonly used by moose and to a lesser extent deer. Cover is provided by conifer-aspen on the north-facing slopes. Cattle graze the area early in the season, mostly in the seeded hollow at the base of the slope.

The sandy loam soil appears moderately shallow and very rocky. The surface horizon is loose, but the layer six inches below the surface is compacted with more rock. Erosion pavement covers 21% of the surface with an additional 16% cover from rock which is all easily disturbed. There is a high erosion potential due to the slope and evidence of down slope soil movement (pedestaling and terracing). Percent litter cover is moderately low at only 30%, which occurs only within the vicinity of a plants protection. Rock provides most of the ground cover (almost 38%), leaving only about 7% of the surface as bare soil.

The key browse species is the abundant and vigorous true mountain mahogany. Population density was estimated at 7,266 plants/acre in 1988. Of that 1988 population, 55% were classified as young plants and mature plants numbered 3,133 plants/acre. During the 1995 reading the population was estimated at 6,200 plants/acre with mature plants numbering 4,360 plants/acre. Eighty-five percent of the mature mahogany were heavily hedged in 1988. By 1995, only 24% displayed that heavy of use. Although heavily hedged, the plants appear quite vigorous. Leader growth was good at 4 to 8 inches in 1995. Vigor was reduced on 42% of the mature mahogany due to insect damage from caterpillars.

Secondarily preferred browse include moderately low numbers of serviceberry and black sagebrush. In 1995, 42% of the black sagebrush displayed heavy use. By far the most numerous shrub is broom snakeweed which had an estimated density of 16,932 plants/acre in 1988. This short lived shrub declined by 89% by 1995 due in part to prolonged drought conditions.

The herbaceous understory on Telephone hollow is not as diverse or abundant as it is on the other mahogany sites in the unit. The common species include, bluebunch wheatgrass, a dry land sedge, needle-and-thread, and Indian ricegrass. Thirteen species of perennial forbs were identified on the study site in 1995, but none are very abundant.

### 1995 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1988 with the exception of a slight increase in bare ground (5% to 7%). Unlike some other sites, litter cover did not decline a great deal, because it was already low. Erosion potential on this site is high, but due to the well dispersed litter and herbaceous vegetation cover, it is not a serious problem. The only soil movement consists of the inevitable, gradual, down slope soil movement with the associated steep slope. Future increases in bare ground should be watched closely. Trend for soil would currently be slightly down, except that with the herbaceous understory having increased, it should be considered stable at this time. Trend for the dominant browse species, true mountain mahogany, is stable. There has been a slight population decline, with the number of mature plants increasing, percent decadency dropped, and the proportion of plants displaying heavy use has also declined.

Some of this decline can be credited to the much larger sample size and better distribution for sampling actually giving a much better estimate of the browse population. The proportion of seedlings and young have declined, yet are still more than adequate to maintain this moderately long-lived population of true mountain mahogany. Trend for herbaceous understory is slightly up. Sum nested frequency of grasses increased slightly with nested frequency of bluebunch and Carex increasing significantly. Nested frequency of forbs also increased.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly up

VEGETATIVE TRENDS --

Herd unit 8, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	-	4	-	2	.15
G	Agropyron spicatum	200	*215	82	85	4.35
G	Carex spp.	121	*162	54	69	2.70
G	Koeleria cristata	-	6	-	3	.06
G	Oryzopsis hymenoides	78	*67	36	31	1.71
G	Stipa comata	44	*10	20	4	.04
Total for Grasses		443	464	192	194	9.03
F	Arabis spp.	-	2	-	2	.01
F	Astragalus gilviflorus	-	*56	-	20	1.50
F	Chenopodium leptophyllum	-	*26	-	10	.05
F	Cirsium spp.	21	23	10	13	.39
F	Comandra pallida	2	15	2	7	.06
F	Cryptantha spp.	79	*91	40	39	.79
F	Hymenoxys acaulis	3	13	1	7	.03
F	Lesquerella alpina	13	*50	6	22	.13
F	Lithospermum incisum	19	12	9	8	.11
F	Linum lewisii	-	*10	-	4	.02
F	Machaeranthera grindelioides	34	*46	20	21	.26
F	Penstemon humilis	63	*91	32	45	.74
F	Phlox hoodii	61	*47	28	21	.50
F	Townsendia spp.	7	*-	4	-	-
F	Trifolium dasyphyllum	5	-	3	-	-
F	Zigadenus elegans	-	*13	-	7	.03
Total for Forbs		307	495	155	226	4.66

Type	Species	Nest Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
B	<i>Amelanchier alnifolia</i>	15	*-	7	-	-
B	<i>Artemisia frigida</i>	10	*5	7	3	.22
B	<i>Artemisia nova</i>	-	2	-	2	.05
B	<i>Cercocarpus montanus</i>	92	*105	40	51	19.10
B	<i>Eriogonum microthecum</i>	-	4	-	2	.36
B	<i>Gutierrezia sarothrae</i>	162	*52	68	26	.54
B	<i>Pinus flexilis</i>	1	-	1	-	-
B	<i>Tetradymia canescens</i>	7	*1	3	1	.03
Total for Browse		287	169	126	85	20.31

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

BASIC COVER --

Herd unit 8, Study no: 5

Cover Type	Nest Frequency '95	Average Cover %	
		'88	'95
Vegetation	332	9.25	32.12
Rock	308	8.00	16.22
Pavement	336	45.50	21.33
Litter	374	32.25	30.12
Cryptograms	8	0	.12
Bare Ground	261	5.00	7.17

PELLET GROUP FREQUENCY --

Herd unit 8, Study no: 5

Type	Quadrat Frequency '95
Moose	6
Elk	15
Deer	4

BROWSE CHARACTERISTICS --

Herd unit 8, Study no: 5

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
Y	88	-	1	-	-	-	-	1	-	-	2	-	-	-	133		2	
	95	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	20	39	1
	95	-	2	-	1	2	-	-	-	-	4	1	-	-	100	20	31	5
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:		-		
												'95	140			-		

A G E	YR	Form Class (No. of 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	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400	4	4	6
	95	16	-	-	8	-	-	-	-	-	24	-	-	-	480	4	7	24
Total Plants/Acre (excluding Dead & Seedlings)												'88	400	Dec:	-			
												'95	500		-			
<i>Artemisia nova</i>																		
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	7	8	1
	95	-	-	11	15	-	-	-	-	-	26	-	-	-	520	6	15	26
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	520		-			
<i>Ceratoides lanata</i>																		
Y	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	0		-			
<i>Cercocarpus montanus</i>																		
S	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	10	-	-	2	-	-	-	-	-	12	-	-	-	240			12
Y	88	34	17	8	-	-	-	1	-	-	60	-	-	-	4000			60
	95	17	51	14	5	3	-	-	-	-	90	-	-	-	1800			90
M	88	1	6	40	-	-	-	-	-	-	47	-	-	-	3133	25	23	47
	95	2	14	17	7	142	36	-	-	-	126	92	-	-	4360	21	36	218
D	88	-	1	1	-	-	-	-	-	-	1	-	1	-	133			2
	95	-	-	1	-	1	-	-	-	-	1	-	1	-	40			2
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
Total Plants/Acre (excluding Dead & Seedlings)												'88	7266	Dec:	1%			
												'95	6200		0%			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	8	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Eriogonum microthecum</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300	5	11	15
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	300		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	19	-	-	-	-	-	-	-	-	19	-	-	-	1266		19	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	88	231	-	-	-	-	-	-	-	-	231	-	-	-	15400	7 5	231	
	95	88	-	-	-	-	-	-	-	-	88	-	-	-	1760	5 6	88	
D	88	4	-	-	-	-	-	-	-	-	2	-	1	1	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	16932	Dec:	1%			
												'95	1940		0%			
<i>Pinus flexilis</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	0		-			
<i>Tetradymia canescens</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4 7	1	
	95	6	3	-	-	-	-	-	-	-	9	-	-	-	180	6 11	9	
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	-			
												'95	200		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 8, Study no: 5

Species	Percent of Total	
	'88	'95
<i>Amelanchier alnifolia</i>	.79	1
<i>Artemisia frigida</i>	2	5
<i>Artemisia nova</i>	.26	5
<i>Ceratoides lanata</i>	.26	0
<i>Cercocarpus montanus</i>	29	63
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	0	.20
<i>Eriogonum microthecum</i>	0	3
<i>Gutierrezia sarothrae</i>	67	20
<i>Pinus flexilis</i>	.26	0
<i>Tetradymia canescens</i>	.79	2

## SUMMARY

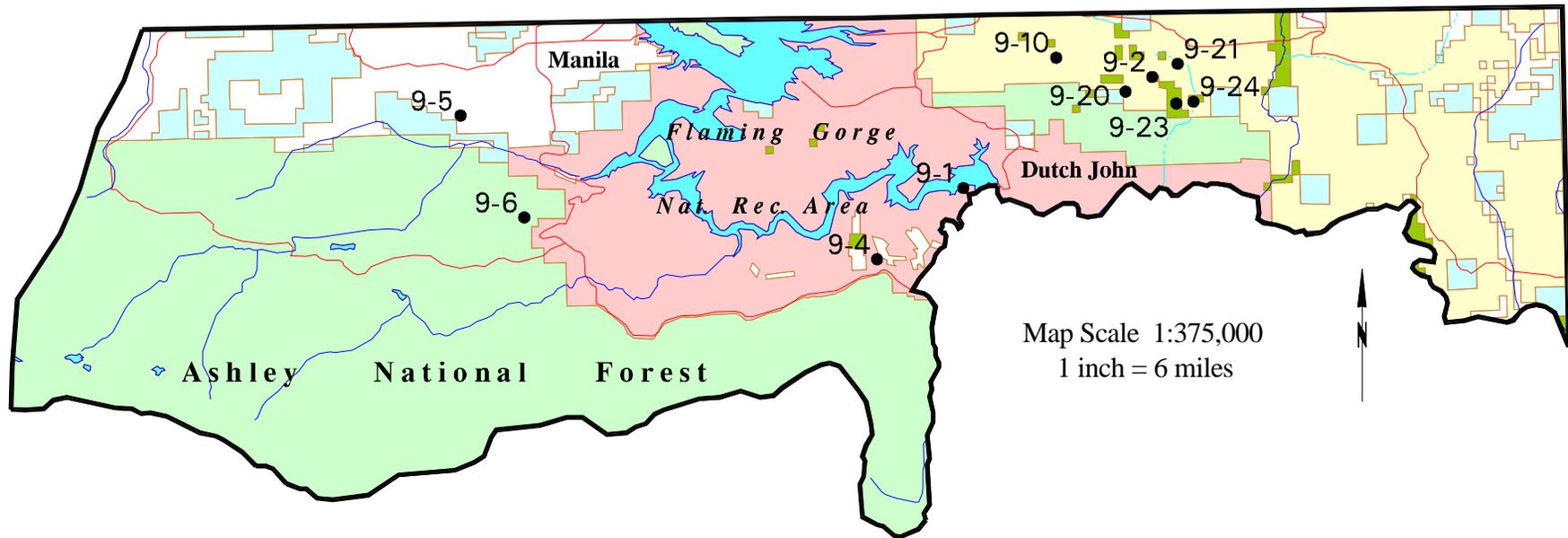
### DEER HERD UNIT - 8 NORTH SLOPE

The steep slopes on the study sites have a high erosion potential. However, the understory, especially the bunch grasses, are dense and vigorous and provide adequate soil stabilization. The site at Widdop Mountain, North Slope has an upward soil trend while all other sites (#1,#3,#4,#5) are stable.

Browse trends on the unit for the key browse species, true mountain mahogany, are stable to slightly up. All sites have reduced numbers of young plants and most have fewer seedlings compared to the 1988 reading. As mentioned previously, the large number of young plants likely became established during the unusually wet years of 1983 and 1984. The drought years that followed reduced the number of young plants on the sites to their current levels. Even with this decline, the number of mature plants either remained stable or increased. Percent decadency declined on most sites as did the proportion of plants displaying heavy hedging. Vigor is generally good.

Herbaceous understory trends are slightly down on Widdop Mountain, South Slope; Widdop Mountain, North Slope; and Bald Range, South. Site #4, Bald Range, exhibits a stable herbaceous trend while the Telephone hollow site shows an slightly upward trend.

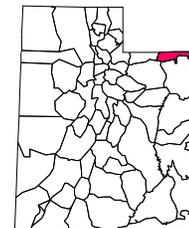
# Deer Management Unit 9 – 1995 Transect Locations



## LEGEND

 Forest Service	 Water Body
 BLM	 Transect Location
 State of Utah	 Road
 State Wildlife Res./Mgmt. Area	 Perennial Stream
 Private Land	 Intermittent Stream
 National Recreation Area	

## MAP LOCATION



## DEER HERD UNIT 9 - DAGGETT

### BOUNDARY DESCRIPTION

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

The above boundary description is reflected in the following acreage figures discussed in the text. Acreages first reported in the 1960 Big Game Range Inventory (Drobnick 1960) were reduced in later reports and now are estimated at 290,300 acres of normal winter range, with severe deer winter range being reduced to only 158,000 acres. These acreage figures normally include land below 8,000 feet in elevation for normal winter range, and below 7,000 feet for severe winter range. Combined big game winter range includes higher elevation areas accessible to elk. The winter range consists primarily of the following vegetative types: pinyon-juniper, mountain brush, and Wyoming big sagebrush. There are an estimated 336,700 acres of summer range in the unit. The summer range is made up primarily of aspen, lodgepole pine and mixed conifer, mountain big sagebrush-grass, and the higher mountain brush communities.

The majority of the deer winter range is on US Forest Service and BLM lands. The federal agencies manage 77% of the normal deer winter range. The State of Utah and the Division of Wildlife owns approximately 23,200 acres, or 8%. Privately owned lands comprise about 15% of the winter range, most notably bottomland in the Lucerne Valley around Manila. The land around Manila is under agricultural use and is not considered in the winter range figures. Elsewhere, privately owned land is used as rangeland for cattle, or for summer homes. Manila and Dutch John are the only towns in the unit. BLM lands are used primarily for cattle grazing, with oil and gas operations being the major activities in Clay Basin. Winter range on Forest Service land is mainly part of the Flaming Gorge National Recreation Area. Following construction of the Flaming Gorge dam, approximately 14,000 acres of deer winter range was flooded, but the reservoir does not appear to be a serious barrier to migration (Warren 1973). Concurrently, most livestock grazing was eliminated within the Green River corridor. The area is now managed for the recreation and electrical power generation associated with the reservoir.

Because the majority of the land within this herd unit is public, the Daggett unit did not rank high on the winter range acquisition list. However, a property boundary survey of DWR land including Red Creek and Goslin Mountain was ranked the top 1990 enhancement project. These areas were proposed for future fencing to protect the riparian areas and achieve better livestock management.

### Key Areas and Study Locations

Several important normal winter concentration areas were identified in the 1974 range inventory. They are Dowd, Bear, and Goslin Mountains; Dutch John Flat, Little Hole, Red Creek Flat, Taylor Flat, Death Valley, and Digger Basin. Even with very generous estimates, these areas provide only about 20% of the winter range, with all being under federal management. The DWR owns some critical lands in Browns Park (Taylor Flat and Red Creek) and on Goslin Mountain.

Several trend studies read in 1988 and 1995 were rereads of 1982 studies. Some of the key areas included Bear Mountain, Death Valley, Goslin Mountain, and Cedar Springs. A new study was established in 1988 on BLM land at Antelope Flat. Do to heavy livestock use of riparian areas on State land in the Goslin Mountain area, five new trend studies were established in 1995. Most of this heavy use was brought on by the extended drought and poor distribution of livestock. Two studies sample mountain big sagebrush-grass range and three sites monitor meadows which receive concentrated livestock and elk use.

The location of these study sites was determined by interagency personnel in Vernal in 1988 and for Goslin Mountain during an Interagency field trip in 1995.

#### Grazing Summary

Local BLM and Forest Service personnel have provided information on past and current livestock grazing programs. With heavy season-long grazing on the Forest in the first half of the 1900's, cattle grazing since then has been reduced and adjusted downward, in particular since construction of Flaming Gorge Reservoir. There is little cattle use permitted in the Flaming Gorge Recreation Area. Currently grazing takes place primarily along the southern boundary between the herd unit and Ashley National Forest. Cattle are in the Greendale area in summer, but currently stocking is light at 14 suitable acres/AUM. The Death Valley area in the Sheep Creek allotment is also lightly stocked. It is currently permitted for 173 cows with calves from June 1 to September 30. The sampled BLM grazing allotments are generally grazed by cattle in spring and/or summer. Antelope Flat is part of the Goslin Mountain allotment, and as part of the deferred rotation system is grazed either spring or fall. The higher country on Goslin Mountain, where DWR owns isolated parcels, is grazed from mid-July to early or mid-September. There are 1,591 AUMs permitted, but actual use is generally lower.

#### Herd Unit Management Objectives

Although management emphasis has changed since 1988, when trends were first read, deer herd unit 9 has been managed under several different harvest strategies. Between 1973 and 1985, the unit was buck only with limited antlerless hunts in 1983 and 1984. Starting in 1986, there was a three-point-or-better hunt in the Three-Corners area and a limited entry hunt west of the reservoir. These strategies hoped to achieve the management objective of reduced hunting pressure and an increase in the population of mature bucks. Bear Top Mountain has been closed to hunting since 1983 to protect the establishment of Rocky Mountain Bighorn sheep. The current annual harvest objective is 600 bucks. Harvests peaked in 1989 when 630 bucks were taken off the unit. Since then numbers have steadily declined to only 114 in 1993 and 158 in 1994.

The Daggett County area contains other important big game. It is part of elk units 9 and 10, the Three-Corners area is for limited entry bull, while the remainder is general season. There are three antelope hunts between the Three-Corners area and South Valley. Moose are hunted in the western portion of Daggett County.

With all these different big game species and hunting seasons, management in this unit has come to focus on habitat management. While there is a wide variety of habitat types and conditions, this particular report deals with key wintering areas of deer and elk. Objectives as stated in the Deer Herd Unit 9 Management Plan are to maintain or improve the present quality and quantity of winter range and to improve spring-fall range.

TREND STUDY 9-1-95

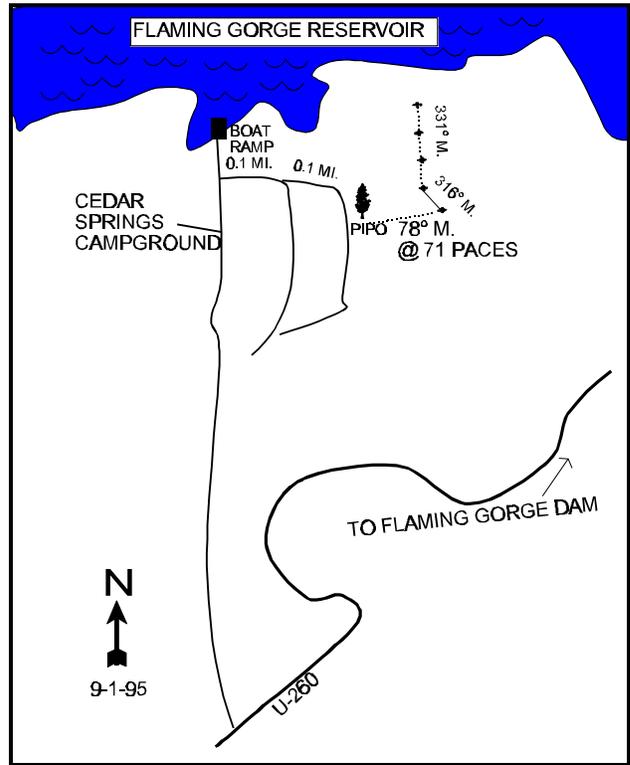
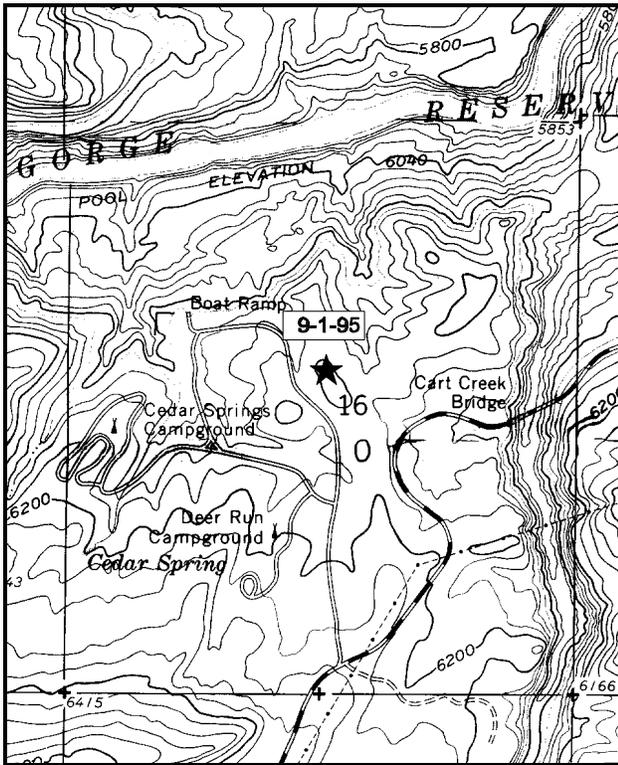
Study site name: Cedar Springs. Range type: Pinyon-Juniper.

Compass bearing: frequency baseline 331 degrees.

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

LOCATION DESCRIPTION

From the intersection of Highway U-260 and the road to Cedar Springs Campground, proceed north towards Cedar Springs Boat Ramp. Turn right (east) just before reaching the boat ramp. Go 0.10 miles to a dirt road on the left. Turn and travel 0.1 miles to a lone Ponderosa pine on the left side of the road. The 0-foot baseline stake is on top of the ridge, 71 paces away at a bearing of 93 degrees from the pine.



Map Name: Dutch John

Diagrammatic Sketch

Township 2N Range 22E, Section 16

GPS COOR. 6-31-153E 45-30-342N

## DISCUSSION

### Trend Study No. 9-1

This study is on deer winter range slightly east of Cedar Springs campground and Marina. It samples a pinyon-juniper type on essentially flat terrain with a slight northern aspect. The area is at the lower end of critical winter range south of Flaming Gorge Reservoir at an elevation of 6,050 feet. Use of the area by deer has been intense in the past and current pellet group data (1995) indicates moderate deer use with a quadrat frequency of 38%. Quadrat frequency for elk pellet groups is 14%.

Soils are sandy to gravelly in texture and moderately shallow. Erosion is apparent from the amount of bare ground, rock and erosion pavement on the surface. Total vegetative cover is only at 25%, with the herbaceous species only contributing 14% of the total. Most of the vegetation cover, 85% of the browse-tree cover, is from pinyon and juniper trees. As a result, plants are pedestaled and numerous small gullies originate on the small ridge top where the study is located.

Key browse on the site consists of mountain big sage brush with smaller amounts of antelope bitterbrush. Density of sagebrush was estimated at 2,366 plants/acre in 1982. Eighty percent of these plants were mature, 16% were decadent and only 3% were young. Poor vigor was noted in 12% of the mature plants and in 100% of the decadent individuals (33% dying). Utilization was heavy on 58% of the population. By 1988, density was essentially the same, but 90% of the sagebrush was classified as decadent with 31% of these displaying poor vigor. Utilization was again heavy with 63% of the shrubs sampled showing heavily use. During the 1995 reading, the sagebrush density was estimated at only 1,040 plants/acre. The drop in density came primarily from the decadent age class which declined from 2,133 to only 640 plants/acre. Of these, 81% were classified as dying. After the thinning of the population, most of the mature plants now show good vigor. Heavy use dropped to 31%.

Antelope bitterbrush is an important species yet it only occurs in small numbers. The population has steadily fallen from 700 plants/acre in 1982 to 266 in 1988 and 140 by 1995. Since 1988 the number of mature plants has remained nearly the same while all of the decadent plants seem to have died out. Heavy use has declined from a high of 90% in 1982 to 38% by 1988. Use was light to moderate in 1995 with no bitterbrush displaying heavy use.

The downward trends in bitterbrush and sagebrush can be attributed to heavy use combined with prolonged drought and the dominance of pinyon-juniper trees on the site. These trees were not counted in the shrub strips in 1995, but point-center quarter data taken during that year estimate 504 pinyon trees/acre and 121 juniper with an overhead canopy cover of 44%. These trees shade out understory plants and effectively tie up the water and mineral resources.

The herbaceous understory is poor with very low sum nested frequencies of both perennial grasses and forbs. All grasses combined provide only 2.5% cover. The most common species include bluebunch wheatgrass and cheatgrass brome. Forbs are diverse but combine for a total of barely one percent cover.

### 1982 APPARENT TREND ASSESSMENT

By almost any measure, range condition is down. Herbaceous vegetative cover is inadequate to hold the soil, and litter is ineffective. Utilization of browse, especially the key species, is heavy and vigor is poor with insufficient reproduction.

1988 TREND ASSESSMENT

Aside from small changes in each ground cover category, the percentage of total ground cover is similar. There is 28.5% bare soil. Soil pedestaling is evident on most plants. The 10% erosion pavement is related to past soil loss. Trend for soil is stable but poor condition. Trends for sagebrush and bitterbrush are both down due to heavy use, poor vigor, high decadency rates, and lack of reproduction. Trend for the herbaceous understory is slightly up due to an increase in the sum quadrat frequency of forbs. Frequency of grasses declined slightly. The understory is in extremely poor condition.

TREND ASSESSMENT

soil - stable, but poor condition

browse - down

herbaceous understory - slightly up for forbs, but still poor

1995 TREND ASSESSMENT

Trend for soil is slightly up due to a decrease in percent bare ground. However, condition is still poor and erosion is continuing. The browse trend is down due to heavy use, poor vigor, high decadency rates, almost no reproduction, a 44% decline in density of sagebrush and 53% decline in bitterbrush since 1988. The herbaceous understory is in very poor condition but shows a stable trend since the last reading.

TREND ASSESSMENT

soil - slightly up but in poor condition

browse - down

herbaceous understory - stable but in poor condition

VEGETATIVE TRENDS --

Herd unit 9, Study no: 1

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron spicatum	82	*69	45	34	31	.90
G	Bouteloua gracilis	-	*14	-	-	5	.22
G	Bromus tectorum	-	158	-	-	56	.80
G	Koeleria cristata	3	*9	2	3	5	.05
G	Oryzopsis hymenoides	2	-	-	1	-	-
G	Poa fendleriana	28	29	10	14	13	.45
G	Poa secunda	-	*8	-	-	4	.02
G	Sitanion hystrix	-	2	-	-	2	.03
G	Stipa comata	29	*2	15	14	2	.01
G	Vulpia octoflora	-	19	-	-	9	.04
Total for Grasses		144	310	72	66	127	2.54
F	Antennaria rosea	4	1	-	2	1	.03
F	Arabis spp.	26	*64	1	12	26	.16
F	Astragalus spp.	1	-	4	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Caulanthus crassicaulis</i>	-	1	-	-	1	.00
F	<i>Calochortus nuttallii</i>	-	2	1	-	2	.01
F	<i>Chaenactis douglasii</i>	1	*17	7	1	8	.06
F	Cruciferae	3	-	-	1	-	-
F	<i>Cryptantha</i> spp.	9	9	6	3	5	.02
F	<i>Descurainia pinnata</i>	-	64	-	-	25	.39
F	<i>Eriogonum alatum</i>	19	*5	12	9	3	.04
F	<i>Erigeron</i> spp	-	9	-	-	3	.01
F	<i>Haplopappus nuttallii</i>	-	-	5	-	-	-
F	<i>Heterotheca villosa</i>	12	*-	1	7	-	-
F	<i>Hymenopappus filifolius</i>	5	2	4	2	1	.00
F	<i>Leucelene ericoides</i>	2	-	-	1	-	-
F	<i>Lepidium</i> spp.	-	6	-	-	5	.02
F	<i>Lesquerella</i> spp.	10	*11	5	5	7	.03
F	<i>Linum kingii</i>	8	13	40	4	6	.03
F	<i>Machaeranthera grindelioides</i>	25	*9	-	13	6	.03
F	<i>Petradoria pumila</i>	8	*-	5	4	-	.00
F	<i>Polygonum douglasii</i>	-	2	-	-	1	.00
F	<i>Sphaeralcea coccinea</i>	27	*15	9	15	7	.11
F	<i>Tragopogon dubius</i>	-	3	-	-	1	.00
F	Unknown forb-perennial	2	4	-	2	3	.01
Total for Forbs		162	237	70	82	111	1.01
B	<i>Artemisia frigida</i>	9	*-	4	5	-	-
B	<i>Artemisia tridentata vaseyana</i>	49	*13	17	22	6	2.04
B	<i>Cercocarpus montanus</i>	2	4	-	1	2	.03
B	<i>Eriogonum microthecum</i>	2	-	1	2	-	-
B	<i>Gutierrezia sarothrae</i>	66	*15	14	31	7	.03
B	<i>Juniperus osteosperma</i>	3	5	1	1	2	4.88
B	<i>Opuntia</i> spp.	14	39	8	10	16	1.00
B	<i>Pinus edulis</i>	13	11	6	8	7	13.47
B	<i>Purshia tridentata</i>	3	-	5	2	-	-
Total for Browse		161	87	53	82	40	21.47

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

BASIC COVER --

Herd unit 9, Study no: 1

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	270	3.8	1.50	25.59
Rock	188	2.8	5.00	7.60
Pavement	186	12.5	10.00	6.09
Litter	391	46.8	50.75	47.84
Cryptograms	36	1.8	4.25	1.24
Bare Ground	225	32.50	28.50	15.51

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 1

Type	Quadrat Frequency '95
Rabbit	13
Elk	14
Deer	38

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia frigida																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	233	6	5	7
	95	6	-	-	1	-	-	-	-	-	7	-	-	-	140	17	12	7
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	399		8%			
												'95	140		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	88	1	3	1	-	-	-	-	-	-	5	-	-	-	166		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	28	29	-	-	-	-	-	-	46	-	7	-	1900	13	20	57
	88	-	1	1	-	-	-	-	-	-	2	-	-	-	66	7	10	2
	95	1	14	4	-	1	-	-	-	-	19	-	-	1	400	11	19	20
D	82	-	-	12	-	-	-	-	-	-	-	-	8	4	400		12	
	88	2	11	43	8	-	-	-	-	-	49	-	14	1	2133		64	
	95	2	16	11	-	2	1	-	-	-	6	-	-	26	640		32	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	440		22	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2366	Dec:	16%			
												'88	2365		90%			
												'95	1040		61%			
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	25	36	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	33		-			
												'95	0		-			
<i>Eriogonum microthecum</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33	4	5	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	6	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	33	Dec:	-			
												'88	0		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	31	-	-	-	-	-	-	-	-	31	-	-	-	1033		31	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	56	-	-	-	-	-	-	-	-	56	-	-	-	1866	8 10	56	
	88	105	-	-	-	-	-	-	-	-	105	-	-	-	3500	9 8	105	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	7 6	5	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1866	Dec:	0%			
												'88	4633		2%			
												'95	100		0%			
<i>Juniperus osteosperma</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33	37 43	1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	33	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	5	-	-	-	-	-	-	-	-	5	-	-	-	166	4 6	5	
	88	11	-	-	-	-	-	-	-	-	11	-	-	-	366	4 7	11	
	95	88	-	-	-	-	-	-	-	-	88	-	-	-	1760	8 25	88	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
Total Plants/Acre (excluding Dead & Seedlings)												'82	166	Dec:	0%			
												'88	532		0%			
												'95	1920		5%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Pinus edulis																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	88	13	-	-	-	-	-	-	-	-	13	-	-	-	433		13	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	9	1	-	-	-	-	-	-	-	8	-	2	-	333	18 15	10	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33	107 58	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	366	Dec:	-			
												'88	466		-			
												'95	0		-			
Purshia tridentata																		
M	82	-	2	10	-	-	-	-	-	-	12	-	-	-	400	10 18	12	
	88	1	-	3	-	-	-	-	-	-	4	-	-	-	133	11 14	4	
	95	3	4	-	-	-	-	-	-	-	7	-	-	-	140	9 23	7	
D	82	-	-	9	-	-	-	-	-	-	-	-	7	2	300		9	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	700	Dec:	42%			
												'88	266		50%			
												'95	140		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 1

Species	Percent of Total		
	'82	'88	'95
Artemisia frigida	0	5	4
Artemisia tridentata vaseyana	43	27	31
Cercocarpus montanus	0	0	.59
Chrysothamnus viscidiflorus viscidiflorus	0	.38	0
Eriogonum microthecum	.60	0	0
Gutierrezia sarothrae	34	53	3
Juniperus osteosperma	.60	0	0
Opuntia spp.	3	6	57
Pinus edulis	7	5	0
Purshia tridentata	13	3	4

TREND STUDY 9-2-95

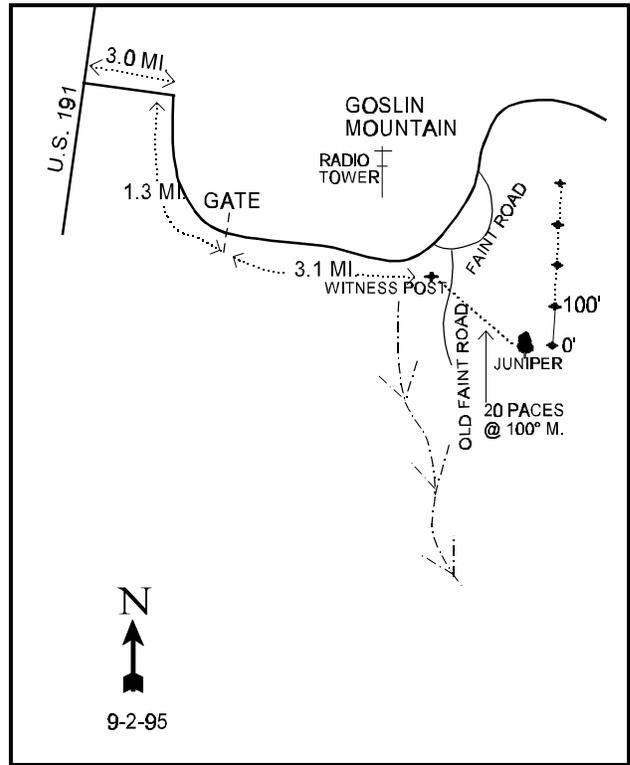
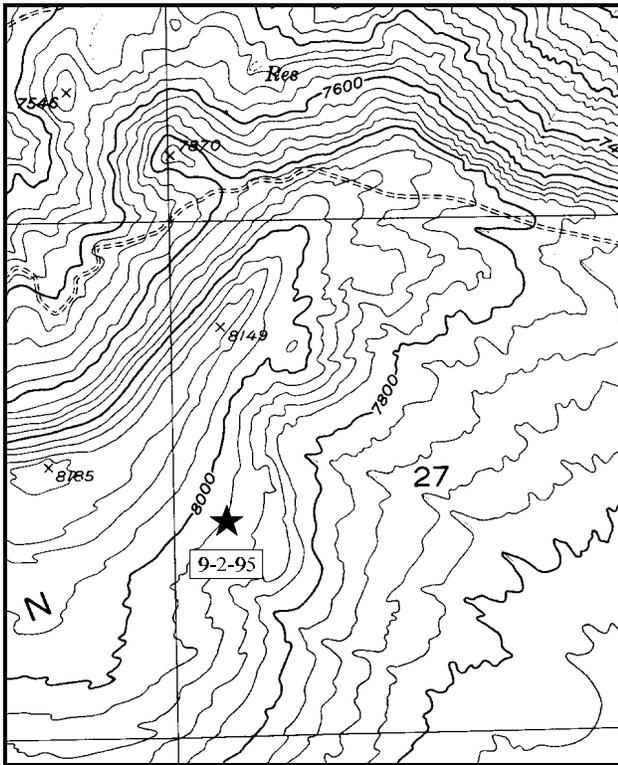
Study site name: Goslin Mountain . Range type: Big Sagebrush - Grass .

Compass bearing: frequency baseline 30 degrees.

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

LOCATION DESCRIPTION

From Dutch John, proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before the Wyoming border, turn east on the Antelope Flat Road towards Goslin Mountain. Go approximately three miles. Turn right towards Goslin Mountain, and go 1.3 miles to a gate. Continue up the mountain 3.1 miles to a turnoff to the left which goes to a radio tower. A little further down the main road there is a road to the right. Stop here and walk 20 paces down the right fork to a juniper on the left. The 0-foot baseline stake is located two paces east of the juniper.



Map Name: Goslin Mountain

Diagrammatic Sketch

Township 3N , Range 23E , Section 27

GPS COOR. 6-41-591E 12 45-36-479N

## DISCUSSION

### Trend study No 9-2

This trend study samples a mountain big sagebrush-grass site near the summit of Goslin Mountain at an elevation of 7,920 feet. Aspect is east, south-east with a gradual slope of 10% to 15%. Deer, elk and antelope utilize the site year-round with less use occurring during severe winters. Cattle grazing is permitted on the site as part of an allotment managed by the BLM. The area is also considered important habitat for sage grouse.

Soils are fairly shallow, coarse, rocky and well drained. Pavement and rocks are not abundant on the surface but occur throughout the profile. Litter cover is fairly high, ranging from just over 60% in 1982 to 51% in 1995. Percent cover of bare ground was fairly high in 1982 at almost 28%. Currently percent bare ground is only about 17%. Erosion potential is moderate and some soil movement is evident in the bare shrub interspaces.

The Key browse species on the site consists of a moderately dense stand of mountain big sagebrush. Density estimates ranged from a low of 2,332 plants/acre in 1982 to a high of 4,866 by 1988. Currently there are an estimated 2,480 plants/acre providing 13.5% cover on the site. The increased density in 1988 comes largely from the abundant young plants counted that year. Percent decadency was estimated at only 2% in 1982, increasing to 52% in 1988 and 33% by 1995. An estimate of the number of dead plants/acre was included in 1995 indicating that 1 in 3 sagebrush on the site were dead (800 plants/acre), a high proportion. The number of seedlings and young peaked in 1988. During the 1995 reading, no seedlings or young were encountered. Since 1982, vigor has declined while the proportion of plants heavily hedged has increased. Currently 44% of the decadent sagebrush display poor vigor and were classified as dying (>50% of crown dead). This would suggest that the population will continue to decline in density with prolonged drouth. This will eventually lead to a smaller, healthier population.

Other important browse on the site consist of serviceberry, bitterbrush, and snowberry. Bitterbrush, has a population which has ranged from 799 plants/acre in 1988 to 400 plants/acre in 1995. These prostrate formed shrubs display heavy use but good vigor. The proportion of plants heavily hedged (>60% of twigs browsed) has steadily decreased from 63% in 1982, 50% in 1988 and 45% in 1995. With no signs of decadence or dead plants, this decline would be more reflective of a considerably larger sampling design which will give much more accurate population estimates for shrubs which are discontinuous and/or clumped in their distribution.

The herbaceous understory is diverse and abundant making up 46% of the total vegetative cover. Grasses make up almost 70% of the understory cover. The dominant grasses on the site consist of needle-and-thread, oniongrass, letterman needlegrass, and thickspike wheatgrass. All of these grasses have steadily increased in nested frequency since 1982. It was reported in 1988 that the Poa's were identified to genus only because of the difficulty identifying grasses that year.

Forbs are also very diverse on the site but none are very abundant. Important species include silver lupine and low penstemon. Sum nested frequencies of perennial forbs have steadily increased since 1982.

#### 1982 APPARENT TREND ASSESSMENT

This site is basically stable. Soil loss is not currently a serious problem; however, roadways and vehicle tracks are a source of erosion. Off-road vehicle use should be discouraged if possible. The soil is fairly shallow and has a high erosion potential if disturbed. Shrubs, especially mountain big sagebrush, are the dominant species on the site and will continue to be so. The more preferred species, such as bitterbrush and serviceberry, are both heavily utilized and may eventually decline. Hopefully, ways can be found to prevent this or to encourage their expansion.

#### 1988 TREND ASSESSMENT

Ground cover is almost unchanged from 1982. There is an adequate litter cover (57.5%) and basal vegetative cover (12%). Although there is 9% bare ground and some soil movement does occur, especially along trails, the canopy and basal vegetative cover minimize the erosion hazard. Trend for the key browse species, mountain big sagebrush, is stable. Even though the population density has increased, percent decadence has also increased to 52%. The herbaceous understory trend is up due to an increase in the quadrat frequency of perennial grasses and forbs.

##### TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up

#### 1995 TREND ASSESSMENT

Ground cover characteristics have improved since 1988. Percent litter cover has declined due to prolonged drought, but percent bare ground has declined from 25% to 17%. The high nested frequency values of vegetation and litter also indicate well dispersed cover which protects the soil from serious erosion. The browse trend for mountain big sagebrush is mixed. Population density has declined from 4,866 plants/acre in 1988 to 2,480 by 1995. The proportion of plants displaying heavy use and poor vigor have both increased. In addition no seedlings or young plants were encountered in 1995. On the favorable side, percent decadency has declined from 52% to 33%. Trend is considered down at this time but by the time of the next reading this population will most likely be smaller but more healthy with the continuation of drought. Trend for the herbaceous understory is up with an increase in sum nested frequency of perennial grasses and forbs.

##### TREND ASSESSMENT

soil - slightly up

browse - down for mountain big sagebrush which makes up 61% of the browse cover

herbaceous understory - up

VEGETATIVE TRENDS --  
Herd unit 9, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	136	*144	58	51	58	1.06
G	Agropyron spicatum	-	*37	155	-	15	.42
G	Bouteloua gracilis	-	4	-	-	3	1.01
G	Bromus tectorum	-	2	-	-	1	.00
G	Carex spp.	22	*32	-	9	15	.88
G	Dactylis glomerata	-	1	-	-	1	.00
G	Koeleria cristata	11	*-	-	5	-	-
G	Leucopoa kingii	-	3	-	-	2	.06
G	Melica bulbosa	86	*102	50	33	43	2.94
G	Poa spp.	171	-	-	67	-	-
G	Poa bulbosa	-	3	-	-	1	.03
G	Poa fendleriana	-	38	-	-	16	.45
G	Poa pratensis	-	5	-	-	2	.06
G	Poa secunda	-	25	43	-	9	.09
G	Sitanion hystrix	63	*-	2	31	-	-
G	Stipa columbiana	-	*7	-	-	4	.07
G	Stipa comata	118	*190	27	51	62	4.46
G	Stipa lettermani	54	89	49	25	34	1.57
G	Stipa nelsonii	89	-	-	35	-	-
G	Unknown grass - perennial	14	-	-	5	-	-
Total for Grasses		764	682	244	312	266	13.12
F	Achillea millefolium	15	*-	3	7	-	-
F	Agoseris glauca	-	*53	-	-	26	.28
F	Allium spp.	21	*139	-	9	61	.81
F	Antennaria rosea	14	*3	1	7	1	.00
F	Arabis spp.	3	3	-	3	1	.00
F	Arenaria congesta	1	20	1	1	10	.20
F	Astragalus argophyllus	3	2	3	1	1	.00
F	Aster chilensis	16	16	-	7	7	.06
F	Astragalus spp.	-	3	-	-	1	.00
F	Chaenactis douglasii	-	3	-	-	1	.00
F	Collomia linearis	-	*151	-	-	61	.75
F	Collinsia parviflora	-	234	-	-	83	1.48
F	Crepis acuminata	3	5	-	1	4	.04
F	Cymopterus longipes	-	19	-	-	10	.05

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Delphinium bicolor</i>	-	1	-	-	1	.00
F	<i>Descurainia pinnata</i>	-	5	-	-	2	.01
F	<i>Erigeron eatonii</i>	-	7	-	-	2	.04
F	<i>Erigeron flagellaris</i>	94	*11	16	39	7	.06
F	<i>Eriogonum umbellatum</i>	46	*3	9	20	2	.02
F	<i>Gilia inconspicua</i>	-	4	-	-	1	.00
F	<i>Heterotheca villosa</i>	-	-	-	-	-	.03
F	<i>Lomatium</i> spp.	-	4	-	-	2	.01
F	<i>Lupinus argenteus</i>	35	44	4	17	21	.51
F	<i>Microsteris gracilis</i>	-	31	-	-	15	.15
F	<i>Penstemon humilis</i>	-	7	-	-	3	.16
F	<i>Phlox longifolia</i>	117	*73	-	51	32	.36
F	<i>Polygonum douglasii</i>	-	71	-	-	30	.17
F	<i>Senecio integerrimus</i>	-	*13	-	-	8	.09
F	<i>Senecio multilobatus</i>	-	4	-	-	2	.03
F	<i>Taraxacum officinale</i>	4	*36	-	2	15	.25
F	<i>Tragopogon dubius</i>	-	3	-	-	1	.00
F	<i>Trifolium gymnocarpon</i>	8	*57	18	4	25	.15
F	Unknown forb-perennial	33	-	-	19	-	-
F	<i>Zigadenus paniculatus</i>	8	*2	-	4	1	.00
Total for Forbs		421	1027	55	192	437	5.78
B	<i>Amelanchier alnifolia</i>	3	1	-	1	1	.30
B	<i>Artemisia tridentata</i> <i>vaseyana</i>	53	*36	27	25	18	13.53
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	8	*1	1	3	1	.42
B	<i>Eriogonum heracleoides</i>	-	67	-	-	31	3.26
B	<i>Gutierrezia sarothrae</i>	4	4	1	1	2	.15
B	<i>Mahonia repens</i>	3	13	1	2	4	.48
B	<i>Purshia tridentata</i>	9	7	1	4	4	3.13
B	<i>Symphoricarpos oreophilus</i>	1	11	-	1	5	.72
Total for Browse		81	140	31	37	66	22.01

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

BASIC COVER --

Herd unit 9, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	363	8.50	12.00	41.94
Rock	149	2.75	2.00	3.28
Pavement	107	0	3.00	.84
Litter	395	60.25	57.50	50.97
Cryptograms	13	1.00	.25	.10
Bare Ground	278	27.50	25.25	16.86

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 2

Type	Quadrat Frequency '95
Elk	3
Deer	7
Cattle	5

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Amelanchier alnifolia																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	2	-	-	-	-	3	-	-	-	60	17	37	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	1	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	80		25%			

A G E	YR	Form Class (No. of 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	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	10	-	-	1	-	-	-	-	-	11	-	-	-	733		11	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	88	14	1	-	-	-	-	-	-	-	15	-	-	-	1000		15	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	32	-	-	-	-	-	-	-	-	32	-	-	-	2133	27 33	32	
	88	8	12	-	-	-	-	-	-	-	20	-	-	-	1333	27 39	20	
	95	19	35	22	1	5	1	-	-	-	83	-	-	-	1660	51 59	83	
D	82	1	-	-	-	-	-	-	-	-	-	1	-	-	66		1	
	88	22	15	-	-	-	1	-	-	-	34	1	3	-	2533		38	
	95	5	19	11	-	6	-	-	-	-	23	-	-	18	820		41	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	800		40	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2332	Dec:	2%			
												'88	4866		52%			
												'95	2480		33%			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
M	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200	9 7	3	
	88	1	-	-	1	-	-	-	-	-	2	-	-	-	133	15 7	2	
	95	9	-	-	1	-	-	-	-	-	10	-	-	-	200	12 21	10	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	199		33%			
												'95	200		0%			
<i>Eriogonum heracleoides</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	24	-	-	-	-	-	-	-	-	24	-	-	-	480		24	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	125	-	-	-	-	-	-	-	-	125	-	-	-	2500	7 18	125	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	1	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	3000		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180	4	7	9
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	180		-			
<i>Mahonia repens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	20	4	-	2	-	-	3	-	-	29	-	-	-	1933			29
	95	50	-	-	-	-	-	-	-	-	50	-	-	-	1000			50
M	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600	5	4	9
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	95	-	-	-	-	-	-	-	-	95	-	-	-	1900	4	6	95
Total Plants/Acre (excluding Dead & Seedlings)												'82	600	Dec:	-			
												'88	1933		-			
												'95	2900		-			
<i>Purshia tridentata</i>																		
Y	82	-	1	1	-	-	-	-	-	-	1	1	-	-	133			2
	88	-	3	-	1	-	-	-	-	-	1	-	3	-	266			4
	95	1	1	-	1	-	-	-	-	-	3	-	-	-	60			3
M	82	1	1	4	-	-	-	-	-	-	4	1	-	-	400	11	21	6
	88	-	1	4	-	1	2	-	-	-	8	-	-	-	533	14	22	8
	95	-	4	7	-	4	2	-	-	-	17	-	-	-	340	13	45	17
Total Plants/Acre (excluding Dead & Seedlings)												'82	533	Dec:	-			
												'88	799		-			
												'95	400		-			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	8	-	-	5	-	-	-	-	-	13	-	-	-	260	15	41	13
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	400		-			

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 2

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	.82
<i>Artemisia tridentata</i> <i>vaseyana</i>	64	62	26
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	0	3	2
<i>Eriogonum heracleoides</i>	0	0	31
<i>Gutierrezia sarothrae</i>	0	0	2
<i>Mahonia repens</i>	16	25	30
<i>Purshia tridentata</i>	15	10	4
<i>Symphoricarpos oreophilus</i>	0	0	4

TREND STUDY 9-3-95

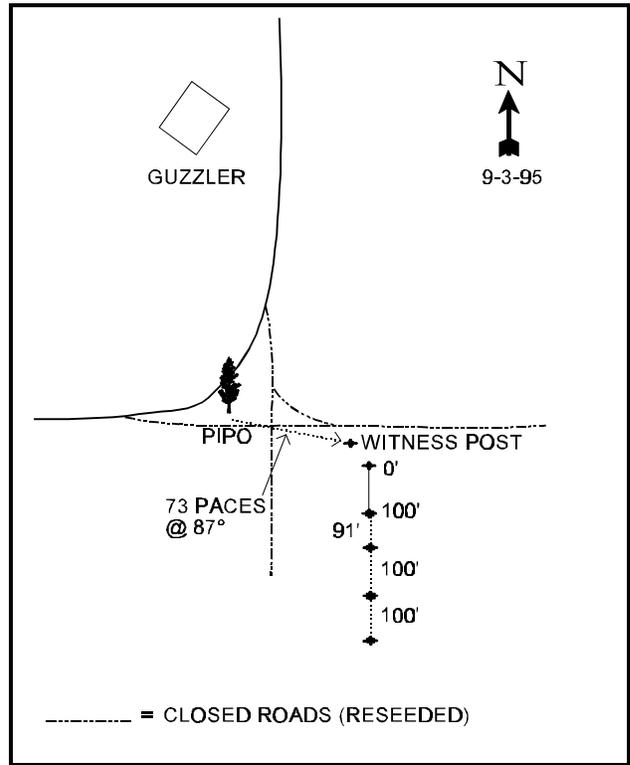
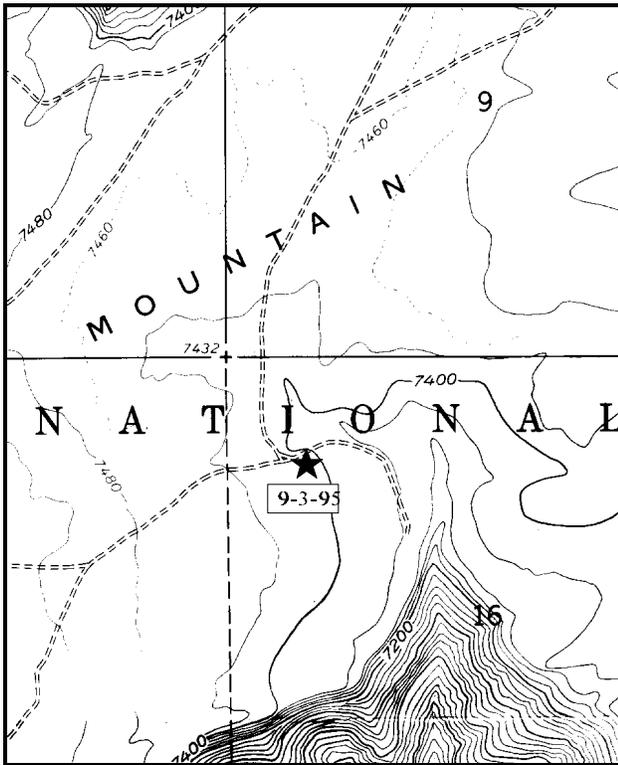
Study site name: Bear Top Mountain. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the intersection of Highway U-260 and U.S. 191 northwest of Dutch John, proceed west towards Antelope Flat campground for 3.60 miles. Turn left, and proceed on the dirt road towards Bear Top Mtn for .35 miles to a located gate. Go through the gate and continue .15 miles to a new fence. Continue up the mountain approximately 5.2 miles to where the road comes to a "T". From the intersection, the 0-foot baseline stake is 10 feet to the south. It is marked with a red browse tag #7095.



Map Name: Flaming Gorge

Diagrammatic Sketch

Township 2N, Range 21E, Section 16

## DISCUSSION

### Trend Study No. 9-3

This study is on Bear Top Mountain at an elevation of 7,400 feet. The area is classified as a sagebrush-grass type which demonstrates great diversity, not just in vegetative composition, but also in terms of wildlife use. Antelope, mule deer, elk, bighorn sheep, and sage grouse were observed in close proximity to the site. Rocky Mountain bighorn sheep were transplanted in the early 1980's and utilize the area as summer range. Two nearby guzzlers provide water for wildlife. Livestock have been excluded since the early 1960's. The site is on nearly level terrain which is within 1/4 mile of the cliffs overlooking Flaming Gorge Reservoir.

Vegetative and litter cover are excellent with percent bare ground declining from 26.5% in 1982 to 17% by 1995. Protective ground cover combined with the level terrain limit erosion.

The key browse species on the site consist of a moderately dense stand of mountain big sagebrush which currently makes up 81% of the browse cover. Other browse species include bitterbrush, mountain low rabbitbrush, gray horsebrush, and low numbers of broom snakeweed. Mountain big sagebrush cover was estimated at 19% in 1988 and 15% in 1995. Density has ranged from 9,065 plants/acre in 1988 to 5,200 in 1995. The number of young and decadent sagebrush have fluctuated over the past 13 years, but the number of mature plants have remained stable at around 4,000 individuals. Percent decadency is currently low at 10% with good vigor on all but 36% of the decadent shrubs which were classified as dying. Use was light to moderate in 1982 and 1988 but heavy in 1995 with 60% of the plants displaying heavy use (>60% of twigs browsed).

Antelope bitterbrush was picked up in the much larger sample used in 1995. There are currently 120 mature plants/acre, 50% of which are heavily hedged. Even at this moderately low density, bitterbrush makes up 14% of the total browse cover making it the second most productive browse. Mountain low rabbitbrush is fairly common but mostly unutilized. The change in density between 1988 and 1995 is primarily the result of the increased sample size which better estimates shrubs with clumped or discontinuous distributions.

Grasses and forbs are abundant and diverse. Ten perennial grasses were encountered in 1995 which provide 20% of the vegetation cover. The most numerous species include muttongrass, needle-and-thread, Sandberg bluegrass, and thickspike wheatgrass. Forbs provide 36% of the vegetative cover with 27 perennial and 7 annual species sampled in 1995. Sulfur eriogonum and silvery lupine are numerous and provide good forage for summering big game animals.

### 1982 APPARENT TREND ASSESSMENT

Based on the apparent trend evaluation, overall range trend is stable. Soil trend may even be improving as a result of level terrain and the withdrawal of livestock grazing. Vegetatively, the area supports a fair density of rather low-growing mountain big sagebrush but a strong grass understory may be equally dominant. At this point, it is difficult to judge which vegetative element is gaining the upper hand. Future readings of the study should provide some useful data in this regard.

### 1988 TEND ASSESSMENT

Basal vegetative cover has remained stable, but protective ground cover of litter and cryptogams has increased only slightly. Percent bare ground currently is at 19%. Due to the level terrain and abundant vegetation and litter cover, erosion

is not a problem. Trend for soil is slightly improved. The browse trend is up with an increase in population density of the key browse species, mountain big sagebrush. Percent decadency has increased but 28% of the population is young. The herbaceous trend is also up with an increase in the quadrat frequency of grasses and forbs.

TREND ASSESSMENT

soil - slightly up

browse - up

herbaceous understory - up

1995 TREND ASSESSMENT

Ground cover characteristics have changed somewhat since 1988. Percent cover of rock has increased while litter cover has declined. Much of this can be attributed to the prolonged drought we have been experiencing since the late 1980's. Percent bare ground has remained low and is currently at 17%. Trend for soil is considered stable. Trend for browse is also currently stable. The number of young and decadent plants have fluctuated considerably over the past readings, but the number of mature plants has remained constant at about 4,000 plants/acre. Percent decadency is currently low at 10% with vigor generally good. The only negative aspect is the high number of heavily hedged sagebrush (60%) and the number of decadent plants (560 plants/acre) in which 36% were classified as dying. Trend for the herbaceous understory is slightly down due to a decline in the sum of nested frequency for perennial grasses and forbs.

TREND ASSESSMENT

soil - stable

browse - stable to slightly down for sagebrush which makes up 81% of the total browse cover

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 9, Study no: 3

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	-	118	-	-	50	1.03
G	Agropyron spicatum	208	*77	20	78	31	.96
G	Bromus tectorum	-	26	-	-	13	.21
G	Carex spp.	72	*17	20	31	11	.15
G	Koeleria cristata	119	*13	33	53	8	.09
G	Poa fendleriana	111	*128	-	48	50	2.51
G	Poa secunda	166	*105	27	69	44	1.27
G	Sitanion hystrix	14	41	21	8	18	.45
G	Sporobolus cryptandrus	-	7	-	-	2	.15
G	Stipa comata	129	*82	29	58	36	1.50
G	Stipa lettermani	39	*-	7	15	-	-
Total for Grasses		858	614	157	360	263	8.36
F	Agoseris glauca	-	*27	-	-	11	.05

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Allium spp.	-	*10	-	-	6	.03
F	Antennaria rosea	-	*33	30	-	14	.77
F	Androsace septentrionalis	-	2	-	-	2	.01
F	Antennaria spp.	124	*8	29	51	3	.09
F	Arabis spp.	11	*3	1	5	1	.00
F	Arenaria congesta	7	*17	-	3	8	.23
F	Astragalus convallarius	7	14	3	4	5	.10
F	Aster spp.	-	*23	-	-	10	.12
F	Balsamorhiza sagittata	5	9	11	2	7	.69
F	Carduus nutans	-	3	-	-	1	.00
F	Comandra pallida	-	*13	9	-	6	.25
F	Collinsia parviflora	-	148	-	-	47	2.28
F	Crepis acuminata	-	*9	-	-	6	.03
F	Cymopterus spp.	-	1	-	-	1	.00
F	Draba spp.	-	12	-	-	5	.02
F	Erigeron flagellaris	-	2	-	-	1	.00
F	Erigeron spp	83	*20	30	40	10	.19
F	Eriogonum umbellatum	79	78	22	33	31	2.25
F	Gayophytum ramosissimum	-	8	-	-	4	.02
F	Gilia aggregata	-	-	1	-	-	-
F	Heterotheca villosa	31	*50	8	12	21	.83
F	Lepidium spp.	-	9	-	-	5	.02
F	Linum lewisii	38	*4	-	24	2	.01
F	Lithospermum ruderale	18	*4	-	7	2	.19
F	Lomatium spp.	-	*9	1	-	4	.04
F	Lupinus argenteus	176	*100	28	75	44	1.97
F	Machaeranthera canescens	7	*-	-	4	-	-
F	Orthocarpus tolmiei	-	35	-	-	15	.15
F	Penstemon spp.	11	*-	3	6	-	-
F	Petrorhiza pumila	7	*31	3	6	14	1.41
F	Phlox austromontana	-	*21	37	-	7	.68
F	Phlox longifolia	59	*3	-	25	2	.01
F	Phlox multiflora	66	*45	-	28	16	1.62
F	Polygonum douglasii	-	60	-	-	27	.13
F	Sedum lanceolatum	76	*100	16	36	40	.42

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Trifolium gymnocarpon	18	16	24	9	7	.03
F	Zigadenus spp.	4	-	-	2	-	-
Total for Forbs		827	927	255	372	385	14.75
B	Artemisia tridentata vaseyana	142	*70	41	66	37	14.65
B	Chrysothamnus viscidiflorus lanceolatus	40	*26	23	21	12	.75
B	Echinocactus spp.	3	6	1	2	2	.01
B	Gutierrezia sarothrae	2	-	-	2	-	-
B	Juniperus osteosperma	-	-	-	-	-	.15
B	Leptodactylon spp.	4	-	3	2	-	-
B	Purshia tridentata	1	5	2	1	3	2.59
B	Tetradymia canescens	-	-	2	-	-	.03
Total for Browse		192	107	72	94	54	18.19

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

BASIC COVER --

Herd unit 9, Study no: 3

Cover Type	Nested Frequency	Average Cover %		
		'95	'82	'88
Vegetation	362	12.00	12.00	38.31
Rock	118	1.00	4.75	11.07
Pavement	26	0	0	.04
Litter	386	58.25	59.75	46.33
Cryptograms	140	2.25	4.50	3.25
Bare Ground	259	26.50	19.00	16.85

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 3

Type	Quadrat Frequency
	'95
Rabbit	3
Elk	7
Deer	16

BROWSE CHARACTERISTICS --  
Herd unit 9, Study no: 3

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	21	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	82	20	3	-	-	-	-	-	-	-	23	-	-	-	1533			23
	88	25	13	-	-	-	-	-	-	-	36	-	2	-	2533			38
	95	2	9	21	-	-	-	-	-	-	31	-	-	1	640			32
M	82	49	14	-	-	-	-	-	-	-	63	-	-	-	4200	15	24	63
	88	33	31	-	-	-	-	-	-	-	64	-	-	-	4266	16	18	64
	95	15	46	114	-	21	4	-	-	-	200	-	-	-	4000	15	29	200
D	82	4	3	1	-	-	-	-	-	-	6	-	2	-	533			8
	88	19	13	2	-	-	-	-	-	-	33	-	1	-	2266			34
	95	-	4	14	-	7	3	-	-	-	18	-	-	10	560			28
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	380			19
Total Plants/Acre (excluding Dead & Seedlings)												'82	6266	Dec:	8%			
												'88	9065		24%			
												'95	5200		10%			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	16	-	-	-	-	-	-	-	-	16	-	-	-	1066			16
	88	26	2	-	2	-	-	-	-	-	29	-	1	-	2000			30
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
M	82	13	-	-	-	-	-	-	-	-	13	-	-	-	866	8	12	13
	88	14	-	-	3	-	-	-	-	-	14	-	3	-	1133	9	11	17
	95	40	-	-	4	-	-	-	-	-	44	-	-	-	880	10	15	44
D	82	6	-	-	-	-	-	-	-	-	-	-	6	-	400			6
	88	3	2	1	-	-	-	-	-	-	5	-	1	-	400			6
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	2332	Dec:	17%			
												'88	3533		11%			
												'95	940		2%			

A G E	YR	Form Class (No. of 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>Echinocactus</i> spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200	2	3	10
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	220		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	6	1
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	4	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	60		-			
<i>Purshia tridentata</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	2	3	-	-	-	-	-	-	6	-	-	-	120	20	78	6
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	120		-			
<i>Tetradymia canescens</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	17	8	1
	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133	13	18	2
	95	4	-	-	1	-	-	-	-	-	5	-	-	-	100	10	13	5
D	82	2	-	-	-	-	-	-	-	-	-	-	2	-	133			2
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	199	Dec:	66%			
												'88	133		0%			
												'95	120		16%			

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 3

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	71	71	78
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	27	28	14
<i>Echinocactus</i> spp.	0	0	3
<i>Gutierrezia sarothrae</i>	0	.52	.90
<i>Purshia tridentata</i>	0	0	2
<i>Tetradymia canescens</i>	2	1	2

TREND STUDY 9-4-95

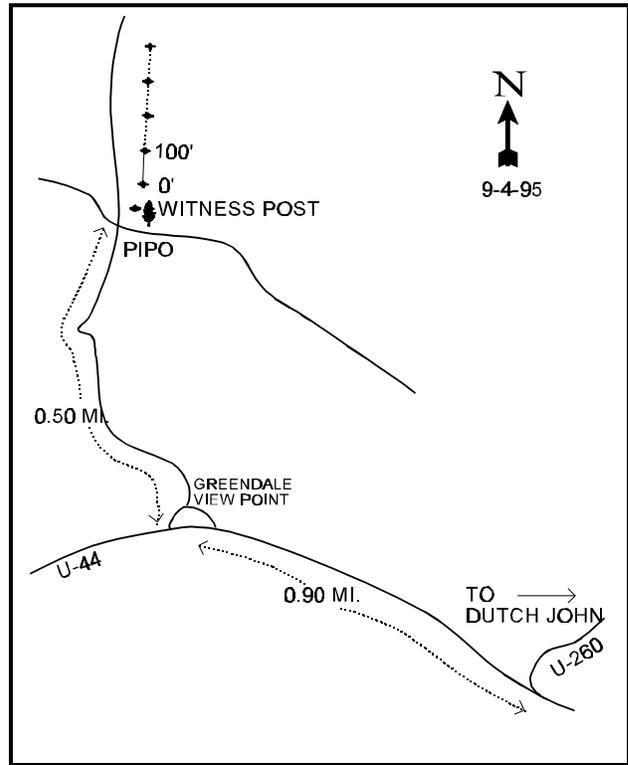
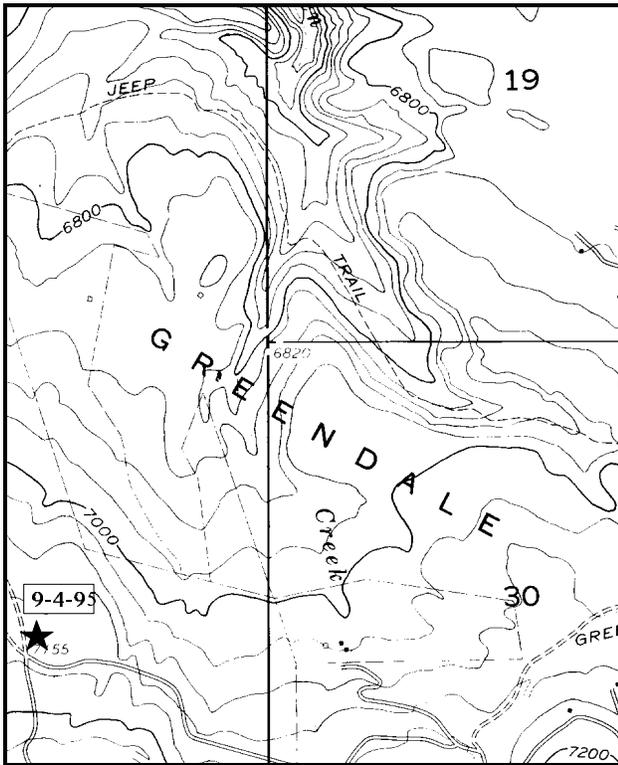
Study site name: Greendale. Range type: Sagebrush - Grass.

Compass bearing: frequency baseline 2 degrees.

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

LOCATION DESCRIPTION

From the junction of Highways U-44 and U.S. 191, proceed towards Manila for 0.9 miles. Turn off at the Greendale view point. Take the dirt road to the north which goes to the Canyon Rim trail. Go 0.5 miles to an intersection. From the Ponderosa pine northeast of the intersection, the 0-foot baseline stake is 21 paces away bearing 26 degrees.



Map Name: Dutch John

Diagrammatic Sketch

Township 2N, Range 21E, Section 25 GPS COOR. 6-26-379E 45-26-413N

## DISCUSSION

### Trend Study No.9-4

The Greendale study samples a sagebrush/grass park surrounded by montane forest at 7,100 feet in elevation. The area is classified as deer and elk winter range, but depending on the weather, actually receives year-round use by big game. The Forest Service allotment is grazed by cattle in the summer.

The site is nearly level (0-5%) with a slight north aspect. The soil is rocky throughout the profile with small amounts of rock on the surface. Erosion is currently not a problem due to the gentle terrain and excellent vegetation and litter cover (47% and 55% respectively).

The key browse species on the site consist of mountain big sagebrush, Martin ceanothus, and antelope bitterbrush. Sagebrush is more numerous with an estimated density of 1,733 plants/acre in 1982, 4,400 in 1988 and 4,440 in 1995. It also contributes the most cover of any of the browse species, 53% of the total browse cover. Average cover was reported at 13% in 1988 and 14% in 1995. Percent decadency has declined from 19% in 1982 to only 5% in 1995. Vigor is good and use has generally been light to moderate. Use was heavier in 1995 when 20% of the sagebrush was heavily hedged.

Martin ceanothus contributes 25% of the total browse cover, second only to mountain big sagebrush, even though its density is only 780 plants/acre. It is a young population with no decadency or dead plants. It is a short statured plant that has a crown of over 4 feet and capable of producing good quantities of forage in the winter if the snows are not deep. The increase in density for this species since 1982 is more reflective of the larger sampling design than reproductive potential. The new sampling design gives much better population estimates for species with discontinuous and/or clumped distributions.

Bitterbrush currently produces 15% of the total browse cover with a density of 1,240 plants/acre. Density estimates show a 44% decline in bitterbrush since 1988. Since only 40 dead plants/acre were encountered in 1995, this change in density is more reflective of the much larger sample taken that year and not a major decline in bitterbrush. Vigor has been reduced in the past but is currently good. Use was heavier during the 1982 (14%) and 1988 (27%) readings. Currently only 8% of the bitterbrush display heavy hedging.

Other browse growing on the site include mountain low rabbitbrush, snakeweed, Oregon grape, woods rose, and snowberry. These species show little or no utilization.

The herbaceous understory is diverse and abundant with grasses and forbs combining to produce 50% of the total vegetative cover. Grasses provide 13.3% cover with 10 grasses and one sedge sampled in 1995. The dominant grass by far is Kentucky bluegrass which provides 77% of the total grass cover. It forms a dense sod over much of the area, to the exclusion of other native grass and forb species. All other grass species produce less than 1% cover.

Forbs are diverse and produce as much cover as the grasses with 32 perennial and 4 annual species encountered in 1995. The most numerous perennial forbs include arrowleaf balsamroot, pussytoes, and rock goldenrod. Two annual forbs, slenderleaf collomia and littleflower collinsia are abundant and combine to produce 34% of the total forb cover.

1982 APPARENT TREND ASSESSMENT

Soil trend is stable with little evidence of extensive soil movement. The vegetative cover is irregular and somewhat unevenly spaced but quite dense where it occurs. Vegetative trend is also stable, although open to more question. Shrub density could be better, especially among the more preferred species which show relatively heavy levels of use. Undesirable shrubs are not currently abundant and show few signs of rapid increase. Grasses and forbs are fairly dense and may inhibit, to some extent, shrub reproduction.

1988 TREND ASSESSMENT

While vegetative and litter cover remain excellent, providing adequate ground cover, yet the data shows an increase in the proportion of pavement and rock cover. As a result, bare soil decreased from 36% to 25%. Aside from rather significant soil loss from the roads and a nearby large gully, soil erosion is not a problem on the well-vegetated study site. Trend for soil is slightly improved. The browse trend is also up for the preferred species, mountain big sagebrush and bitterbrush. Densities have increased, decadency rates are low, vigor is generally good and reproduction is excellent. Trend for the herbaceous understory is up with an increase in the quadrat frequency of grasses and forbs.

TREND ASSESSMENT

soil - slightly up  
browse - up  
herbaceous understory - up

1995 TREND ASSESSMENT

Ground cover characteristics continue to improve with percent bare ground declining from 25% to 17%. Litter cover has also increased slightly. Herbaceous plants make up 50% of the vegetation cover further protecting the soil from erosion. The browse trend is improving for mountain big sagebrush due to increased density, good vigor, low percent decadency and good recruitment. Trend for bitterbrush is slightly up due to reduced heavy use, good vigor, and a reduced percent decadency. Overall, trend for browse is up. Trend for the herbaceous understory is also up due to a large increase in sum nested frequency of perennial grasses and forbs.

TREND ASSESSMENT

soil - up  
browse - up  
herbaceous understory - up

VEGETATIVE TRENDS --  
Herd unit 9, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	37	*110	-	21	37	.88
G	Agropyron spicatum	-	4	-	-	2	.03
G	Agropyron trichophorum	-	-	4	-	-	-
G	Bromus tectorum	-	5	-	-	2	.15
G	Carex spp.	20	*17	4	11	7	.08

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Dactylis glomerata</i>	-	*25	-	-	10	.07
G	<i>Elymus junceus</i>	-	-	1	-	-	-
G	<i>Koeleria cristata</i>	18	18	-	9	8	.11
G	<i>Poa fendleriana</i>	-	*28	-	-	11	.25
G	<i>Poa pratensis</i>	303	*287	-	98	91	10.21
G	<i>Poa secunda</i>	8	*33	44	5	13	.26
G	<i>Sitanion hystrix</i>	54	*40	21	27	17	.28
G	<i>Stipa comata</i>	36	*82	19	19	35	.97
G	<i>Stipa lettermani</i>	1	-	10	1	-	-
Total for Grasses		477	649	98	191	233	13.33
F	<i>Achillea millefolium</i>	-	1	-	-	1	.00
F	<i>Agoseris glauca</i>	-	*27	-	-	13	.09
F	<i>Allium</i> spp.	-	*46	26	-	22	.18
F	<i>Antennaria rosea</i>	6	37	-	3	14	1.11
F	<i>Arabis</i> spp.	-	5	-	-	2	.01
F	<i>Aster</i> spp.	4	24	1	2	8	.26
F	<i>Balsamorhiza sagittata</i>	8	*57	2	4	29	3.67
F	<i>Carduus nutans</i>	-	7	2	-	3	.01
F	<i>Castilleja</i> spp.	-	1	-	-	1	.00
F	<i>Collomia linearis</i>	-	195	-	-	71	1.56
F	<i>Comandra pallida</i>	54	72	18	22	30	.39
F	<i>Collinsia parviflora</i>	-	255	-	-	81	2.95
F	<i>Cymopterus longipes</i>	8	7	-	3	3	.01
F	<i>Eriogonum alatum</i>	45	*6	11	21	3	.07
F	<i>Erigeron divergens</i>	28	*-	-	12	-	-
F	<i>Erigeron flagellaris</i>	-	3	-	-	1	.03
F	<i>Erigeron</i> spp	12	11	2	5	5	.02
F	<i>Eriogonum umbellatum</i>	6	6	4	3	2	.03
F	<i>Gayophytum ramosissimum</i>	-	2	-	-	1	.00
F	<i>Gilia aggregata</i>	-	-	3	-	-	-
F	<i>Heterotheca villosa</i>	110	*39	45	46	17	.29
F	<i>Ipomopsis aggregata</i>	-	-	-	-	-	.00
F	<i>Lepidium</i> spp.	-	5	-	-	2	.01
F	<i>Linum lewisii</i>	40	35	20	19	16	.10
F	<i>Lithospermum ruderales</i>	-	2	-	-	1	.03
F	<i>Lomatium</i> spp.	-	*6	-	-	4	.02
F	<i>Lupinus</i> spp.	1	-	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Lychnis drummondii</i>	-	-	3	-	-	-
F	<i>Oenothera pallida</i>	26	*6	-	11	2	.01
F	<i>Penstemon humilis</i>	2	*18	3	2	8	.14
F	<i>Petradoria pumila</i>	40	*27	19	19	14	.92
F	<i>Phlox austromontana</i>	-	8	-	-	5	.51
F	<i>Phlox longifolia</i>	-	7	-	-	3	.01
F	<i>Phlox spp.</i>	-	21	-	-	7	.03
F	<i>Polygonum douglasii</i>	-	51	-	-	24	.19
F	<i>Sedum lanceolatum</i>	23	*13	-	11	5	.02
F	<i>Solidago spp.</i>	17	27	-	8	14	.51
F	<i>Taraxacum officinale</i>	-	*11	-	-	5	.05
F	<i>Tragopogon dubius</i>	5	8	1	2	5	.02
F	<i>Trifolium gymnocarpon</i>	-	10	-	-	5	.03
F	<i>Zigadenus spp.</i>	-	3	-	-	1	.00
Total for Forbs		435	1059	160	194	428	13.38
B	<i>Artemisia tridentata vaseyana</i>	73	*60	38	34	32	14.17
B	<i>Ceanothus martinii</i>	74	62	25	30	22	6.81
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	30	*14	15	17	9	.71
B	<i>Gutierrezia sarothrae</i>	10	*1	5	6	1	.03
B	<i>Mahonia repens</i>	20	23	6	8	9	.45
B	<i>Purshia tridentata</i>	39	*26	1	17	12	3.98
B	<i>Symphoricarpos oreophilus</i>	-	7	7	-	2	.79
Total for Browse		246	193	96	112	87	26.97

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

BASIC COVER --

Herd unit 9, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	384	9.25	10.75	46.69
Rock	144	2.25	4.00	2.57
Pavement	158	0	7.00	1.43
Litter	398	51.25	53.25	55.45
Cryptograms	33	1.25	0	.57
Bare Ground	280	36.00	25.00	16.99

PELLET GROUP FREQUENCY --  
 Herd unit 9, Study no: 4

Type	Quadrat Frequency '95
Elk	2
Deer	8
Cattle	1

BROWSE CHARACTERISTICS --  
 Herd unit 9, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	29	45	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	2	-	-	-	-	-	-	-	-	-	2	-	-	133			2
	88	13	-	-	-	-	-	-	-	-	10	-	3	-	866			13
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	16	4	-	-	-	-	1	-	-	19	2	-	-	1400			21
	95	6	20	-	-	-	-	-	-	-	26	-	-	-	520			26
M	82	21	-	-	-	-	-	-	-	-	17	4	-	-	1400	24	31	21
	88	15	17	2	1	1	-	-	-	-	36	-	-	-	2400	26	26	36
	95	50	105	25	-	3	-	-	-	-	183	-	-	-	3660	19	30	183
D	82	2	3	-	-	-	-	-	-	-	-	5	-	-	333			5
	88	5	3	1	-	-	-	-	-	-	9	-	-	-	600			9
	95	6	6	1	-	-	-	-	-	-	10	-	-	3	260			13
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
Total Plants/Acre (excluding Dead & Seedlings)												'82	1733	Dec:	19%			
												'88	4400		13%			
												'95	4440		5%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Ceanothus martinii</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	39	-	-	-	-	-	-	-	-	39	-	-	-	780	9 49	39	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	780		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400	10 9	6	
	88	6	-	-	-	-	-	1	-	-	6	1	-	-	466	12 10	7	
	95	30	1	-	9	-	-	-	-	-	40	-	-	-	800	14 16	40	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	-			
												'88	466		-			
												'95	840		-			
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6 10	1	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	7 7	4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	80		-			
<i>Mahonia repens</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	244	-	-	-	-	-	-	-	-	244	-	-	-	4880	3 4	244	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	4880		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Purshia tridentata</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	1	-	-	2	-	-	-	40		2	
Y	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66		1	
	88	4	-	-	-	2	-	1	-	-	6	1	-	-	466		7	
	95	1	4	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	82	-	17	3	-	-	-	-	-	-	8	12	-	-	1333	22 26	20	
	88	3	8	8	-	1	-	2	-	-	18	-	4	-	1466	19 25	22	
	95	4	35	5	2	11	-	-	-	-	57	-	-	-	1140	14 33	57	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	3	1	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1399	Dec:	0%			
												'88	2198		12%			
												'95	1240		0%			
<i>Rosa woodsii</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7 8	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	180		-			
<i>Symphoricarpos oreophilus</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9 17	1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	10 19	1	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	17 53	5	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	100		-			

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 4

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	0	61	35
<i>Ceanothus martinii</i>	2	0	6
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	11	6	7
<i>Gutierrezia sarothrae</i>	0	.92	.63
<i>Mahonia repens</i>	0	0	39
<i>Purshia tridentata</i>	38	31	10
<i>Rosa woodsii</i>	0	0	1
<i>Symphoricarpos oreophilus</i>	2	.92	.79

TREND STUDY 9-5-95

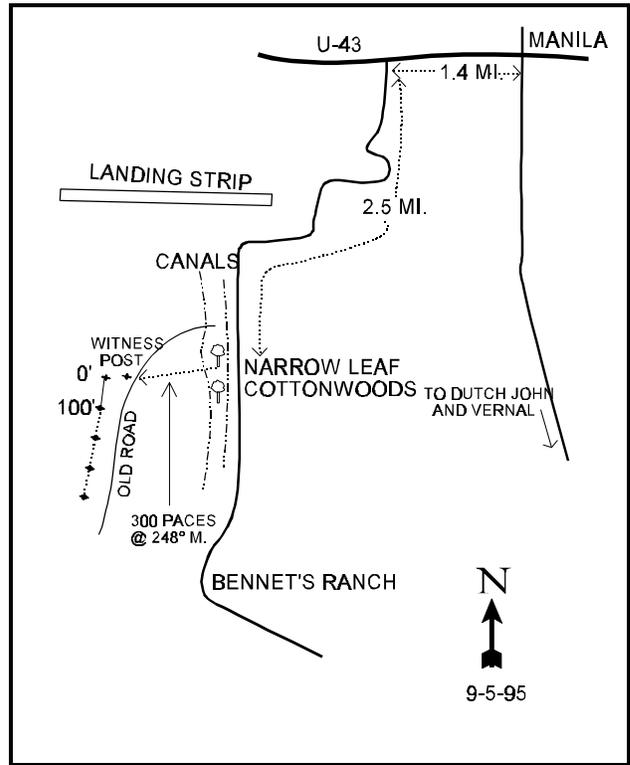
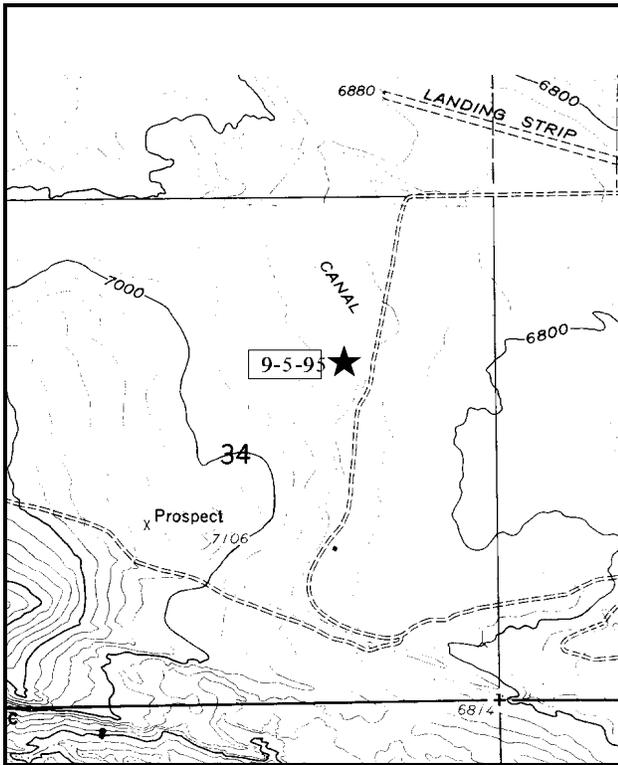
Study site name: Bennett Ranch. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 212 degrees.

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

LOCATION DESCRIPTION

From the intersection of Highway U-43 and Main Street in Manila, proceed west on U-43 for 1.4 miles to a dirt road on the left. Turn south and go 2.5 miles to a narrowleaf cottonwood on the right (west) side of the road. From the cottonwood, the 0-foot baseline stake is 300 paces away at a bearing of 249 degrees true.



Map Name: Jessen Butte

Diagrammatic Sketch

Township 3N, Range 19E, Section 34

GPS COOR. 6-03-351E 12 45-34-348N

## DISCUSSION

### Trend Study No. 9-5

This trend study is located on Bennett Ranch property which is privately owned. It samples a Wyoming big sagebrush rangeland, located at the foot of Jensen Butte and above the irrigated hay fields and pastures around Manila. Slope is 5% to 10% with a northeast facing aspect and an elevation of approximately 6,920 feet. The area is heavily used by cattle which have access to the area year-round. Deer pellet group quadrat frequency is 32%, while elk and cattle have quadrat frequencies of 10%.

Soils are alluvially deposited and rocky on the surface and throughout the profile. Rooting depth is restricted in some areas as evidenced by the abundance of black sagebrush. Ground cover is typical for a Wyoming big sagebrush site with a moderately high percentage of bare ground. Erosion is occurring on the site but it is not serious due to the lack of slope.

The key browse species include Wyoming big sagebrush and black sagebrush. Wyoming big sagebrush currently makes up 63% of the browse cover with an estimated 6,080 plants/acre. Density had increased from 2,999 plants/acre estimated in 1982 to a high of 7,133 in 1988. These shrubs have been heavily utilized in the past. In 1982, 84% of the population was heavily hedged, vigor was reduced on 38% of the shrubs but percent decadency was low at 11%. By 1988, heavy use occurred on 31% of the shrubs and percent decadency rose to 33%. During the 1995 reading, 25% of the Wyoming big sagebrush was classified as heavily hedged. Vigor improved and percent decadency dropped to only 7%. Even through the total population declined by 15%, this decline is primarily from the decadent age class. The number of mature plants actually increased from 3,800 plants/acre to 5,020. It appears that some of the decadent shrubs recovered between 1988 and 1995. The only negative aspect of the 1995 data is that 32% of the decadent plants were classified as dying. This would indicate a possible continued decline in Wyoming big sagebrush density through intraspecific competition and continued drought.

Black sagebrush on the site are moderately small measuring only 7 x 20 inches. Currently it numbers 2,760 plants/acre and accounts for 22% of the browse cover. The large fluctuation in its population estimate between 1988 and 1995 is characteristic of a species which occurs discontinuous and/or clumped in its distribution. With the much larger sample size, its population is closer to what it actually is. Use is light to moderate and vigor is good. Other preferred browse encountered on the site include small numbers of winterfat, white rubber rabbitbrush, and slenderbush eriogonum. It appears that prickly phlox (*Leptodactylon pungens*) was misidentified in 1982 and 1988. During the 1995 reading it was classified as the forb, hoods phlox (*Phlox hoodii*).

Grass identification was difficult due to the very dry conditions, lack of seed heads, and heavy grazing. Grasses combine to produce about 8% cover while forbs make up about 5% cover. Dominant grasses include thickspike wheatgrass, bottlebrush squirreltail, and needle-and-thread grass. The only abundant forbs include hoods phlox and scarlet globemallow.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable to declining. It is fortunate that this site occurs on nearly level terrain, otherwise erosion and soil loss would be much greater. Vegetative condition is rather poor due to heavy browsing. Trend is difficult to judge but it is considered slightly downward at this time. The herbaceous understory is obviously depleted but it is not immediately apparent that shrub density is also declining.

1988 TREND ASSESSMENT

An increase in most all ground cover components was noted in 1988. The percentage of bare soil decreased from 34% in 1982 to 23.5%. There is some soil movement in the bare interspaces. A healthier herbaceous understory would do much to help limit erosion on the gentle slope. Trend for soil slightly up. Trend for black sagebrush and Wyoming big sagebrush is up with increased densities, reduced heavy use, and improved vigor. Trend for the herbaceous understory is also up slightly due to increased quadrat frequency of grasses and forbs.

TREND ASSESSMENT

soil - slightly up

browse - up

herbaceous understory - slightly up

1995 TREND ASSESSMENT

Percent litter cover has declined slightly as has percent bare ground. The soil trend is considered stable at this time. Trend for Wyoming big sagebrush is slightly up due to decreased heavy use, improved vigor, good recruitment, and a low decadency rate of only 7%. The population density has declined since 1988 but this decline came mostly from the decadent age class. The number of mature plants has increased. Black sagebrush is of secondary importance on this site. It displays a stable trend but produces little forage due to its small size. The herbaceous understory has a stable trend. Sum of nested frequency of grasses declined slightly, while that of forbs increased. Nested frequency of two of the three dominant grasses; thickspike and bottlebrush squirreltail was actually a significant increase.

TREND ASSESSMENT

soil - stable

browse - slightly up

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 9, Study no: 5

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron cristatum	1	-	-	1	-	-
G	Agropyron dasystachyum	209	*220	14	77	79	2.75
G	Koeleria cristata	47	*19	1	18	8	.11
G	Oryzopsis hymenoides	24	35	29	10	21	.43
G	Poa fendleriana	177	*47	45	67	21	.88
G	Poa secunda	68	71	-	30	31	.74
G	Sitanion hystrix	40	*81	13	19	32	1.36
G	Stipa comata	111	*104	55	59	48	1.99
Total for Grasses		677	577	157	281	240	8.28
F	Arabis spp.	4	16	-	3	6	.03
F	Astragalus spp.	3	-	2	2	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Calochortus nuttallii</i>	7	6	-	3	3	.01
F	<i>Chaenactis douglasii</i>	-	1	-	-	1	.00
F	<i>Chenopodium leptophyllum</i>	-	47	2	-	20	.10
F	<i>Crepis acuminata</i>	16	12	-	11	8	.04
F	Cruciferae	13	-	-	9	-	-
F	<i>Descurainia pinnata</i>	-	32	-	-	17	.16
F	<i>Erigeron</i> spp	-	*4	7	-	4	.02
F	<i>Hymenoxys richardsonii</i>	17	*1	5	8	1	.03
F	<i>Lesquerella alpina</i>	-	4	-	-	2	.03
F	<i>Leucelene ericoides</i>	23	*5	-	10	3	.04
F	<i>Linum lewisii</i>	37	*62	3	21	29	.21
F	<i>Machaeranthera canescens</i>	1	3	-	1	2	.18
F	<i>Penstemon humilis</i>	7	*-	-	4	-	-
F	<i>Phlox hoodii</i>	146	*94	42	63	45	2.59
F	<i>Sphaeralcea coccinea</i>	80	*119	38	38	50	1.36
F	<i>Townsendia incana</i>	7	-	-	3	-	-
F	Unknown forb-perennial	8	-	-	3	-	-
Total for Forbs		223	406	27	116	191	4.84
B	<i>Artemisia nova</i>	58	*55	12	26	27	5.64
B	<i>Artemisia tridentata wyomingensis</i>	108	*98	58	57	53	16.11
B	<i>Ceratoides lanata</i>	14	8	9	7	5	.60
B	<i>Chrysothamnus nauseosus albicaulis</i>	-	1	-	-	1	.15
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	6	-	-	3	.33
B	<i>Echinocactus</i> spp.	2	-	-	1	-	-
B	<i>Eriogonum microthecum</i>	-	1	-	-	1	.03
B	<i>Gutierrezia sarothrae</i>	116	*5	58	54	3	.04
B	<i>Juniperus osteosperma</i>	-	-	-	-	-	.93
B	<i>Opuntia</i> spp.	14	*31	4	8	13	1.58
Total for Browse		458	205	183	216	106	25.44

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 9, Study no: 5

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	334	3.00	6.75	32.09
Rock	239	5.50	9.00	9.55
Pavement	256	11.50	14.25	5.40
Litter	390	45.25	41.25	39.65
Cryptograms	96	.75	5.25	3.51
Bare Ground	319	34.00	23.50	21.24

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 5

Type	Quadrat Frequency '95
Rabbit	3
Elk	10
Deer	32
Cattle	10

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia frigida																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	1	1	-	-	-	5	-	-	7	-	-	-	466	5	0	7
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	532		-			
												'95	0		-			

A G E	YR	Form Class (No. of 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	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	11	-	-	1	-	-	-	-	-	11	1	-	-	800		12	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	88	12	3	1	-	-	-	-	-	-	16	-	-	-	1066		16	
	95	18	8	-	-	-	-	-	-	-	26	-	-	-	520		26	
M	82	25	2	-	-	-	-	-	-	-	27	-	-	-	1800	6 12	27	
	88	14	26	8	-	-	-	-	-	-	48	-	-	-	3200	7 14	48	
	95	77	29	5	-	-	-	-	-	-	111	-	-	-	2220	7 20	111	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	10	7	1	-	-	-	-	-	-	14	-	2	2	1200		18	
	95	-	-	-	1	-	-	-	-	-	-	-	-	1	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1933	Dec:	0%			
												'88	5466		21%			
												'95	2760		0%			
<i>Artemisia tridentata wyomingensis</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	11	3	-	-	-	-	-	-	-	14	-	-	-	933		14	
	95	17	11	3	-	-	-	-	-	-	31	-	-	-	620		31	
M	82	3	3	33	-	-	-	-	-	-	41	-	12	-	2600	11 16	39	
	88	2	31	24	-	-	-	-	-	-	51	1	4	1	3800	13 16	57	
	95	41	149	59	-	2	-	-	-	-	243	4	4	-	5020	14 27	251	
D	82	-	-	5	-	-	-	-	-	-	-	-	1	4	333		39	
	88	15	12	9	-	-	-	-	-	-	21	2	4	9	2400		36	
	95	-	7	14	1	-	-	-	-	-	15	-	-	7	440		22	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	280		14	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2999	Dec:	11%			
												'88	7133		33%			
												'95	6080		7%			
<i>Ceratoides lanata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266	4 6	4	
	88	-	2	4	-	1	-	-	-	-	7	-	-	-	466	4 5	7	
	95	2	6	1	-	1	-	-	-	-	10	-	-	-	200	5 8	10	
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	-			
												'88	466		-			
												'95	220		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus nauseosus albicaulis</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	13	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	10	2	-	-	-	-	-	-	-	12	-	-	-	240	9	14	12
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	240		-			
<i>Eriogonum microthecum</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	4	7	7
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	140		-			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	51	-	-	2	-	-	-	-	-	53	-	-	-	3533			53
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	47	-	-	-	-	-	-	-	-	47	-	-	-	3133	5	5	47
	88	62	-	-	1	-	-	1	-	-	64	-	-	-	4266	5	4	64
	95	32	-	-	2	-	-	-	-	-	34	-	-	-	680	12	14	34
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	-	-	-	1	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	3133	Dec:	0%			
												'88	7865		0%			
												'95	680		0%			

A G E	YR	Form Class (No. of 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	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	8	-	-	2	-	-	-	-	-	9	-	1	-	666		10	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	15	-	-	-	-	-	-	-	-	15	-	-	-	1000	4	6	15
	88	19	-	-	1	-	-	-	-	-	19	-	1	-	1333	3	5	20
	95	37	4	-	1	-	-	-	-	-	42	-	-	-	840	4	15	42
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	-	-	1	1	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1000	Dec:	0%			
												'88	2132		6%			
												'95	860		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 5

Species	Percent of Total		
	'82	'88	'95
Artemisia frigida	0	3	0
Artemisia nova	21	22	25
Artemisia tridentata wyomingensis	32	30	55
Ceratoides lanata	3	3	2
Chrysothamnus nauseosus albicaulis	0	0	.18
Chrysothamnus viscidiflorus viscidiflorus	0	0	2
Eriogonum microthecum	0	0	1
Gutierrezia sarothrae	33	33	6
Opuntia spp.	11	9	8

TREND STUDY 9-6-95

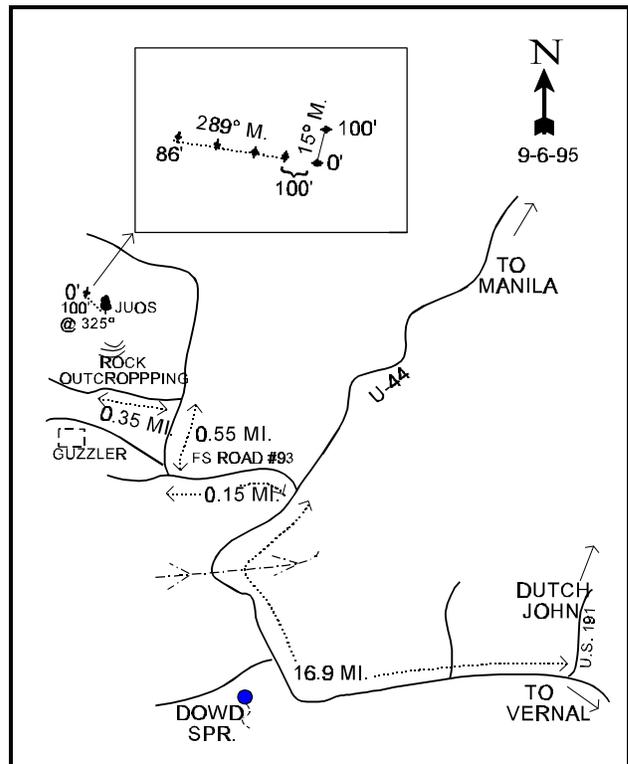
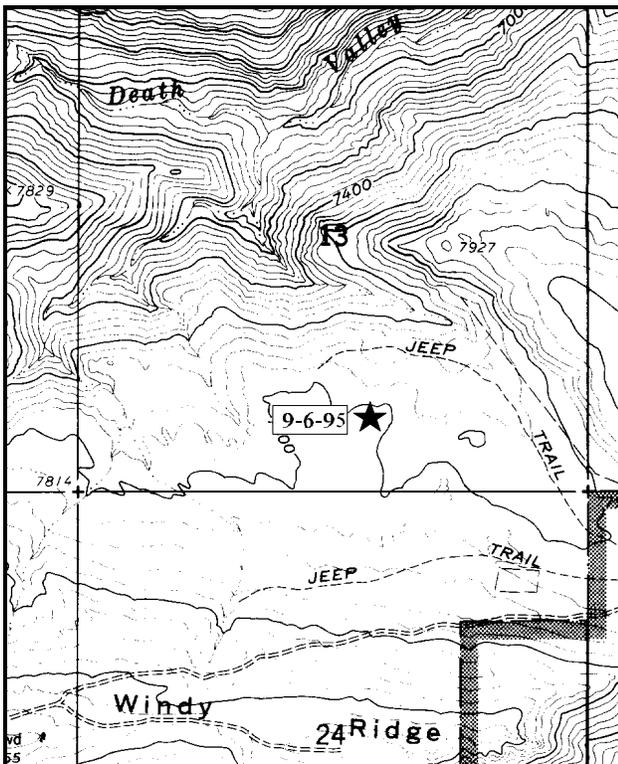
Study site name: Death Valley. Range type: Mountain Brush.

Compass bearing: frequency baseline 15 degrees.

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

LOCATION DESCRIPTION

From the Dutch John turnoff on Highway U-44, proceed 16.90 miles towards Manila. As you reach the summit before dropping down into Sheep Creek, there will be a dirt road to the left. Turn left on FS road #93 and drive west for .75 miles until you pass a grove of ponderosa pines. Turn to the right. The road forks again almost immediately, keep to the right and proceed .55 miles to another faint fork. Turn left and drive west .35 miles to the top of a small knoll. To the north, there are 2 rock out droppings-the highest point of the knoll. From the juniper on top, the 0-foot baseline stake is 100 feet away at a bearing of 325 degrees true.



Map Name: Manila

Diagrammatic Sketch

Township 2N, Range 19E, Section 13

GPS COOR. 6-06-873E 12 45-28-722N

## DISCUSSION

### Trend Study No. 9-6

This trend study is on critical deer and elk winter range in Death Valley. It samples a sagebrush-mixed mountain brush range type at an elevation of 7,800 feet. Death Valley is a broad bench that drops off very rapidly towards Death Valley Creek to the north. Slope at the site is gentle (3%-5%) with a slight north aspect. Deer use the area more heavily than elk as evidenced by a pellet group quadrat frequency twice that of elk.

Soils are sandy and shallow with some rock outcrops in the area. Percent bare ground was fairly high for this range type in 1982 at 29%. It has now improved to about 18% in 1995. Erosion is not a problem due to the lack of slope and abundant, well dispersed vegetation and litter cover.

The most important aspect of this site is the browse composition. Eleven species of shrubs were identified during the 1995 reading. The key species include true mountain mahogany and mountain big sagebrush which respectively contributes 59% and 20% of the browse cover. Mahogany density declined from 933 plants/acre in 1982 to 533 by 1988. No decadent plants were encountered either year and vigor was good. Shrubs displaying heavy use increased from zero to 13%. With the new larger sample size used in 1995, estimated mahogany density is 1,680 plants/acre. Vigor is generally good and percent decadence is low at 2% even though heavy use has increased to 35%. Percent decadence should be watched closely to help determine if there are any future declines in vigor and cover (productivity).

During the 1988 reading there were an estimated 1,599 mountain big sagebrush plants/acre. Use was light to moderate, vigor was good but percent decadency was fairly high at 29%. The population increased over 50% by 1988 when 3,465 plants/acre were estimated. Use was reported moderate with 8% of the sagebrush displaying heavy use. Vigor was good and percent decadency declined to 26%. High numbers of seedlings (200 plants/acre) and young (1,066 plants/acre) were encountered in 1988. During the 1995 reading a much larger sample size and better sampling distribution estimated 2,140 plants/acre. Vigor is generally good and percent decadence is now only 17%, but 38% of the population is heavily hedged. Pellet group frequency would suggest that this use is primarily from deer.

Other important browse include a few large serviceberry, some heavily hedged black sagebrush, and antelope bitterbrush. Some fringed sage, rabbitbrush, Oregon grape, snowberry, and gray horsebrush were also encountered.

The herbaceous understory consists of 6% cover from grasses and almost 8% cover from a variety of forbs. Grasses are dominated by alpine fescue and Sandberg bluegrass which combine to produce 67% of the grass cover. Thick spike wheatgrass and needle-and-thread are also fairly common. Forbs are very diverse, but only one species (sulfur eriogonum) produces more than 1% cover. Twenty species of perennial and nine species of annual forbs were identified during the 1995 reading.

### 1982 APPARENT TREND ASSESSMENT

This is one of the better winter range sites on the unit. Overall range condition is good and trend appears stable. From a trend monitoring point of view, one of the more important items will be to keep track of the key species, especially reproduction. The field observers saw few established seedlings or young plants but also no decadent plants. A fairly large number of seedlings-of-the-year were observed but were not sampled.

### 1988 TREND ASSESSMENT

Trend for soil is up. Increases in the measured percentages of vegetative and cryptogamic ground cover led to a significant decrease in the amount of bare soil. Percent bare ground has decreased from 29% in 1982 to 14% in 1988. The browse trend is mixed. Trend for one of the key species, mountain mahogany, is slightly down due to a decrease in population density. Trend for the other key species, mountain big sagebrush, is up due to a 54% increase in population density, excellent reproductive potential and a slight decrease in percent decadency. Overall, browse trend is up. Trend for the herbaceous understory is also up due to a dramatic increase in the sum of nested frequency of grasses and forbs.

#### TREND ASSESSMENT

soil - up

browse - up

herbaceous understory - up

### 1995 TREND ASSESSMENT

The soil trend is slightly down since 1988 due to an increase in percent bare ground, but is still considered fairly low at 18%. The browse trend is mixed. Trend for mountain big sagebrush is slightly down, but it only contributes 20% of the total browse cover. The mature population density is stable but 32% of the decadent plants were classified as dying. This condition appears to be caused by heavy use as 41% of the mature and decadent plants display heavy hedging (>60% of twigs browsed). Continued heavy use combined with drought will cause a downward trend in sagebrush. Another downward indicator for the population is the ratio of dead to live plants which is quite high at 1:9. True mountain mahogany shows a slightly upward trend. Population density increased, but much of this difference may be due to the greatly increased sample size used in 1995. Vigor is generally good and percent decadence is low at 2%. Heavy use has continually increased since 1982. Currently 35% of the population displays heavy hedging. This is not excessive however. According to Shepherd (1971), shrubs from the Rosaceae family like serviceberry, bitterbrush, and mountain mahogany, can withstand heavy use for many years without causing reduced vigor. Overall trend for browse is stable. The herbaceous understory trend is stable. Sum of nested frequency for grasses declined slightly while frequency of perennial forbs increased slightly. Nested frequency of alpine fescue which accounts for 45% of the grass cover, increased significantly. Other dominant grasses are thickspike wheatgrass and Sandberg bluegrass which declined significantly in nested frequency.

#### TREND ASSESSMENT

soil - slightly down to stable

browse - stable; slightly down for sagebrush (makes up 20% of the browse cover) and slightly up for mahogany (makes up 59% of the browse cover)

herbaceous understory - stable

VEGETATIVE TRENDS --  
Herd unit 9, Study no: 6

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	153	*114	20	64	51	.79
G	Carex spp.	42	*31	6	19	14	.45
G	Festuca ovina	62	*118	-36	27	54	2.84
G	Koeleria cristata	28	26	25	14	10	.12
G	Oryzopsis hymenoides	-	5	2	-	3	.21
G	Poa secunda	221	*132	50	85	55	1.36
G	Stipa comata	28	*57	19	15	25	.52
Total for Grasses		534	483	158	224	212	6.31
F	Allium spp.	70	*78	36	30	32	.36
F	Antennaria rosea	15	*3	10	8	2	.03
F	Androsace septentrionalis	-	1	-	-	1	.00
F	Arabis spp.	35	*6	1	18	3	.01
F	Aster spp.	72	*-	4	32	-	-
F	Balsamorhiza sagittata	3	-	-	1	-	-
F	Calochortus nuttallii	-	*13	3	-	6	.03
F	Chenopodium fremontii	-	8	-	-	3	.04
F	Collomia linearis	-	74	-	-	30	.43
F	Comandra pallida	19	*30	5	10	17	.19
F	Collinsia parviflora	-	143	-	-	52	.91
F	Cryptantha spp.	22	*13	20	11	5	.33
F	Delphinium bicolor	-	4	-	-	2	.01
F	Descurainia pinnata	-	12	-	-	4	.04
F	Draba spp.	-	87	-	-	34	.59
F	Erigeron eatonii	43	43	22	21	19	.92
F	Erigeron speciosus	-	13	-	-	5	.22
F	Eriogonum umbellatum	24	*47	10	11	20	1.33
F	Gilia aggregata	-	-	4	-	-	-
F	Heterotheca villosa	17	14	3	9	7	.23
F	Hymenoxys acaulis	19	*37	19	9	17	.23
F	Lepidium spp.	-	2	-	-	2	.01
F	Lithospermum ruderales	-	-	2	-	-	.00
F	Lupinus spp.	-	2	-	-	1	.00
F	Machaeranthera canescens	6	-	3	3	-	.00
F	Microsteris gracilis	-	96	-	-	44	.53

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Phacelia sericea	6	*34	5	5	16	.08
F	Polygonum douglasii	-	45	-	-	21	.10
F	Sedum lanceolatum	50	*103	37	26	40	.79
F	Senecio multilobatus	1	6	-	1	3	.04
F	Taraxacum officinale	-	3	-	-	2	.01
F	Townsendia incana	1	-	-	1	-	-
F	Unknown forb-perennial	-	3	47	-	1	.03
Total for Forbs		403	920	231	196	389	7.58
B	Amelanchier alnifolia	5	2	2	2	1	.91
B	Artemisia frigida	9	*-	3	4	-	-
B	Artemisia tridentata vaseyana	34	*38	20	20	17	5.65
B	Cercocarpus montanus	78	*62	32	31	28	16.22
B	Chrysothamnus viscidiflorus viscidiflorus	38	*26	18	19	13	1.65
B	Echinocactus spp.	-	-	1	-	-	-
B	Gutierrezia sarothrae	1	-	-	1	-	-
B	Mahonia repens	9	*19	6	6	8	.69
B	Opuntia spp.	31	*30	16	15	13	.57
B	Purshia tridentata	4	6	2	2	2	1.38
B	Symphoricarpos oreophilus	3	5	3	1	2	.21
B	Tetradymia canescens	1	4	1	1	2	.30
Total for Browse		213	192	104	102	86	27.61

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

BASIC COVER --

Herd unit 9, Study no: 6

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	354	7.00	12.00	35.36
Rock	63	4.00	5.25	2.33
Pavement	27	0	.25	.47
Litter	396	59.25	58.75	60.37
Cryptograms	118	1.00	9.50	2.96
Bare Ground	221	28.75	14.25	18.35

PELLET GROUP FREQUENCY --  
Herd unit 9, Study no: 6

Type	Quadrat Frequency '95
Rabbit	12
Elk	17
Deer	37

BROWSE CHARACTERISTICS --  
Herd unit 9, Study no: 6

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	1	-	-	2	-	-	-	-	4	-	-	-	80	64	69	4
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	80		-			
<i>Artemisia frigida</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	4	5	4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	7	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	332		-			
												'95	0		-			
<i>Artemisia nova</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	1	-	1	-	-	-	-	2	-	-	-	40	11	20	2
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	60		33%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	88	10	5	-	-	-	-	1	-	-	16	-	-	-	1066		16	
	95	5	2	1	1	-	-	-	-	-	9	-	-	-	180		9	
M	82	6	6	-	-	-	-	-	-	-	12	-	-	-	800	14	25	12
	88	9	10	3	-	-	-	-	-	-	22	-	-	-	1466	11	15	22
	95	25	16	34	3	1	-	-	-	-	79	-	-	-	1580	14	26	79
D	82	-	7	-	-	-	-	-	-	-	6	-	1	-	466		7	
	88	5	8	1	-	-	-	-	-	-	14	-	-	-	933		14	
	95	6	5	6	2	-	-	-	-	-	13	-	-	6	380		19	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1599	Dec:	29%			
												'88	3465		26%			
												'95	2140		17%			
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	2	2	1	2	-	-	-	-	-	7	-	-	-	140		7	
M	82	10	4	-	-	-	-	-	-	-	14	-	-	-	933	34	8	14
	88	-	4	1	-	-	-	-	-	-	5	-	-	-	333	36	44	5
	95	1	3	9	1	43	18	-	-	-	75	-	-	-	1500	34	51	75
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	1	1	-	-	-	1	-	-	1	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	933	Dec:	0%			
												'88	533		0%			
												'95	1680		2%			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	14	-	-	-	-	-	-	-	-	14	-	-	-	933	7	8	14
	88	21	-	-	-	-	-	-	-	-	18	-	3	-	1400	10	11	21
	95	70	1	-	3	-	-	-	-	-	74	-	-	-	1480	10	15	74
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1333	Dec:	0%			
												'88	1866		7%			
												'95	1520		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Echinocactus</i> spp.																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	2	5	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466	7	7	7
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	4	0
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	599		22%			
												'95	0		0%			
<i>Mahonia repens</i>																		
S	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	12	-	-	-	-	-	-	-	-	12	-	-	-	800			12
	88	25	-	-	-	-	-	-	-	-	25	-	-	-	1666			25
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	20	-	-	-	-	-	-	-	-	20	-	-	-	1333	7	2	20
	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400	2	2	6
	95	29	-	-	31	-	-	8	-	-	68	-	-	-	1360	3	6	68
Total Plants/Acre (excluding Dead & Seedlings)												'82	2133	Dec:	-			
												'88	2066		-			
												'95	1360		-			
<i>Opuntia</i> spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466	2	7	7
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333	3	9	5
	95	56	-	-	1	-	-	-	-	-	57	-	-	-	1140	3	9	57
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	532	Dec:	0%			
												'88	666		0%			
												'95	1180		1%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Purshia tridentata</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	2	-	3	2	-	-	-	-	7	-	-	-	140	19	50	7
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	140		-			
<i>Rosa woodsii</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	333		-			
												'95	0		-			
<i>Symphoricarpos oreophilus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20	15	25	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Tetradymia canescens</i>																		
Y	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	88	8	2	-	-	-	-	-	-	-	10	-	-	-	666			10
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	10	-	-	-	-	-	-	-	-	8	2	-	-	666	8	13	10
	88	3	1	-	-	-	-	1	-	-	5	-	-	-	333	9	10	5
	95	12	2	-	-	-	-	-	-	-	14	-	-	-	280	10	15	14
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533			8
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	932	Dec:	0%			
												'88	1532		34%			
												'95	320		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 6

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	.93
<i>Artemisia frigida</i>	0	3	0
<i>Artemisia nova</i>	0	0	.69
<i>Artemisia tridentata</i> <i>vaseyana</i>	21	30	25
<i>Cercocarpus montanus</i>	13	5	20
<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	18	16	18
<i>Echinocactus</i> spp.	0	0	.69
<i>Gutierrezia sarothrae</i>	0	5	0
<i>Mahonia repens</i>	29	18	16
<i>Opuntia</i> spp.	7	6	14
<i>Purshia tridentata</i>	0	0	2
<i>Rosa woodsii</i>	0	3	0
<i>Symphoricarpos oreophilus</i>	0	0	.46
<i>Tetradymia canescens</i>	13	13	4

TREND STUDY 9-10-95

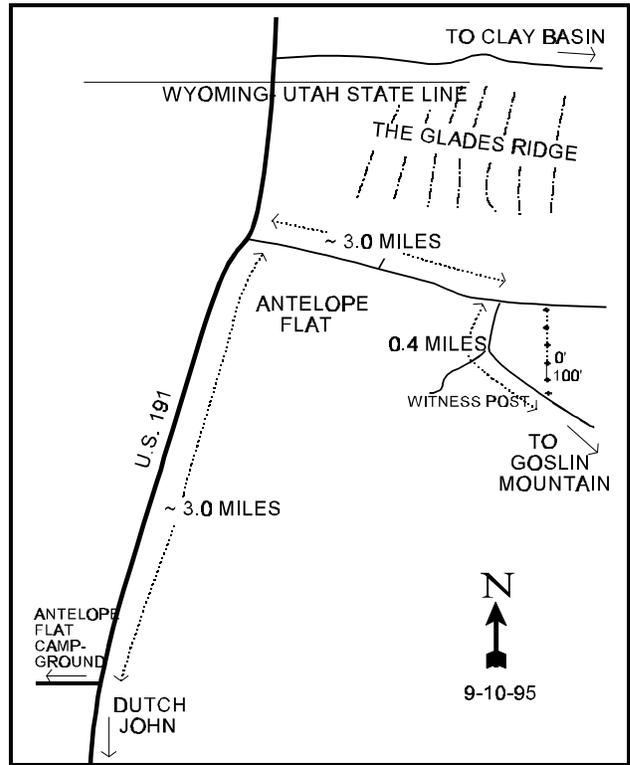
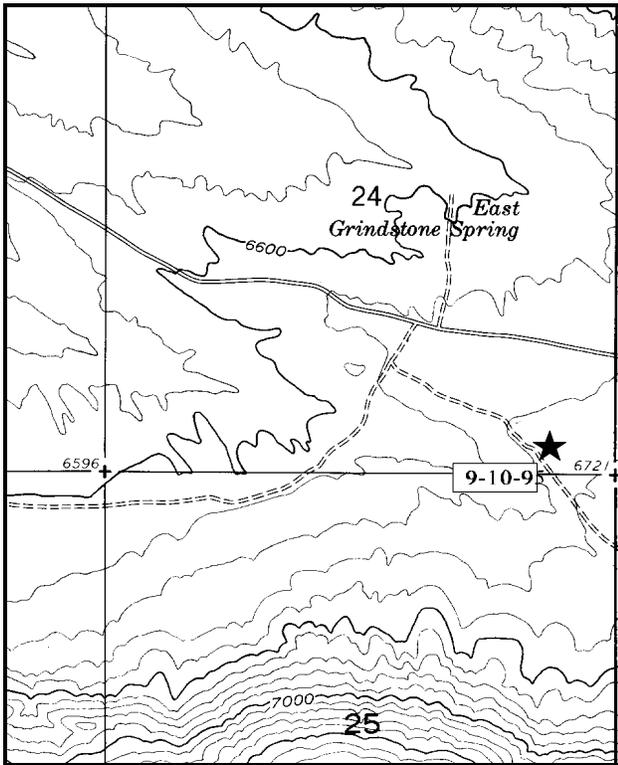
Study site name: Antelope Flat. Range type: Big Sagebrush - Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the Antelope Flat Road (east of US 191), turn south on the road to Goslin Mountain. Go .1 miles to a fork. Bear left on the main fork towards the mountain and proceed .3 miles to a witness post on the north side of the road. From the witness post walk approximately 100 feet (22 paces) north into the sagebrush to the 100-foot end of the baseline. The 0-foot end of the frequency baseline is 100 feet north.



Map Name: Dutch John

Diagrammatic Sketch

Township 3N, Range 22E, Section 24 GPS COOR. 6-36-286E 12 45-37-539N

## DISCUSSION

### Trend Study No. 9-10

This trend study was established on Antelope Flat in September 1988. The long sagebrush valley stretches from Flaming Gorge Reservoir east to Goslin Mountain. The study is located at the base of the north side of Dutch John and Goslin Mountains with an elevation of 6,650 feet. The slope is gentle (2-3%) with a northwest aspect. Deer and antelope can be found in the valley year round. Elk from Goslin Mountain also utilize the lower valleys as winter range. Pellet group data shows that deer use the area more than elk with a pellet group frequency nearly 8 times more than elk. Cattle graze the allotment on a deferred rotation system, and are on the unit either early (May 1 to July 20) or late (September 5-November 20) in the season. Cattle use was light in 1995, likely due to prolonged drought and the distance of the site from water.

The soil is deep but compacted below in the subsurface horizons. The surface layer is a sandy loam with very little gravel. Consequently, it is more susceptible to wind and water erosion. There is an extensive cover of cryptogams covering 6% of the soil surface in 1988, increasing to nearly 8% by 1995. This along with the vegetative and litter cover adequately protect the soil from erosion given the gentle terrain.

The study site supports a moderately dense stand of Wyoming big sagebrush which had an estimated density of 7,200 plants/acre in 1988 and 5,620 by 1995. The change in density comes primarily from a reduction in the proportion of decadent plants in the population which declined from 3,400 plants/acre in 1988 to 1,220 by 1995. The sample size was also greatly enlarged in 1995 and would also be responsible for some of the change. The number of mature sagebrush actually increased from 2,800 to 3,820 plants/acre. During the 1988 reading, 47% of the sagebrush was classified as decadent with 43% of the population displaying heavy use. Vigor was generally good but annual growth was low (<1") with the average mature plant measuring 15" in height with a crown diameter of 17".

During the 1995 reading, 35% of the sagebrush displayed heavy use, which is an improvement. Vigor was generally good with percent decadency declining to 21%. One noted downward trend is the percent of the decadent plants that are in poor vigor or dying has increased from 12% in 1988 to 31% in 1995. Also, there is continuing evidence of downward trend with the ratio of dead to live plants at 1:9. Photos show an improvement in annual growth due to the wet spring of 1995 and average height and crown measurements increased respectively to 18 x 32 inches. Reproductive potential and the number of young plants declined but they are still acceptable at 1% and 10% respectively. The changes in trend are primarily being driven by the prolonged drought in conjunction with intraspecific competition which could turn around with normal or near-normal precipitation patterns.

Mountain low rabbit brush is also numerous with an estimated density of 7,199 plants/acre in 1988 and 5,840 by 1995. These shrubs are mostly lightly hedged and in good vigor. Density has declined since 1988, but it appears that this decline came primarily from the young age class. Nearly all of the decadent plants found in 1988 have recovered by 1995, as percent decadency fell from 42% to 1%. Small numbers of slenderbush eriogonum, snakeweed, and prickly pear were also encountered on the site.

Grasses and forbs are diverse and fairly abundant for a Wyoming big sagebrush site. Eight perennial grasses encountered on the site in 1995 provided a little over 6% cover. The most abundant grasses include Sandberg bluegrass, thickspike, and bluebunch wheatgrass. Fifteen perennial and 8 annual forbs were encountered

in 1995. Combined, they account for nearly 10% cover. Annual forbs, primarily owlclover, combined account for 71% of the forb cover. The most numerous perennial forbs include hoods and longleaf phlox and low penstemon.

1988 APPARENT TREND ASSESSMENT

The site has 46% litter cover and 10% basal vegetative cover. Although the shrub interspaces are well-vegetated for this range type, there is a significant amount of bare ground (37%). The browse trend appears to be declining due to heavy use and a high decadency rate (47%). Recruitment appears good however with abundant seedlings and young. The herbaceous understory is fairly abundant for a Wyoming big sagebrush site.

1995 TREND ASSESSMENT

Basic ground cover characteristics have improved since 1988. Even though percent litter cover declined slightly, cover of cryptogams increased and percent bare ground decreased to 29%. Trend for soil is up slightly. The browse trend is stable to slightly declining. The key browse species, Wyoming big sagebrush, has declined in overall density but shows less heavy use and an improving rate of decadency (47% to 21%). The population could decline further because 380 decadent plants/acre were classified as dying. However, there appears to be sufficient young plants (580/acre) to replace them. The herbaceous trend is slightly down due to a decline in the sum of nested frequency of perennial grasses and forbs. Annual forbs were sampled in 1995. They dominate the forb composition by providing 71% of the forb cover.

TREND ASSESSMENT

soil - slightly up

browse - stable to slightly declining for Wyoming big sagebrush

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 9, Study no: 10

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	238	*190	89	71	.83
G	Agropyron spicatum	18	*110	6	42	.61
G	Bromus tectorum	-	66	-	27	.50
G	Carex spp.	9	*-	4	-	-
G	Koeleria cristata	55	*-	24	-	-
G	Oryzopsis hymenoides	13	20	6	10	.20
G	Poa fendleriana	5	*32	2	13	.43
G	Poa secunda	184	*159	75	58	3.00
G	Sitanion hystrix	67	*34	33	19	.30
G	Stipa comata	87	*31	37	16	.28
G	Vulpia octoflora	-	1	-	1	.00
Total for Grasses		676	643	276	257	6.17
F	Agoseris glauca	-	*22	-	10	.05

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'88	'95	'88	'95	
F	Allium spp.	4	11	2	6	.04
F	Antennaria rosea	62	*1	26	1	.00
F	Arabis spp.	9	10	4	5	.02
F	Astragalus convallarius	31	*23	12	12	.25
F	Collinsia parviflora	-	57	-	21	.25
F	Crepis acuminata	-	3	-	1	.00
F	Cymopterus longipes	15	15	7	7	.03
F	Descurainia pinnata	-	3	-	1	.00
F	Erigeron eatonii	7	19	4	11	.08
F	Gayophytum ramosissimum	-	17	-	6	.03
F	Gilia inconspicua	-	10	-	4	.02
F	Lepidium spp.	-	3	-	1	.00
F	Machaeranthera canescens	-	5	-	2	.03
F	Microsteris gracilis	-	118	-	40	.42
F	Orthocarpus luteus	-	*187	-	73	6.05
F	Penstemon humilis	60	*54	28	25	.45
F	Phlox hoodii	139	*95	68	44	1.23
F	Phlox longifolia	153	*97	66	41	.22
F	Polygonum douglasii	-	45	-	19	.09
F	Schoenocrambe linifolia	-	*12	-	5	.02
F	Sphaeralcea coccinea	40	*26	16	11	.18
F	Trifolium gymnocarpon	-	*55	-	25	.15
Total for Forbs		520	888	233	371	9.67
B	Artemisia nova	4	-	1	-	-
B	Artemisia tridentata wyomingensis	114	*80	58	43	16.12
B	Chrysothamnus viscidiflorus lanceolatus	82	*90	45	40	5.16
B	Eriogonum microthecum	-	7	-	2	.01
B	Gutierrezia sarothrae	18	*-	9	-	-
B	Opuntia spp.	21	11	10	6	.36
Total for Browse		239	188	123	91	21.67

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

BASIC COVER --

Herd unit 9, Study no: 10

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	348	10.25	36.86
Rock	64	0	.19
Pavement	150	1.00	.55
Litter	394	45.50	42.59
Cryptograms	207	6.00	7.77
Bare Ground	328	37.25	26.36

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 10

Type	Quadrat Frequency '95
Rabbit	8
Elk	5
Deer	38
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 10

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	88	6	-	-	2	-	-	-	-	-	8	-	-	-	533		8	
	95	3	-	-	-	-	-	-	-	3	-	-	-	60		3		
Y	88	9	5	1	-	-	-	-	-	14	1	-	-	1000		15		
	95	19	6	2	2	-	-	-	-	29	-	-	-	580		29		
M	88	2	16	24	-	-	-	-	-	41	1	-	-	2800	15	17	42	
	95	3	99	59	-	12	18	-	-	191	-	-	-	3820	18	32	191	
D	88	12	18	21	-	-	-	-	-	43	2	2	4	3400		51		
	95	4	25	9	-	10	11	2	-	42	-	-	19	1220		61		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	-	-	-	-	-	-	-	-	-	-	-	620		31		
Total Plants/Acre (excluding Dead & Seedlings)												'88	7200	Dec:	47%			
												'95	5620		21%			
<i>Ceratoides lanata</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	3	7	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	2	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	88	17	3	1	2	-	-	-	-	-	23	-	-	-	1533		23	
	95	32	1	-	3	-	-	-	-	-	36	-	-	-	720		36	
M	88	30	5	-	4	-	-	-	-	-	39	-	-	-	2600	9 8	39	
	95	224	4	1	24	-	-	-	-	-	251	-	-	2	5060	10 16	253	
D	88	23	12	9	2	-	-	-	-	-	37	-	9	-	3066		46	
	95	3	-	-	-	-	-	-	-	-	2	-	-	1	60		3	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	7199	Dec:	42%				
											'95	5840		1%				
<i>Eriogonum microthecum</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	6 8	3	
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	60		-				
<i>Gutierrezia sarothrae</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	14	-	-	-	-	-	-	-	-	13	-	1	-	933	5 4	14	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	9 13	1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	999	Dec:	-				
											'95	20		-				
<i>Opuntia spp.</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333	4 7	5	
	95	27	-	-	-	-	-	-	-	-	27	-	-	-	540	3 12	27	
D	88	3	-	-	-	-	-	-	-	-	2	-	-	1	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)											'88	799	Dec:	25%				
											'95	560		0%				

PERCENT BROWSE COMPOSITION--  
Herd unit 9, Study no: 10

Species	Percent of Total	
	'88	'95
<i>Artemisia tridentata wyomingensis</i>	44	46
<i>Ceratoides lanata</i>	0	0
<i>Chrysothamnus viscidiflorus lanceolatus</i>	44	48
<i>Eriogonum microthecum</i>	0	.49
<i>Gutierrezia sarothrae</i>	6	.16
<i>Opuntia spp.</i>	5	5

TREND STUDY 9-18-95(25-18)

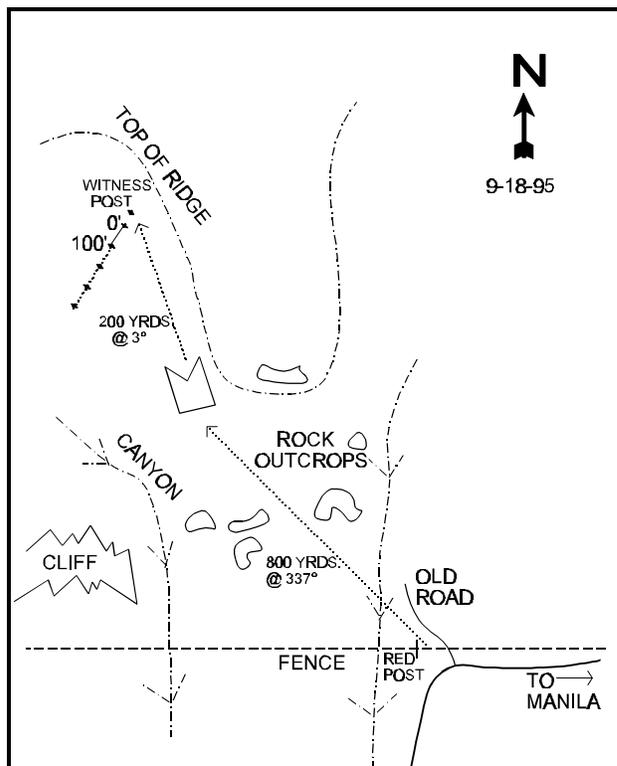
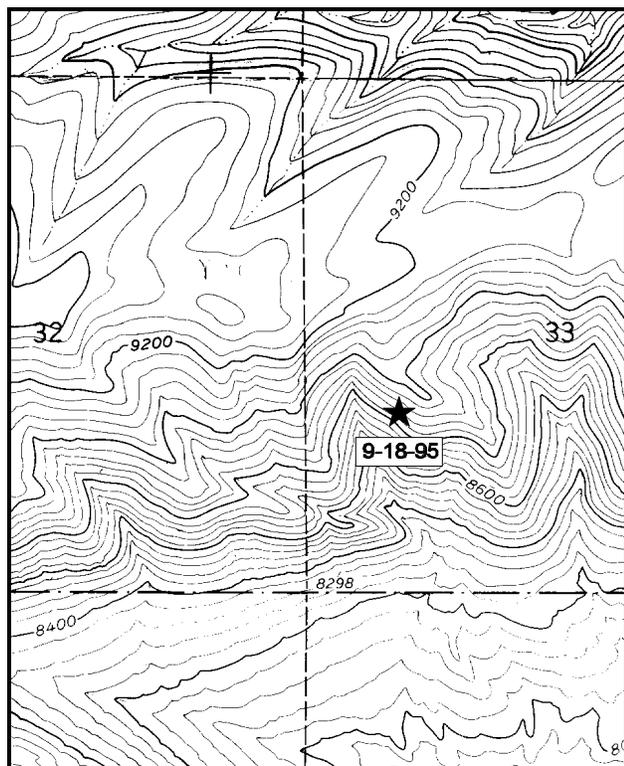
Study site name: Phil Pico Mountain. Range type: True Mtn Mahogany.

Compass bearing: frequency baseline 227 degrees.

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

LOCATION DESCRIPTION

West of Manila, on Highway U-43 1.9 miles from the Wyoming-Utah stateline, turn south off the highway. Follow Rt. 166 for 3.7 miles to an intersection. Turn to the right and go 1.6 miles to another fork. Bear right before crossing the creek and go .9 miles on a fairly rough road for .9 miles to the FS boundary fence. Continue .8 miles west along the fence. Stop where the road turns left away from the fence by a red post. The study is located on the slope below the ridge to the northwest. From the red witness post along the fence, hike about 1/4 mile NNW (337° true) up across the slope to a large square rock outcrop. Continue hiking about 200 yards directly north to the study site. The 0-foot baseline stake is tagged with browse tag #9080.



Map Name: Phil Pico Mountain

Diagrammatic Sketch

Township 3N, Range 18E, Section 33

## DISCUSSION

### Trend Study No. 9-18

The south side of Phil Pico Mountain is steep and rocky, covered mostly with mountain brush. There are scattered clumps of aspen and conifer in the protected drainages and an open sagebrush-grass type on the upper slopes and ridgetops. The study site is located just below a narrow windswept ridge. It samples a steep (60% to 65%) southwest facing slope dominated by true mountain mahogany at an elevation of 8,800 feet. These south slopes are used mostly by wintering elk and deer to a lesser extent. While cattle graze this state-owned land in summer, they utilize mainly the valley bottoms and more gentle slopes.

Considering the harshness of the site on the dry, steep, rocky slope, there is a surprising amount of vegetative cover (39.5%). Sandstone and limestone rock is very common on the surface, making the slope loose and talus-like. Outcrops of old conglomerate are scattered throughout the hillside. It is a shallow soil, with the shrubs establishing in cracks and deep spots. Texture of the sandy loam surface layer is coarse due to the high percentage of sand and rock fragments. With the steep, talus slope, some erosion is expected. There is definite soil movement, especially along game trails. Herbaceous vegetative cover is critical for minimizing soil movement.

True mountain mahogany provides 81% of the browse cover and the bulk of the forage available to wintering elk. There were an estimated 1,866 mature shrubs/acre in 1988, which constituted 43% of the population. Seventeen percent were decadent plants. Some of the young and mature plants showed signs of insect damage. About 85% of the 2-4 foot tall mature and decadent shrubs were heavily hedged. Often the branches have a severely hedged appearance due to minimal growth and death of some twigs. The more vigorous plants had moderate seed production and 4-5 inch leader growth. There was a fair amount of regeneration, with young and seedling age classes comprising 37% and 5% of the population respectively. During the 1995 reading there were an estimated 3,120 plants/acre, 79% mature and only 2% decadent. Vigor was mostly good with 6% of the population displaying reduced vigor due to insect damage. Sixty-three percent of the mature and decadent mahogany displayed heavy hedging. Recruitment is still good with 160 seedlings and 560 young plants/acre.

Mountain big sagebrush occurs across the slope at a density of 1,932 plants/acre in 1988 and 1,000 in 1995. These short vigorous plants are generally lightly to moderately hedged with some displaying heavy use (14% and 10% respectively). Percent decadency has declined slightly from 24% to 22%. Other browse on the site include serviceberry, fringed sagebrush, black sagebrush winterfat, mountain low rabbitbrush, and slenderbush eriogonum.

The herbaceous understory is surprisingly abundant with grasses producing 16.5% cover and forbs combining to produce 3.4% cover on this harsh site. Together they produce 47% of the total vegetative cover. By far the most abundant grass consists of bluebunch wheatgrass which exhibits considerable vegetative production. Other common grasses include Indian ricegrass and the annual cheatgrass. Forbs are represented by a variety of species, but none are very numerous or provides more than ½ of one percent cover. The species which provide the most cover include *Cryptantha*, low larkspur and the annual tansymustard.

### 1988 APPARENT TREND ASSESSMENT

The amount of total rock cover reflect the rocky nature of the site. Rock cover is 19% and pavement cover of 23%. Their total cover estimate of rock is 42%, which is very high. Basal vegetative cover is good at 11%, but litter cover is unsatisfactory at only 38%. Trend for browse appears stable with adequate

numbers of seedlings and young for mountain big sagebrush and true mountain mahogany. The composition of the herbaceous understory is good and dominated by native grasses. Forbs are diverse but none are numerous.

1995 TREND ASSESSMENT

Percent bare ground has declined from 8% to only 2%. Soil movement down slope is unavoidable but not severe due to the abundant and well dispersed vegetation and litter cover. Trend for soil is slightly up. Trend for the key species, true mountain mahogany which makes up 81% of the total browse cover, is slightly up. The number of mature plants increased while the number of decadent shrubs declined from 17% to only 2%. The proportion of shrubs displaying heavy use also declined from 73% in 1988 to 54% in 1995. The number of seedlings and young plants declined, but they are still adequate to maintain the population. Trend for the secondary browse species, mountain big sagebrush, is slightly down, but only contributes 7% of the total browse cover. The population has declined by 48% with 55% of the decadent sagebrush classified as dying, indicating a further decline in population density in the future. This would be considered a marginal site for mountain big sagebrush because of the rockiness of the shallow soils coupled with drought conditions have further stressed the population. Since mountain mahogany provides 81% of the browse cover and the bulk of the forage on the site, overall browse trend is considered slightly up. It should be noted that with the increased sample size and much better sampling distribution, the population estimates for shrubs are much closer to reality. Therefor, much of the decrease in shrub density estimates can be attributed to the better sampling method. Trend for the herbaceous understory is down. Nested frequency of nearly all grass species have declined significantly. Nested frequency of perennial forbs have also declined.

TREND ASSESSMENT

soil - slightly up

browse - slightly up

herbaceous understory - down

VEGETATIVE TRENDS --

Herd unit 25 , Study no: 18

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'88	'95	'88	'95	
G	Agropyron spicatum	297	*287	97	96	10.99
G	Bromus tectorum	-	152	-	55	2.53
G	Carex spp.	36	33	17	11	.50
G	Koeleria cristata	16	*7	9	5	.08
G	Leucopoa kingii	-	2	-	1	.03
G	Oryzopsis hymenoides	115	*85	57	39	2.16
G	Poa secunda	45	*23	19	11	.18
Total for Grasses		509	589	199	218	16.49
F	Arabis spp.	-	*7	-	4	.02
F	Astragalus aretioides	8	*-	5	-	-
F	Aster chilensis	25	*-	12	-	-
F	Astragalus convallarius	-	*7	-	3	.21

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'88	'95	'88	'95	
F	<i>Astragalus gilviflorus</i>	-	2	-	1	.03
F	<i>Astragalus</i> spp.	-	2	-	2	.03
F	<i>Balsamorhiza hookeri</i>	1	-	1	-	-
F	<i>Castilleja</i> spp.	26	*-	12	-	-
F	<i>Chaenactis douglasii</i>	28	*24	16	10	.10
F	<i>Chenopodium leptophyllum</i>	-	19	-	11	.05
F	<i>Cirsium</i> spp.	12	*2	6	2	.06
F	<i>Comandra pallida</i>	6	-	2	-	-
F	<i>Collinsia parviflora</i>	-	3	-	1	.00
F	Cruciferae	2	-	2	-	-
F	<i>Cryptantha</i> spp.	81	*35	41	17	.48
F	<i>Delphinium bicolor</i>	65	*52	29	25	.48
F	<i>Descurainia pinnata</i>	-	67	-	34	.39
F	<i>Erigeron</i> spp	-	1	-	1	.00
F	<i>Hymenoxys acaulis</i>	-	2	-	1	.03
F	<i>Ipomopsis aggregata</i>	-	3	-	2	.01
F	<i>Lappula occidentalis</i>	-	8	-	6	.03
F	<i>Lesquerella alpina</i>	-	*29	-	14	.19
F	<i>Leucelene ericoides</i>	10	*-	4	-	-
F	<i>Lepidium</i> spp.	-	3	-	1	.03
F	<i>Lesquerella</i> spp.	65	*37	33	18	.28
F	<i>Linum lewisii</i>	6	5	3	2	.03
F	<i>Lithophragma</i>	1	-	1	-	-
F	<i>Lychnis drummondii</i>	-	2	-	1	.00
F	<i>Machaeranthera canescens</i>	48	*15	25	7	.07
F	<i>Microsteris gracilis</i>	-	1	-	1	.03
F	<i>Oxytropis sericea</i>	12	*2	6	2	.19
F	<i>Penstemon humilis</i>	66	*35	30	16	.37
F	<i>Phlox hoodii</i>	-	*24	-	11	.22
F	<i>Phlox longifolia</i>	46	*-	22	-	-
F	<i>Senecio multilobatus</i>	-	*9	-	3	.04
Total for Forbs		508	396	250	196	3.43
B	<i>Amelanchier alnifolia</i>	-	-	-	-	.01
B	<i>Artemisia frigida</i>	57	*68	30	33	.91
B	<i>Artemisia tridentata vaseyana</i>	39	*17	19	8	1.51
B	<i>Cercocarpus montanus</i>	89	*79	42	38	18.02

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
B	Chrysothamnus viscidiflorus lanceolatus	12	*-	6	-	.07
B	Eriogonum microthecum	66	52	30	28	1.59
B	Symphoricarpos oreophilus	-	-	-	-	.00
B	Tetradymia canescens	1	2	1	2	.06
Total for Browse		264	218	128	109	22.21

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

BASIC COVER --

Herd unit 9, Study no: 18

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	343	11.00	39.45
Rock	338	19.25	23.53
Pavement	274	23.25	11.68
Litter	391	38.00	40.21
Cryptograms	8	.25	.02
Bare Ground	160	8.25	2.26

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 18

Type	Quadrat Frequency '95
Rabbit	8
Elk	51
Deer	25

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 18

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Amelanchier alnifolia																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	4	-	-	-	-	-	-	-	-	-	80	-	4	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	5	-	-	-	-	-	-	-	-	-	-	-	-	100	-	5	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	1	-	-	-	-	-	-	-	-	-	-	20	16	9	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	120		-			

A G E	YR	Form Class (No. of 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	-	-	1	-	-	-	-	-	6	-	-	-	400		6	
	95	2	-	-	6	-	-	-	-	-	8	-	-	-	160		8	
Y	88	75	2	1	14	-	-	6	-	-	98	-	-	-	6533		98	
	95	10	-	-	12	-	-	-	-	-	22	-	-	-	440		22	
M	88	103	4	3	12	-	-	4	-	-	125	-	1	-	8400	5 4	126	
	95	122	-	-	51	-	-	-	-	-	173	-	-	-	3460	9 7	173	
Total Plants/Acre (excluding Dead & Seedlings)												'88	14933	Dec:	-			
												'95	3900		-			
<i>Artemisia nova</i>																		
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4 7	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	0		-			
<i>Artemisia tridentata vaseyana</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
Y	88	2	1	-	2	-	-	-	-	-	5	-	-	-	333		5	
	95	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	88	11	4	2	-	-	-	-	-	-	17	-	-	-	1133	11 16	17	
	95	10	12	4	4	4	-	-	-	-	34	-	-	-	680	11 24	34	
D	88	4	1	2	-	-	-	-	-	-	7	-	-	-	466		7	
	95	2	6	1	1	1	-	-	-	-	5	-	-	6	220		11	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
Total Plants/Acre (excluding Dead & Seedlings)												'88	1932	Dec:	24%			
												'95	1000		22%			
<i>Ceratoides lanata</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40	11 13	2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	40		-			
<i>Cercocarpus montanus</i>																		
S	88	2	-	-	1	-	-	-	-	-	3	-	-	-	200		3	
	95	3	-	-	5	-	-	-	-	-	8	-	-	-	160		8	
Y	88	5	5	12	1	-	-	-	-	-	21	-	2	-	1533		23	
	95	9	5	3	8	3	-	-	-	-	28	-	-	-	560		28	
M	88	-	3	25	-	-	-	-	-	-	27	-	1	-	1866	27 24	28	
	95	1	1	5	-	44	73	-	-	-	115	-	9	-	2480	29 39	124	
D	88	1	2	8	-	-	-	-	-	-	11	-	-	-	733		11	
	95	-	-	-	1	-	3	-	-	-	4	-	-	-	80		4	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	4132	Dec:	17%			
												'95	3120		2%			

A G E	YR	Form Class (No. of 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>																		
M	88	3	-	-	2	-	-	-	-	-	3	-	2	-	333	9	7	5
	95	16	-	-	4	-	-	-	-	-	20	-	-	-	400	10	14	20
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	-			
												'95	400		-			
<i>Echinocactus spp.</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	4	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	132	Dec:	-			
												'95	0		-			
<i>Eriogonum microthecum</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2
Y	88	15	-	-	1	-	-	-	-	-	16	-	-	-	1066			16
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
M	88	53	8	3	2	-	-	-	-	-	66	-	-	-	4400	5	6	66
	95	95	-	-	29	-	-	-	-	-	124	-	-	-	2480	6	12	124
D	88	-	1	1	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	5599	Dec:	2%			
												'95	2540		0%			
<i>Gutierrezia sarothrae</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	8	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Symphoricarpos oreophilus</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9	15	1
	95	-	-	-	7	-	-	-	-	-	7	-	-	-	140	9	32	7
Total Plants/Acre (excluding Dead & Seedlings)												'88	399	Dec:	-			
												'95	240		-			
<i>Tetradymia canescens</i>																		
M	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	6	7	4
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8	12	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	-			
												'95	20		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 9, Study no: 18

Species	Percent of Total	
	'88	'95
<i>Amelanchier alnifolia</i>	0	1
<i>Artemisia frigida</i>	54	34
<i>Artemisia nova</i>	.23	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	7	9
<i>Ceratoides lanata</i>	0	.35
<i>Cercocarpus montanus</i>	15	27
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	1	4
<i>Echinocactus</i> spp.	.47	0
<i>Eriogonum microthecum</i>	20	22
<i>Gutierrezia sarothrae</i>	0	0
<i>Symphoricarpos oreophilus</i>	1	2
<i>Tetradymia canescens</i>	.95	.17

TREND STUDY 9-20-95

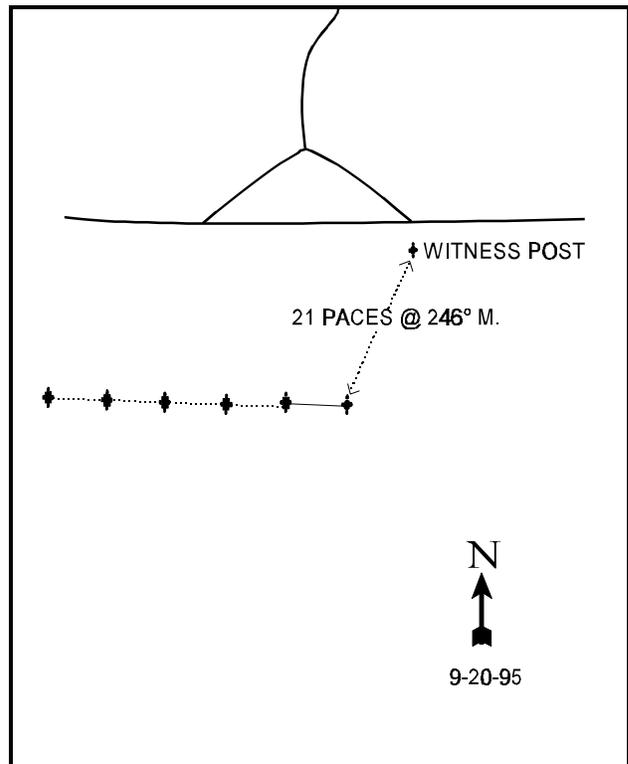
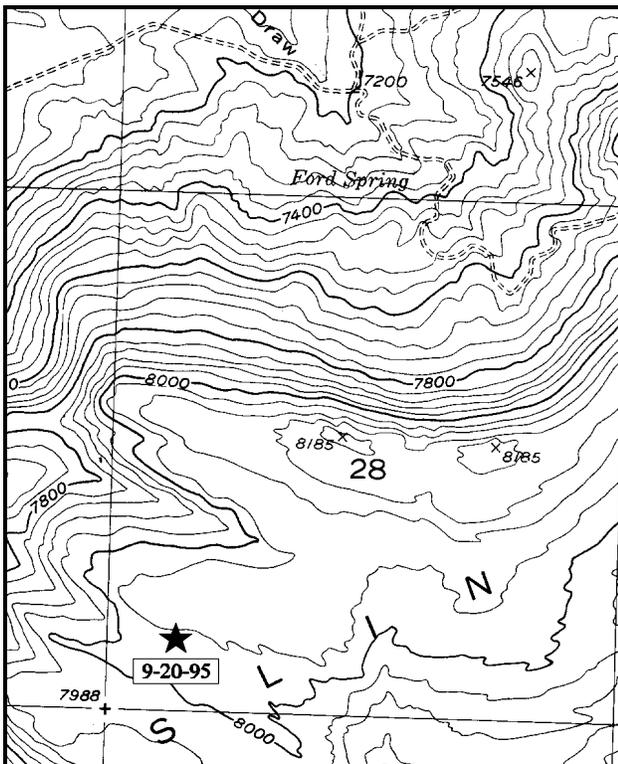
Study site name: West Goslin. Range type: Big Sagebrush - Grass.

Compass bearing: frequency baseline 279 degrees.

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

LOCATION DESCRIPTION

From Dutch John, travel north on Highway 191 to the turn off to Goslin Mountain. Turn right and drive 2.85 miles to a fork. Turn right and drive 1.3 miles to a gate. Go through the gate and continue 2.5 miles to a fork. Go right 0.5 miles to a intersection . The witness post is locates on the East side of the Y shaped intersection about 50' south of the road. Full size posts are used to mark the site. The 0' post is marked with a browse tag # 34.



Map Name: Goslin Mtn.

Diagrammatic Sketch

Township 3N, Range 23E, Section 28

GPS COOR. 6-40-123E 12 45-35-669N

## DISCUSSION

### Trend Study No. 9-20

Five new study sites were setup in 1995 on Goslin Mountain to monitor key habitat used by both livestock and elk. The area is used for livestock during the summer. Two of the sites were placed in the mountain big sagebrush-grass type and the remaining three monitor meadows which receive concentrated use. This particular site was placed on a ridge top at an elevation of 8,000 feet with a south-east aspect. Slope is a gentle three to five percent. An elk herd of about 30 individuals was encountered when setting up the study in early July of 1995. Elk pellet groups were found in 7% of the quadrats placed on the site, deer pellet-groups were less common. A few cattle pats were also scattered through the area in small numbers, but none were encountered within a quadrat.

The soil is shallow and rocky. Rooting depth is restricted in some places as evidenced by the presence of black sagebrush. Due to the abundant vegetation and litter cover which totals to 117% cover, there is little bare ground (9%). Vegetation and litter cover are also very well dispersed (as indicated by the very high nested frequency values) further protecting the soil from erosion.

The key browse species on the site consists of a fairly dense stand of mountain big sagebrush. Total cover of sagebrush is almost 25%. These large sagebrush account for only 35% of the browse composition by density, but make up 39% of the total vegetation cover and 73% of the browse cover. Population density was estimated at 3,380 plants/acre with 80% of the population consisting of large mature plants. Average height/crown of the mature sagebrush is respectively 30 by 43 inches. Utilization is light to moderate with only 2% of the population being heavily hedged. Vigor is generally good with the exception of some of the decadent sagebrush. Percent decadence is moderately low at 13%, but the ratio of dead to live plants could be an indicator of continued downward trend, especially when 30% of the decadent plants are classified as dying.

Other preferred browse encountered on the site include small numbers of serviceberry, black sagebrush, mountain mahogany, bitterbrush, and snowberry. Snowberry shows light to moderate hedging, while use of the other browse is moderate to heavy.

The herbaceous understory is diverse and abundant. Grasses combine to produce 13% cover, while forbs provide just over 16%. Eleven perennial grasses and one sedge were encountered. The most numerous species include oniongrass, letterman needlegrass, and subalpine needlegrass.

Thirty one species of forbs occur on the site. Silvery lupine is the dominate forb. It provides nearly 7% cover and accounts for 42% of the total forb cover. Other numerous forbs which produce more than 1% cover consist of slenderleaf collomia, sulfur eriogonum, and longleaf phlox. Preferred forbs include arrowleaf balsamroot, yellow Indian paintbrush, low penstemon, lambstongue, hollyleaf clover, and bluebell.

### 1995 APPARENT TREND ASSESMENT

Due to the abundant vegetation and litter cover, little bare ground is found on the site. The high nested frequency values for vegetation and litter also suggest well dispersed cover. This combined with the gentle terrain limits erosion. Trend for soil appears stable at this time. The browse trend is slightly down. The population of mountain big sagebrush is healthy and vigorous, but has low numbers of seedlings with a moderate density of young to maintain the population. Percent decadence is moderately low and use is mostly light to moderate. The most negative aspects of the population is that one in seven

plants are dead and 30% of the decadent plants are classified as dying. The herbaceous understory is abundant and diverse. There are several known increaser species on the site including Kentucky bluegrass, Columbia needlegrass, and letterman needlegrass. Combined, these species makeup only 40% of the grass cover with the more preferred grasses accounting for 60%. The forb component also contains some increaser species but the overall composition is good. Trend for grasses and forbs is considered stable.

APPARENT TREND ASSESSMENT

soil - stable

browse - slightly down

herbaceous understory - stable

VEGETATIVE TRENDS --  
Herd unit 9, Study no: 20

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron dasystachyum	180	55	.80
G	Carex spp.	39	14	.56
G	Dactylis glomerata	49	13	.31
G	Festuca idahoensis	26	12	.35
G	Melica bulbosa	213	60	4.51
G	Poa compressa	15	7	.13
G	Poa fendleriana	43	16	.86
G	Poa pratensis	13	3	.06
G	Sitanion hystrix	28	13	.16
G	Stipa columbiana	96	30	1.70
G	Stipa comata	16	6	.13
G	Stipa lettermani	174	55	3.47
Total for Grasses		892	284	13.07
F	Agoseris glauca	151	56	.90
F	Allium spp.	86	41	.42
F	Antennaria rosea	4	1	.03
F	Arenaria congesta	16	6	.51
F	Arabis drummondi	9	4	.02
F	Astragalus convallarius	4	2	.18
F	Astragalus spp.	8	2	.01
F	Balsamorhiza sagittata	4	2	.01
F	Castilleja flava	4	2	.03
F	Collomia linearis	169	61	1.07
F	Collinsia parviflora	154	49	.99
F	Crepis acuminata	36	14	.34

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
F	<i>Cymopterus longipes</i>	11	5	.07
F	<i>Delphinium bicolor</i>	18	8	.04
F	<i>Draba</i> spp.	2	1	.03
F	<i>Erigeron eatonii</i>	11	4	.02
F	<i>Eriogonum umbellatum</i>	52	19	1.31
F	<i>Heterotheca villosa</i>	3	1	.00
F	<i>Hymenoxys</i> spp.	2	1	.03
F	<i>Lomatium triternatum</i>	9	3	.01
F	<i>Lupinus argenteus</i>	197	69	6.85
F	<i>Mertensia</i> spp.	3	1	.00
F	<i>Penstemon humilis</i>	9	4	.04
F	<i>Phlox austromontana</i>	27	10	.56
F	<i>Phlox longifolia</i>	129	51	1.36
F	<i>Polygonum douglasii</i>	69	28	.19
F	<i>Senecio integerrimus</i>	16	7	.09
F	<i>Sedum lanceolatum</i>	9	3	.06
F	<i>Taraxacum officinale</i>	58	23	.21
F	<i>Trifolium gymnocarpon</i>	75	29	.73
F	Unknown forb-annual	3	1	.00
Total for Forbs		1348	508	16.19
B	<i>Amelanchier utahensis</i>	5	1	.21
B	<i>Artemisia nova</i>	-	-	.00
B	<i>Artemisia tridentata</i> <i>vaseyana</i>	60	27	24.90
B	<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	5	2	.53
B	<i>Eriogonum heracleoides</i>	132	44	7.47
B	<i>Gutierrezia sarothrae</i>	3	1	.15
B	<i>Symphoricarpos oreophilus</i>	17	6	.96
Total for Browse		222	81	34.23

BASIC COVER --

Herd unit 9, Study no: 20

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	474	55.49
Rock	112	1.75
Pavement	52	.12
Litter	495	61.50
Cryptograms	22	.07
Bare Ground	211	8.76

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 20

Type	Quadrat Frequency '95
Elk	7
Deer	3

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 20

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier utahensis</i>																		
Y	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	95	6	1	-	-	1	1	-	-	-	9	-	-	-	180	27	41	9
D	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'95	260	Dec:	7%			
<i>Artemisia nova</i>																		
M	95	-	2	1	-	-	-	-	-	-	3	-	-	-	60	6	9	3
D	95	-	-	1	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'95	80	Dec:	25%			
<i>Artemisia tridentata vaseyana</i>																		
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	95	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
M	95	92	39	4	-	-	-	-	-	-	135	-	-	-	2700	30	43	135
D	95	19	3	-	1	-	-	-	-	-	16	-	-	7	460		23	
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	480		24	
Total Plants/Acre (excluding Dead & Seedlings)												'95	3380	Dec:	13%			
<i>Cercocarpus montanus</i>																		
M	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	68	84	0
Total Plants/Acre (excluding Dead & Seedlings)												'95	0	Dec:	-			

A G E	YR	Form Class (No. of 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																		
Y	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180	8 12	9	
Total Plants/Acre (excluding Dead & Seedlings)												'95	200	Dec:	-			
Eriogonum heracleoides																		
Y	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	95	242	-	-	28	-	-	-	-	-	270	-	-	-	5400	11 14	270	
Total Plants/Acre (excluding Dead & Seedlings)												'95	5440	Dec:	-			
Gutierrezia sarothrae																		
M	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6 7	2	
Total Plants/Acre (excluding Dead & Seedlings)												'95	40	Dec:	-			
Purshia tridentata																		
M	95	-	-	-	-	1	-	-	-	-	1	-	-	-	20	15 42	1	
Total Plants/Acre (excluding Dead & Seedlings)												'95	20	Dec:	-			
Symphoricarpos oreophilus																		
M	95	7	7	-	3	-	-	-	-	-	17	-	-	-	340	24 47	17	
Total Plants/Acre (excluding Dead & Seedlings)												'95	340	Dec:	-			

PERCENT BROWSE COMPOSITION--  
Herd unit 9, Study no: 20

Species	Percent of Total '95
Amelanchier utahensis	3
Artemisia nova	.81
Artemisia tridentata vaseyana	35
Cercocarpus montanus	0
Chrysothamnus viscidiflorus viscidiflorus	2
Eriogonum heracleoides	56
Gutierrezia sarothrae	.40
Purshia tridentata	.20
Symphoricarpos oreophilus	3

TREND STUDY 9-21-95

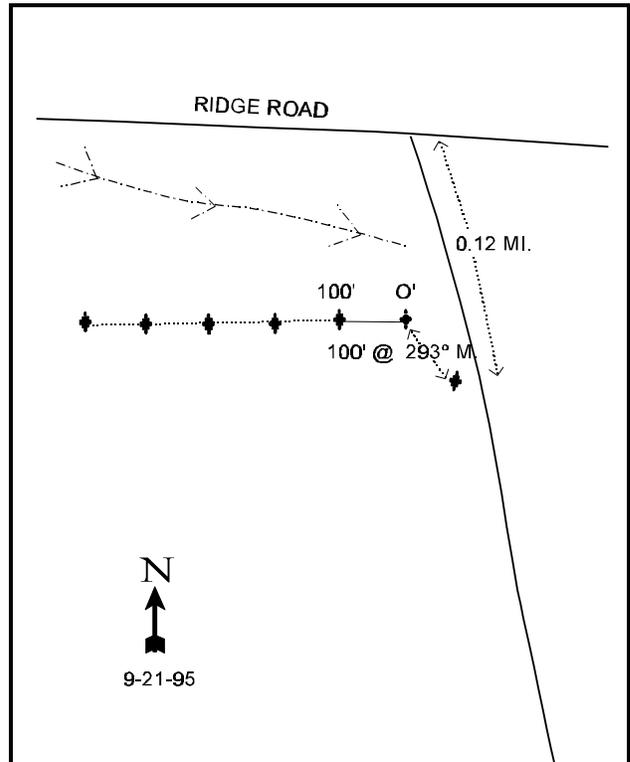
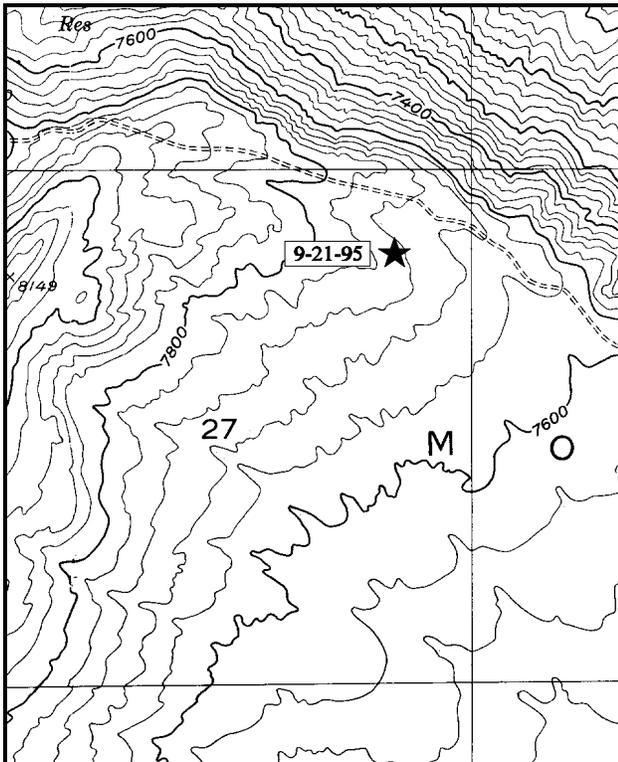
Study site name: Sagebrush Ridge. Range type: Big Sagebrush - Grass.

Compass bearing: frequency baseline 257 degrees.

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

LOCATION DESCRIPTION

From Dutch John drive north on highway #191 to the turn off for Goslin mountain. Turn right and Drive 2.85 miles to a fork. Bear right and drive 1.3 miles to a gate. Continue 2.9 miles to a fork. Bear right and drive .12 miles. There will be a witness post on the west side of the road. The 0' post is 100 ft at 293/. The site is marked with full high fence posts. The 0' post is marked with a browse tag # 33.



Map Name: Goslin Mtn.

Diagrammatic Sketch

Township 3N, Range 23E, Section 27

GPS COOR. 6-43-002E 12 45-37-204N

## DISCUSSION

### Trend Study No. 9-21

This trend study also samples a mountain big sagebrush-grass type at an elevation of 7,700 feet with an eastern aspect. Slope is moderate ranging from 20% to 25%. Cattle utilize this site when not concentrated in the numerous wet meadows nearby. Deer also use the area in the summer. A few elk pellet-groups were noted but none were encountered within the quadrats.

The soil is shallow and rocky but rooting depth does not appear to be a limiting factor. Percent bare ground is higher on this site than on site #20, but it is still low at 11%. The abundant and well dispersed vegetation and litter cover adequately protect the soil from erosion.

The dominant browse on this site is mountain big sagebrush which have an estimated density of 3,580 plants/acre, which are mostly classified as mature. Sagebrush cover was estimated at 17% which accounts for 75% of the total browse cover. Percent decadence is 17% with a larger proportion of dead plants on this site than on the west Goslin site (#20). It appears that winter injury on the more open areas and snow mold due to deep long lasting snow is responsible for most of the decadence and some of the dead plants on the site. Several areas nearby, especially those with more northern aspects, contain pockets of dead sagebrush due to deep snow accumulation from the previous winter. Utilization is moderate and vigor is good except for 25% of the decadent sagebrush which have been classified as having poor vigor or dying.

Bitterbrush is another important browse species on the site. There is an estimated 760 plants/acre. Utilization was reported moderate to heavy with 53% of the shrubs displaying heavy use (>60% stems browsed). Even with this heavy use some bitterbrush was in flower. Vigor is good and percent decadence is low at 2%. Other less desirable browse encountered on the site include mountain low rabbitbrush, wyeth eriogonum, slenderbush eriogonum, and gray horsebrush.

Herbaceous composition is very similar to that of site #20. The dominant grasses include Ross sedge, needle-and-thread, letterman needlegrass and, alpine fescue. All grasses combine to produce 17% cover (32% of the total vegetative cover). Forbs are also abundant accounting for 26% of the total vegetative cover. Silvery lupine is the dominant forb providing 27% of the forb cover. Other numerous species which produce more than 1% cover include pale agoseris, slenderleaf collomia, litterflower collinsia, and sulfur eriogonum.

### 1995 APPARENT TREND ASSESMENT

Estimated cover for bare ground is only 11% on the site with abundant vegetation and litter cover. This cover is also well dispersed, adequately protecting the soil from erosion. Trend for soil is stable at this time. The browse trend appears to be slightly down with a moderately high proportion of the decadent plants still dying. The high number of dead plants encountered is evidence of a reduction in density in the past, either by unusually heavy snow cover during the 1992-93 and the 1994-95 winters, or winter injury coupled with drought. Currently the population appears healthy, utilization is mostly light to moderate and percent decadency is moderately low at 17%. The herbaceous understory contains a large variety of grasses and forbs. Of the 12 species of grasses and one sedge encountered, most are desirable forage species. The forb component also contains several desirable species. Trend for the herbaceous understory appears stable and in relatively good condition.

APPARENT TREND ASSESSMENT

soil - stable

browse - slightly down

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 9, Study no: 21

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron dasystachyum	186	57	2.15
G	Carex spp.	177	58	5.86
G	Festuca ovina	43	14	1.47
G	Koeleria cristata	6	2	.01
G	Melica bulbosa	13	4	.24
G	Muhlenbergia asperifolia	5	2	.06
G	Poa compressa	96	33	.64
G	Poa fendleriana	2	1	.03
G	Poa pratensis	8	3	.04
G	Sitanion hystrix	57	24	.45
G	Stipa columbiana	19	9	.42
G	Stipa comata	188	60	3.63
G	Stipa lettermani	95	29	2.32
Total for Grasses		895	296	17.35
F	Agoseris glauca	181	68	1.12
F	Antennaria dimorpha	2	1	.03
F	Antennaria rosea	12	5	.07
F	Arenaria congesta	6	2	.18
F	Arabis drummondi	3	2	.01
F	Astragalus convallarius	26	13	.72
F	Calochortus nuttallii	3	1	.00
F	Collomia linearis	198	75	1.58
F	Collinsia parviflora	193	60	1.64
F	Cryptantha spp.	8	3	.01
F	Cymopterus longipes	48	26	.40
F	Delphinium bicolor	8	4	.02
F	Erigeron eatonii	22	11	.28
F	Eriogonum umbellatum	38	14	1.29
F	Gayophytum ramosissimum	9	3	.01
F	Lithospermum ruderales	29	12	.62

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
F	Lomatium triternatum	3	1	.00
F	Lupinus argenteus	135	59	3.95
F	Mertensi fusiformis	56	25	.71
F	Penstemon humilis	42	18	.29
F	Phlox longifolia	172	62	.79
F	Polygonum douglasii	110	40	.25
F	Senecio integerrimus	6	6	.11
F	Stellaria longipes	5	3	.04
F	Tragopogon dubius	9	3	.01
F	Trifolium gymnocarpon	47	21	.28
F	Unknown forb-annual	1	1	.00
Total for Forbs		1372	539	14.49
B	Artemisia tridentata vaseyana	51	31	17.29
B	Ceratoides lanata	-	-	.00
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	.03
B	Eriogonum heracleoides	38	17	1.86
B	Eriogonum microthecum	39	18	.97
B	Purshia tridentata	13	7	2.84
Total for Browse		141	73	23.01

BASIC COVER --

Herd unit 9, Study no: 21

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	469	50.19
Rock	105	.51
Pavement	221	1.72
Litter	497	54.46
Cryptograms	2	.00
Bare Ground	306	11.05

PELLET GROUP FREQUENCY --  
Herd unit 9, Study no: 21

Type	Quadrat Frequency '95
Rabbit	2
Deer	6
Cattle	8

BROWSE CHARACTERISTICS --  
Herd unit 9, Study no: 21

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	95	4	6	1	-	-	-	-	-	-	11	-	-	-	220		11	
M	95	45	86	5	-	-	-	-	-	-	136	-	-	-	2720	25	39	136
D	95	2	16	12	-	-	-	-	-	-	22	-	2	6	640		32	
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	920		46	
Total Plants/Acre (excluding Dead & Seedlings)												'95	3580	Dec:	17%			
<i>Ceratoides lanata</i>																		
M	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	9	1
Total Plants/Acre (excluding Dead & Seedlings)												'95	20	Dec:	-			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
M	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	12	17	2
Total Plants/Acre (excluding Dead & Seedlings)												'95	40	Dec:	-			
<i>Eriogonum heracleoides</i>																		
M	95	68	-	-	-	-	-	-	-	-	68	-	-	-	1360	11	19	68
Total Plants/Acre (excluding Dead & Seedlings)												'95	1360	Dec:	-			
<i>Eriogonum microthecum</i>																		
S	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	95	49	-	-	5	2	-	-	-	-	56	-	-	-	1120	7	12	56
Total Plants/Acre (excluding Dead & Seedlings)												'95	1280	Dec:	-			
<i>Gutierrezia sarothrae</i>																		
M	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	16	0
Total Plants/Acre (excluding Dead & Seedlings)												'95	0	Dec:	-			
<i>Purshia tridentata</i>																		
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	95	3	7	13	-	5	7	-	-	-	35	-	-	-	700	16	36	35
D	95	-	1	-	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'95	760	Dec:	2%			

A G E	YR	Form Class (No. of 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	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	10	0
Total Plants/Acre (excluding Dead & Seedlings)													'95	0	Dec:	-		

PERCENT BROWSE COMPOSITION--

Herd unit 9, Study no: 21

Species	Percent of Total '95
Artemisia tridentata vaseyana	51
Ceratoides lanata	.28
Chrysothamnus viscidiflorus viscidiflorus	.56
Eriogonum heracleoides	19
Eriogonum microthecum	18
Gutierrezia sarothrae	0
Purshia tridentata	11
Tetradymia canescens	0

TREND STUDY 9-22-95

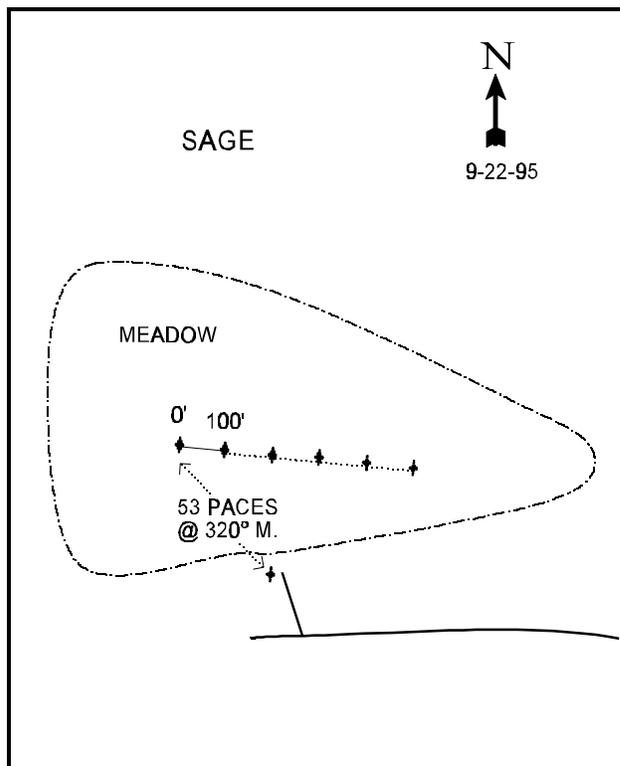
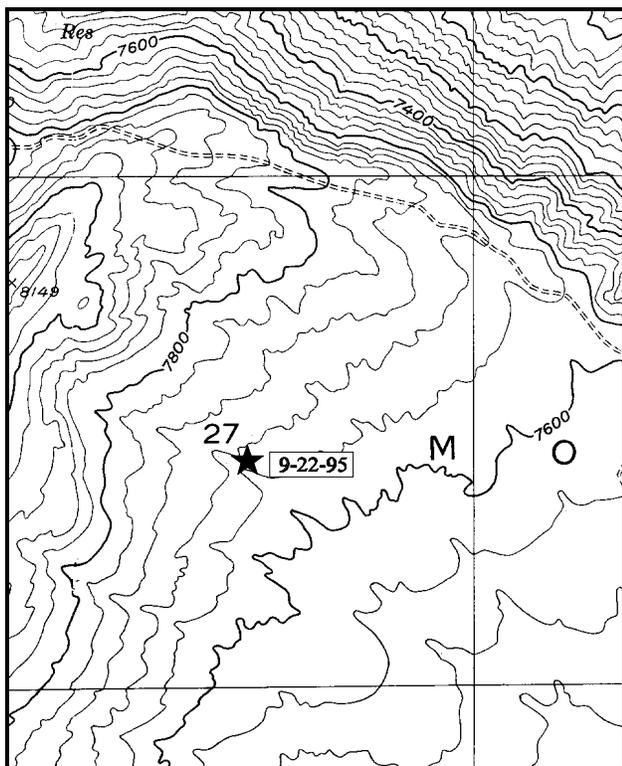
Study site name: Triangle Meadow. Range type: Wet Meadow.

Compass bearing: frequency baseline 110 degrees.

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

LOCATION DESCRIPTION

From the right turn by study # 21. Drive .8 miles to a four way intersection. Turn right and drive .4 miles to a fork by a meadow. Turn right and continue 0.1 miles to a meadow with a witness post. The 0 foot baseline stake is located 53 paces away at 320° M.



Map Name: Goslin Mtn.

Diagrammatic Sketch

Township 3N, Range 23E, Section 27

GPS COOR. 6-42-490E 12 43-36-275N

## DISCUSSION

### Trend Study No. 9-22

This study site was placed in a meadow less than one half of a mile south of study #21. This meadow, which is on DWR land, receives light to moderate use by elk and deer, cattle use would be considered heavy as evidenced by the pellet-group quadrat frequency data. Deer use the meadows mostly in the spring. Elk were seen on the site in July before livestock were let into the allotment. Slope on the meadow is nearly level (2% to 5%) and drainage is to the east. This meadow is partially flooded in the spring and early summer and sub-irrigated most of the rest of the season by springs originating from the hillside a short distance to the west.

Erosion is not a problem on these meadows due to the extensive ground cover of sod forming grasses and the gentle slope. Bare ground on this site was less than one half of one percent.

Very few browse occur on these meadows. The only species encountered on this site was a seedling and one young mountain big sagebrush. The high water table during most of the spring prohibits sagebrush from becoming established.

The important aspect of these meadows is the herbaceous species, especially the grasses which provide forage for wildlife and livestock. The grasses produce a total cover of 39%. Kentucky bluegrass, an increaser, is the most numerous species accounting for 74% of the grass cover on this meadow. Baltic rush, a less desirable species, is also common, producing 11% of the grass cover. The key forage species on this meadow is Nebraska sedge which provides 13% of the grass cover. This sedge is highly palatable and a good indicator species. Forbs provide a total cover of 6%. The most common species is dandelion, an invasive plant, which accounts for 78% of the forb cover. Most of the other forbs are annuals or low growing perennials. Two increaser species, Kentucky bluegrass and dandelion, account for 75% of the total vegetative cover on this site.

### 1995 APPARENT TREND ASSESMENT

Soil trend is stable and there is no threat of erosion on this site as long as the sod cover is not broken. There are very few shrubs on site, but the shrub component is not an important aspect here with regard to transition or summer range. The herbaceous composition is the important aspect of this meadow type. Since there is no previous data to determine trends, vegetative condition will have to be assessed by composition only. The grass component is dominated by Kentucky bluegrass, an increaser under moderate to heavy grazing pressure. The second most abundant species is Nebraska sedge which is a palatable and highly sought after forage plant, which decreases with moderate to heavy grazing pressure. Forbs are dominated by dandelion and other low growing perennial and annual species. Trend is impossible to determine without at least two different time periods with 3-5 years between the sampling dates. However, trend would be stable, but with the present species composition of this meadow, it would be considered fair to poor.

#### APPARENT TREND ASSESSMENT

soil - stable

browse - almost nonexistent and not important

herbaceous understory - trend appears stable under current conditions, but composition is fair to poor and dominated by less desirable increasers Kentucky bluegrass, Baltic rush, and dandelion

VEGETATIVE TRENDS --  
Herd unit 9, Study no: 22

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron spp.	7	3	.39
G	Carex nebraskensis	271	79	5.09
G	Juncus balticus	215	75	4.50
G	Muhlenbergia asperifolia	6	2	.15
G	Poa pratensis	487	100	28.99
G	Sitanion hystrix	1	1	.03
Total for Grasses		987	260	39.16
F	Achillea millefolium	1	1	.00
F	Astragalus galegiformis	4	2	.01
F	Aster spp.	11	5	.24
F	Chorispora tenella	16	9	.07
F	Collinsia parviflora	18	7	.08
F	Descurainia pinnata	2	1	.00
F	Draba spp.	48	18	.43
F	Gayophytum ramosissimum	10	3	.01
F	Lappula occidentalis	8	3	.39
F	Lepidium spp.	2	1	.00
F	Myosotis alpestris	15	6	.03
F	Polygonum douglasii	4	2	.01
F	Ranunculus testiculatus	1	1	.00
F	Taraxacum officinale	251	88	4.67
F	Tragopogon dubius	2	1	.03
F	Unknown forb-annual	3	1	.00
Total for Forbs		396	149	6.02
B	Artemisia tridentata vaseyana	4	2	.01
Total for Browse		4	2	0.00

BASIC COVER --

Herd unit 9, Study no: 22

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	494	51.43
Rock	17	.05
Pavement	36	.06
Litter	500	79.47
Cryptograms	10	.02
Bare Ground	58	.43

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 22

Type	Quadrat Frequency '95
Rabbit	2
Elk	7
Deer	8
Cattle	48

BROWSE CHARACTERISTICS --

Herd unit 9, Study no: 22

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia tridentata vaseyana																	
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1

TREND STUDY 9-23-95

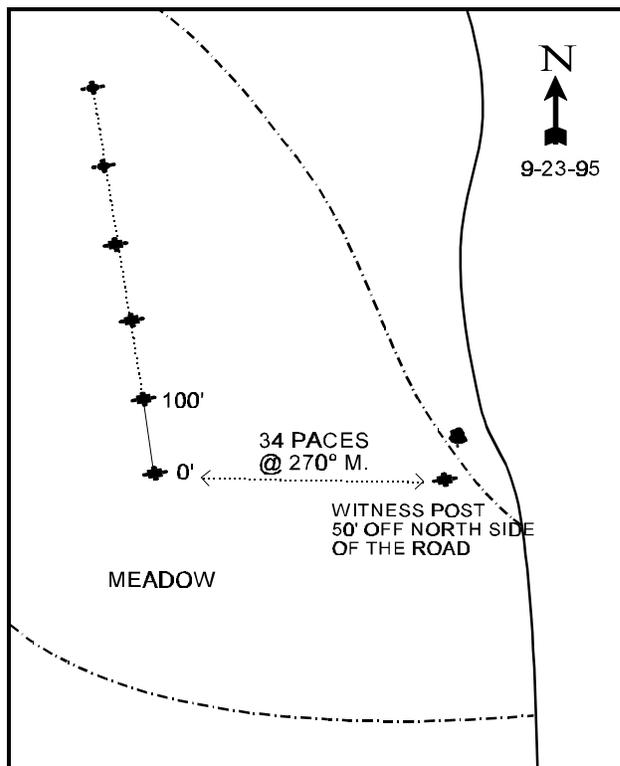
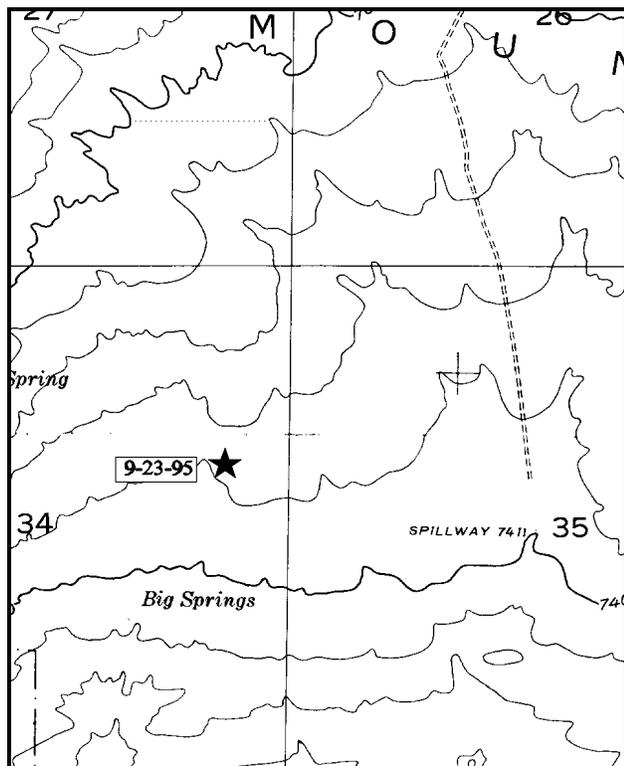
Study site name: Big Meadow. Range type: Wet Meadow.

Compass bearing: frequency baseline 337 degrees.

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

LOCATION DESCRIPTION

From the right turn by study # 21, drive 0.8 miles to a four way intersection. From the four way intersection, continue straight west and drive 0.4 miles to a witness post. The witness post is located 50 feet off the north side of the road. From the witness post walk 34 paces at 270° M. to the 0 ft. Baseline stake.



Map Name: Goslin Mtn.

Diagrammatic Sketch

Township 3N, Range 23E, Section 34 GPS COOR. 6-42-924E 12 45-35-011N

## DISCUSSION

### Trend Study No. 9-23

This is another new study set up on the Goslin Mountain to monitor concentrated use areas by wildlife and livestock on small meadows. This meadow is about one half of a mile south of site #22, just north of Big Springs at an elevation of 7,500 feet. The transect was placed on the north edge of the meadow. Slope is more gradual than site #22 resulting in wetter conditions. Drainage is to the east, south-east.

The soil is deep with no rocks encountered on the surface. Vegetation and litter cover are abundant and prohibit any erosion. Water is found on the surface of the meadow until sometime in June or July depending on weather conditions. During study establishment, July 7<sup>th</sup> 1995, the ground was mostly dry but the water table appeared to be just under the surface in most places. Further to the south the meadow becomes increasingly wet with some shallow accumulations of water visible.

Grasses and forbs are diverse and abundant on this site, however species composition is poor. Eighty percent of the grass cover comes from Baltic rush and Kentucky bluegrass, both are considered increasers. These species are also well dispersed on the site as evidenced by their high nested frequency values (410 and 440 out of a possible 500). The more desirable Nebraska sedge, tufted hair-grass, and slender wheatgrass make up only 13% of the grass cover. Dominant forbs include yarrow, Pacific aster, thistle, cinquefoil, balsam groundsel and dandelion. Many of these species are low growing increasers which establish under heavy grazing pressure. The increaser forbs make up 76% of the forb cover. The grass and forb increasers together make up 76% of the total vegetative cover.

### 1995 APPARENT TREND ASSESMENT

Soil trend is considered stable due to the almost imperceptible slope and excellent vegetation and litter cover. No shrubs occur on the site so there is no data available for a browse trend. Composition of the herbaceous understory is diverse, but dominated by less desirable increaser species. The increaser grass-like and grass species are Baltic rush and Kentucky bluegrass. Forbs are diverse but are also dominated by low growing increasers. Dandelion is the most numerous forb with a quadrat frequency of 96%. Although this forb is found in many natural undisturbed communities, high densities are a good indication of overgrazing.

#### APPARENT TREND ASSESSMENT

soil - stable

browse - none on site

herbaceous understory - stable under current conditions, but dominated by increasers, indicating a poor to fair trend for composition

VEGETATIVE TRENDS --  
Herd unit 9, Study no: 23

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron trachycaulum	89	30	.74
G	Carex nebraskensis	233	78	2.76
G	Carex spp.	146	39	2.86
G	Deschampsia caespitosa	88	30	1.85
G	Equisetum spp.	33	10	.05
G	Hordeum brachyantherum	9	3	.01
G	Juncus balticus	410	94	16.51
G	Muhlenbergia asperifolia	16	5	.07
G	Poa pratensis	440	95	16.20
Total for Grasses		1464	384	41.07
F	Achillea millefolium	48	14	1.43
F	Agoseris glauca	10	4	.05
F	Antennaria rosea	26	10	.91
F	Arabis spp.	3	1	.00
F	Astragalus agrestis	37	11	.08
F	Aster chilensis	146	48	3.13
F	Aster spp.	36	11	.59
F	Cirsium spp.	95	38	1.53
F	Equisetum spp.	39	14	.29
F	Erigeron spp	3	1	.00
F	Myosotis alpestris	13	4	.04
F	Potentilla anersina	200	68	3.85
F	Potentilla gracilis	69	32	1.56
F	Ranunculus testiculatus	11	3	.18
F	Senecio pauperculus	97	25	2.75
F	Sisyrinchium spp.	104	39	1.24
F	Stellaria longipes	5	2	.01
F	Taraxacum officinale	316	96	8.56
F	Viola adunca	124	39	2.32
Total for Forbs		1382	460	28.58

BASIC COVER --

Herd unit 9, Study no: 23

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	499	69.33
Litter	499	76.84
Cryptograms	83	5.28

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 23

Type	Quadrat Frequency '95
Cattle	21

TREND STUDY 9-24-95

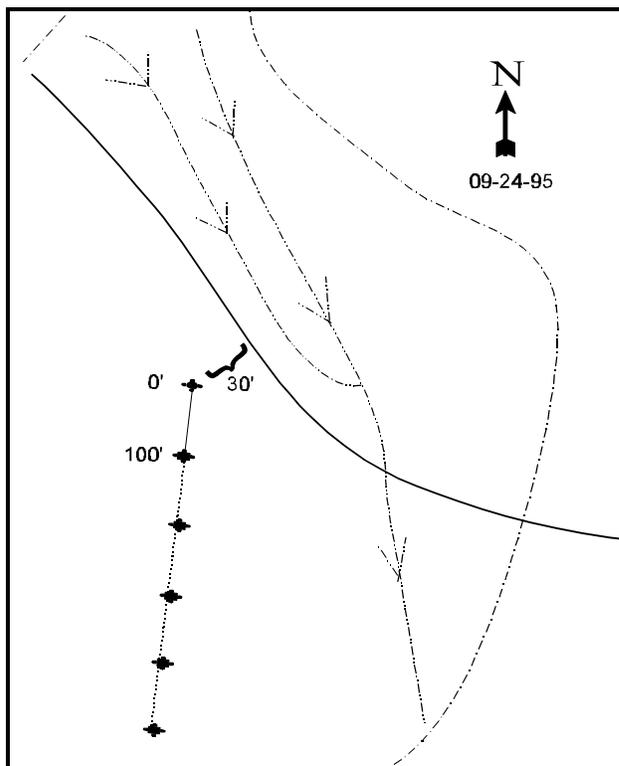
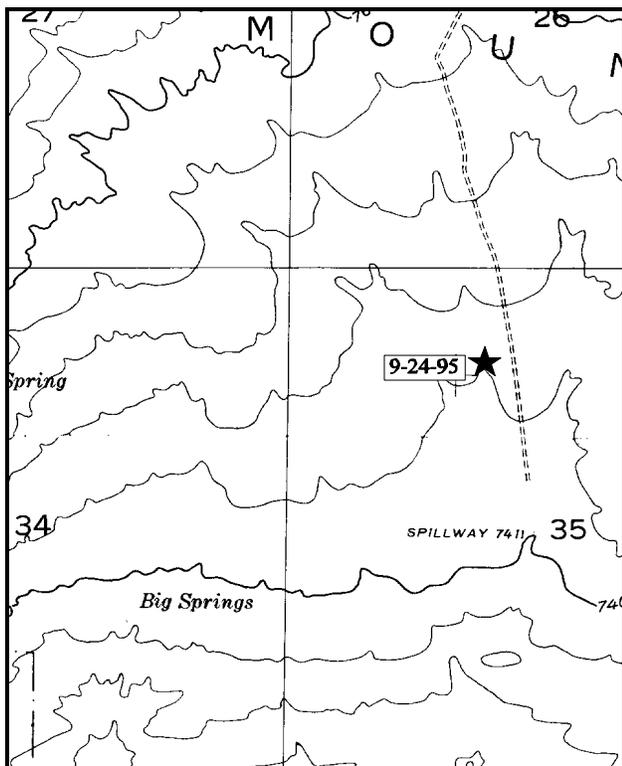
Study site name: Lower Big Meadow. Range type: Wet Meadow.

Compass bearing: frequency baseline degrees.

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

LOCATION DESCRIPTION

From the right turn by study # 21, drive 0.8 miles to a four way intersection. From the four way intersection, bear left and drive 0.6 miles to a post in a meadow 30 feet south of the road. The road is faint as it crosses the large meadow. The 0' stake is marked with browse tag #37.



Map Name: Goslin Mtn.

Diagrammatic Sketch

Township 3N, Range 23E, Section 35

GPS COOR. 6-43-879E 12 45-35-112N

DISCUSSION

Trend Study No. 9-24

This is a new study site established in 1995 to monitor wildlife and livestock impacts on meadows on Goslin Mountain. This study was setup on a meadow about one half of a mile east of study #23. It is a drier site than site #23, but has the same elevation, slope, and aspect.

The soil is deep with very little surface rock. Vegetation and litter cover are abundant and prevent any erosion.

Ten grasses, two sedges, and one rush occur on the site and provide 32% cover. The most common grasses include Canada and Kentucky bluegrass which account for 47% of the grass cover. These species are very tolerant of grazing and often occur on disturbed sites. The increaser grasses on this site account for 60% of the grass cover. Grasses considered decreasers on this range type include slender and thick spike wheatgrass, Nebraska sedge, prairie Junegrass and Sandberg bluegrass. Combined, these desirable species account for only 18% of the grass cover.

Forbs are more abundant on this site than on site #22 or #23. Combined they provide a total of 39% cover. Unfortunately, the most abundant forb (56% of the forb cover) is the mat forming rose pussytoes. Other abundant forbs include Pacific aster and dandelion. The increaser forbs account for 86% of the total forb cover. Grass and forb increasers make up 74% of the total vegetative cover.

1995 APPARENT TREND ASSESMENT

The soil trend is stable with abundant well dispersed vegetation and litter cover. There is no browse trend because no shrubs occur on the site. The herbaceous understory is very diverse and abundant. However, like the other meadows sampled, less desirable increaser species dominate the understory. Only 18% of the grass cover comes from decreaser species. Fifty six percent of the forb cover comes from rose pussytoes, a mat forming species which provides very little forage. Most of the other forbs are low growing increasers who's dominance indicates over grazing. Overall, 74% of the total vegetative cover is contributed by increaser grasses and forbs.

APPARENT TREND ASSESSMENT

soil - stable

browse - none on site

herbaceous understory - stable, but dominated by increasers indicating only fair to poor condition for composition

VEGETATIVE TRENDS --

Herd unit 9, Study no: 24

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron dasystachyum	157	46	1.55
G	Agropyron trachycaulum	57	21	.45
G	Carex nebraskensis	3	1	.03

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Carex spp.	297	84	6.59
G	Hordeum brachyantherum	6	3	.04
G	Juncus balticus	70	24	1.12
G	Koeleria cristata	87	30	3.23
G	Muhlenbergia asperifolia	91	25	2.37
G	Poa compressa	238	68	9.39
G	Poa pratensis	94	26	5.67
G	Poa secunda	31	9	.61
G	Sporobolus cryptandrus	41	13	.21
G	Stipa lettermani	30	9	.64
Total for Grasses		1202	359	31.94
F	Achillea millefolium	22	9	.52
F	Antennaria rosea	306	79	21.67
F	Arabis spp.	5	2	.01
F	Astragalus agrestis	115	40	1.58
F	Aster chilensis	177	55	3.19
F	Cirsium spp.	119	47	1.04
F	Descurainia spp.	3	1	.00
F	Draba spp.	15	5	.02
F	Equisetum spp.	113	44	.39
F	Erigeron spp	62	20	.41
F	Eriogonum spp.	3	1	.03
F	Potentilla anersina	56	21	.69
F	Potentilla gracilis	15	4	.04
F	Ranunculus testiculatus	2	1	.00
F	Sedum lanceolatum	3	1	.00
F	Senecio pauperculus	4	1	.00
F	Sisymbrium spp.	28	9	.43
F	Sisyrinchium spp.	155	52	1.62
F	Taraxacum officinale	189	63	6.05
F	Viola spp.	33	10	.73
F	Zigadenus venenosus	9	3	.16
Total for Forbs		1434	468	38.67

BASIC COVER --

Herd unit 9, Study no: 24

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	499	68.32
Rock	9	.01
Litter	495	63.81
Cryptograms	38	.79
Bare Ground	92	.52

PELLET GROUP FREQUENCY --

Herd unit 9, Study no: 24

Type	Quadrat Frequency '95
Rabbit	16
Elk	2
Deer	12
Cattle	40

## SUMMARY

### DEER Herd Unit 9 - DAGGETT

A total of 13 study sites were read on unit 9 in 1995. Of these, 6 were rereads of sites established in 1982, two were rereads of studies established in 1988, and the other 5 were new studies. Two studies at Bennett Ranch (#5) and Antelope Flat (#10) sample Wyoming big sagebrush-grass. The Bennett Ranch site samples private land and appears to have a stable soil and herbaceous trend and a slightly improving browse trend due to reduced heavy use of the sagebrush. Antelope Flat has a slightly improving soil trend with a stable to slightly down browse trend and a slightly downward herbaceous trend.

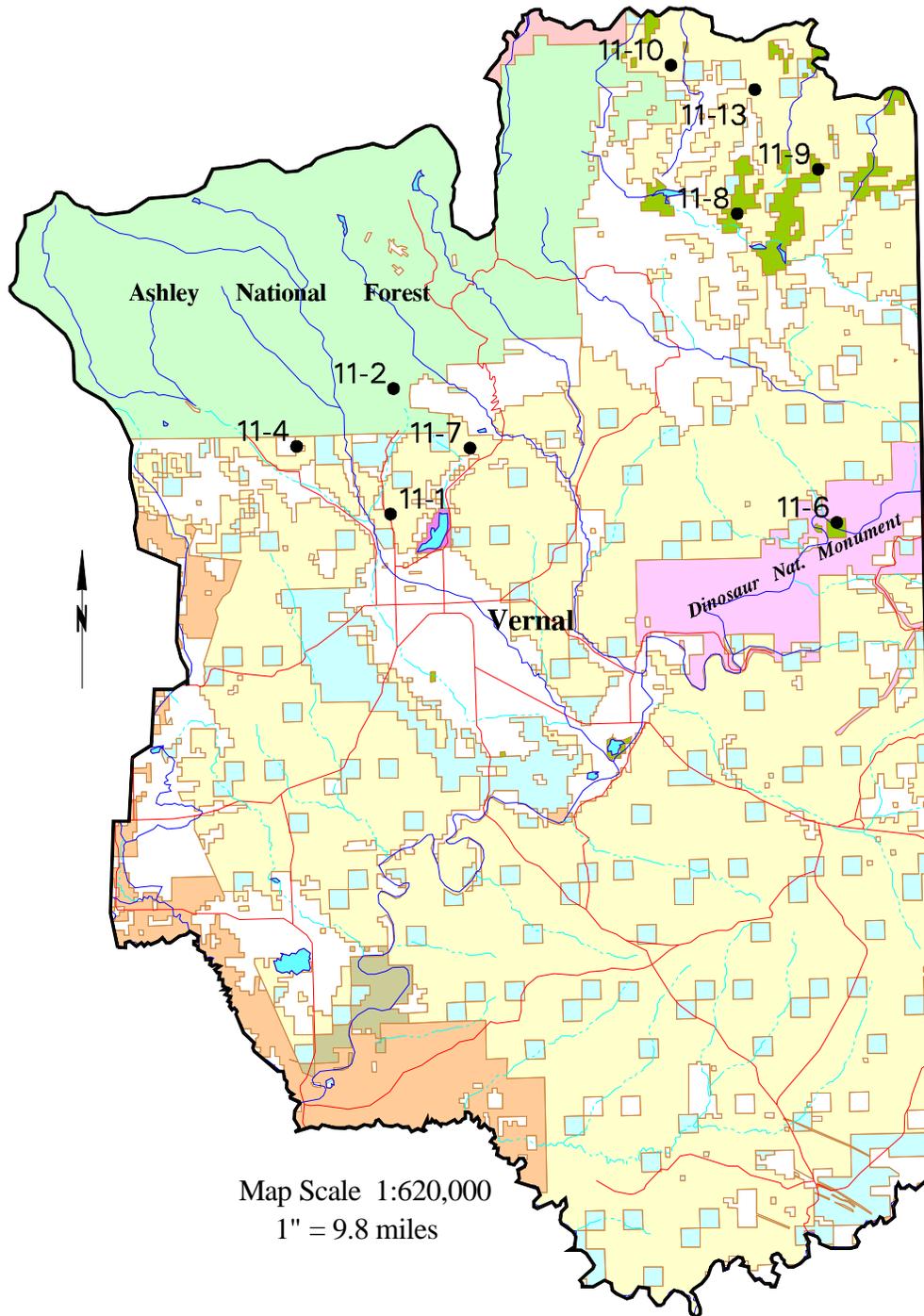
Sites at Goslin Mountain (#2), Bear Top Mountain (#3), Greendale (#4) West Goslin (#20), and sagebrush ridge (#21) sample mountain big sagebrush-grass. All sites had stable or improved soil trends. Browse trends are up on Greendale and stable to slightly down on all others except Goslin Mountain which has a downward browse trend due to heavy use, poor recruitment and a high number of dying decadent plants. Herbaceous trends are up on Greendale and Goslin Mountain, slightly down on Bear Top and stable for all others.

One site at Cedar Springs samples a pinyon-juniper dominated range type. The trees are shading out understory plants and tying up water and mineral resources causing a downward browse trend and poor conditions for soil and herbaceous understory. This site is in great need of a prescribed burn or some kind of mechanical treatment.

Sites at Death Valley (#6) and Phil Pico Mountain (#18), sample true mountain mahogany sites which are important winter range areas for elk and deer. Soil trends are slightly down for the Death Valley site but slightly up for Phil Pico. Browse trends are slightly up for true-mountain mahogany on both sites. Herbaceous trends are stable at Death Valley and down at Phil Pico due to decreased nested sum of frequency for grasses and forbs.

Three other new sites sample meadows on the Goslin Mountain to monitor use by elk and livestock. Frequency of pellet groups indicated that livestock use would be moderate to heavy, while use by elk and deer would be light. These meadows (Triangle meadow #22, Big Meadow #23 and Lower Big Meadow #24) all appeared to have stable soil trends due to the extensive cover of sod forming grasses. Browse did not occur on the meadows so there was no browse trends. Herbaceous trends are impossible to determine with only one year of data. Condition, however, was estimated from the species composition. All of these sites are dominated to varying degrees by increasers caused by historically heavy grazing pressure and considered in fair to poor condition for composition.

# Deer Management Unit 11 –1995 Transect Locations

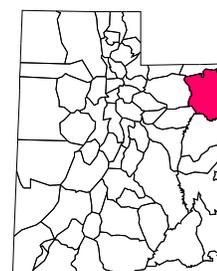


Map Scale 1:620,000  
1" = 9.8 miles

## LEGEND

	<i>Forest Service</i>		<i>State Park</i>		<i>Road</i>
	<i>BLM</i>		<i>State Wildlife Res.</i>		<i>Perennial Stream</i>
	<i>State of Utah</i>		<i>Nat. Recreation Area</i>		<i>Intermittent Stream</i>
	<i>Native American</i>		<i>Fed. Wildlife Ref.</i>		
	<i>Private Land</i>		<i>Water Body</i>		
	<i>National Park</i>		<i>Transect Location</i>		

## MAP LOCATION



## Herd Unit 11 - Vernal

### Boundary Description

Uintah and Daggett Counties - Boundary begins at the junction of U.S. Highway 40 and the Utah-Colorado state line; then south along this state line to the White River; west along this river to the Green River; West along the Green River to the Duchesne River; northwest along this river to the Uinta River; north along the Uinta River to Deep Creek; north along this creek to the Paradise Reservoir Road; north on this road to Paradise Reservoir and the Whiterocks-dry Fork drainage divide; north along this drainage divide to the Uintah-Daggett County line; east along this county line to Highway US-191; north on US-191 to Cart Creek; north along this creek to the east shoreline of Flaming Gorge Reservoir; east along this shoreline to the Green River; east along this river to the Utah-Colorado state line; south along this state line to US-40 and beginning point; excludes Dinosaur National Monument and all Indian Tribal Lands.

Herd Unit boundaries changed in 1993 to include areas south of US-40 and east of the Green River. This addition did not change summer and winter range acreage deemed important for deer as reported in the 1996 Big Game Harvest Summary.

The winter range on the Vernal deer herd unit is estimated to be 253,100 acres, comprised mainly of closely associated areas of the pinyon-juniper woodlands on the south-facing slopes and foothill benches of Diamond, Blue, and Taylor Mountains. The upper limits generally follow the 8,500 foot contour. The lower limits are defined by agricultural lands and the desert below Vernal. Over half of the identified winter range (55%) is managed by the BLM. This BLM land is used primarily for livestock grazing. Public land on the key winter range sampled is grazed by cows on various schedules, generally in spring and fall. There is a high probability for phosphate strip mining on some BLM winter range, especially around the Red Mountain, Dry Fork Mountain, and Steinaker Draw. There are major phosphate mining operations ongoing in the herd unit. Dinosaur National Monument manages 17% of the winter range in the southeast part of the unit along the Green River. These desert lands are managed primarily for recreation, and no livestock grazing is permitted. The 10% privately owned winter range in the unit appears to be used mainly for livestock grazing. The Forest Service and the state of Utah each manage 8% of the winter range.

Key areas of winter range on the Vernal unit are the small sagebrush/grass parks found throughout the pinyon-juniper zone. The sparse pinyon-juniper type predominates the foothills where diversity and productivity of desirable browse is low. The areas with a sagebrush understory or sagebrush/grass associations are more productive, therefore, normally receives more use by big game and livestock. These areas were sampled by six studies; two on the south side of Taylor Mountain (#11-1 and #11-2), one on the Dry Fork Mountain face (#11-4), one at Island Park (#11-6) and two north of Diamond Mountain (#11-8 and #9). Two sites sample pinyon-juniper types, one above Steinaker Reservoir (#11-7), and another near Toliver Creek (#11-12), just south of the Green River. Two additional sites sample pinyon-juniper treatments, one in a chaining near Toliver Creek (#11-11) and a burn just south of the Green River called Brown's Park (#11-13). One site samples mixed mountain brush in the Ponderosa Pine zone across the Green River from Little Hole (#11-10).

Six study sites just south of the Green River including Warren Draw, Rye Grass, Little Hole, Toliver Creek chaining, Toliver Creek P-J, and Browns Park burn and P-J were previously in the Daggett deer herd unit #25. They have now been changed to herd unit #11.

### Grazing Summary

Island Park is now part of Dinosaur National Park and is no longer grazed by livestock. Dry Fork Mountain, managed by the BLM, is grazed from May 10 to September 20 for 470 AUM's, but actual use averages 334 year due to a lack of water. The BLM Spring Creek allotment below Taylor Mountain has been grazed by cows in the spring (May) and late fall (November 26 to December 15) for the last 12 years. The Forest Service land on Taylor Mountain is managed in a six pasture rest-rotation system with grazing occurring from June 1 to September 15. The unit in which the trend study is located supports about 500 AUM's in years not rested, for a grazing intensity of 2.9 suitable acres/AUM. Study #11-5 occurs within the Forest Service Lake Mountain allotment. This mixed mountain brush type is grazed by 276 cows/calves from June 21 to September 30, on a four unit rest-rotation system. The prevalent, sparse pinyon-juniper type was sampled by the study above Steinaker Draw. This area is grazed by cattle in the spring (May 5 to June 4).

The sampled BLM grazing allotments are generally grazed by cattle in spring and/or summer. The Little Hole allotment has 330 AUMs and is grazed May 16 to October 15. The Warren Draw cattle allotment is permitted for 376 AUM's from May 15 to October 31. Cows use the lower areas of Browns Park on the Taylor Flat allotment in spring. The intensive annual grazing April 1 to May 31 is planned to reduce grass-shrub competition and to promote sagebrush vigor, however, better livestock distribution is needed. Since 1970 there have been 1,000 AUMs permitted. The DWR land in the drainages above Browns Park are grazed in conjunction with BLM permits.

### Herd Unit Management Objectives

Current management objectives (1997 state-wide herd management plan) for the Vernal deer herd unit are to harvest a total of 1,400 bucks annually. Antlerless harvest will be utilized once the buck harvest target is reached to help stabilize the population. Deer harvest for this unit has historically been quite variable. In 1988 there were 2,527 bucks harvested from the unit. Between 1988 and 1992, harvests averaged 1,685 bucks. During the 1992 harvest, there were 1,803 bucks harvested but the heavy snows of the 1992-93 winter reduced the number of bucks taken the next season by nearly 1,000 animals. Harvests have continued to range around 900 bucks between 1993 and 1995. Fawn/doe ratios were moderately high in 1988 with 68 fawns/100 does. Since then the number has remained fairly stable averaging 52 fawn/100 does. These lower fawn/doe ratios will continue with the prolonged drought which continues to cause poor conditions for the summer range.

### Study Site Update

A total of twelve trend studies were read on this herd unit in 1988 and in 1995. It was decided at a March 21, 1988 Interagency meeting in Vernal to drop the study in the desert shrub type in Steinaker Draw and add one in the juniper foothills above the draw. Three additional sites were established in 1988; two sample a native pinyon-juniper and a P-J chaining treatment, a third site samples a pinyon-juniper prescribed burn. The other 8, 1982 range trend studies were considered valuable and suitable for rereading. The studies were read in August of 1982, September of 1988, and August of 1995.

TREND STUDY 11-1-95

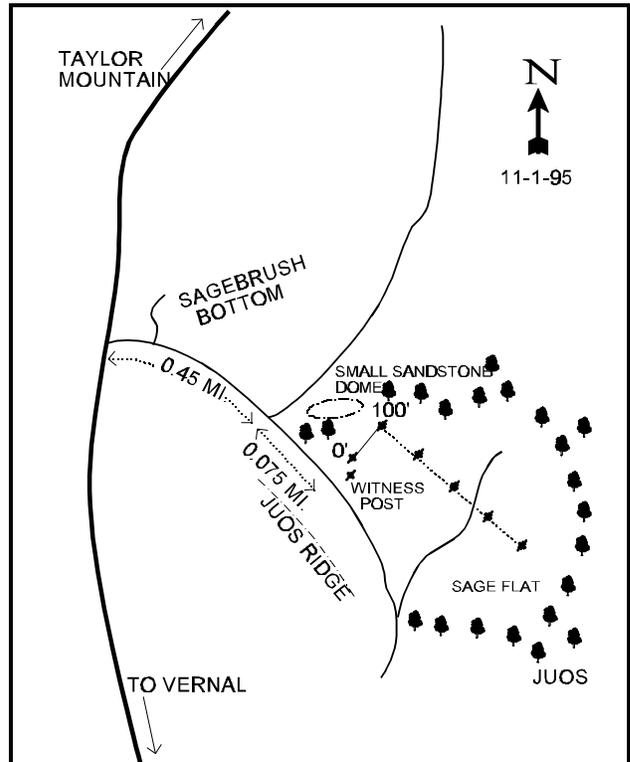
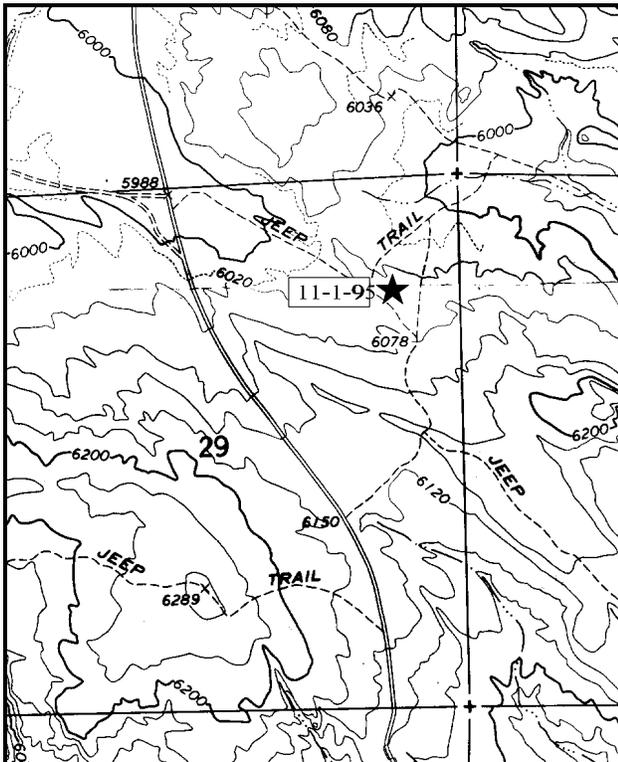
Study site name: Red Mountain Allotment . Range type: Sagebrush - Grass .

Compass bearing: frequency baseline 23 degrees.

First frame Placement on frequency belts 5 feet. Frequency belt placement; line 1 (4 & 89ft), line 2 (28ft), line 3 (45ft), line 4 (77ft).

LOCATION DESCRIPTION

From Highway 121 (500 N) west of Vernal in Maeser, go north on 2500 West for 3.25 miles to the Ashley substation. From there, continue 2.2 miles to a dirt road to the right in the sagebrush bottom. Turn and go east for .45 miles to a fork. Stay right and go just under .1 miles. The 0-foot baseline stake should be visible in the sagebrush along the left side of the road. The study can also be located by walking 75 paces bearing 182° true from the east end of the sandstone dome to the 0-foot baseline stake.



Map Name: Steinaker Reservoir

Diagrammatic Sketch

Township 3S , Range 21E , Section 29 UTM COOR. 6-20-327E 12 44-87-847N

## DISCUSSION

### Trend Study No. 11-1

This trend study is located on big game winter range above Vernal. The site supports nearly a pure stand of Wyoming big sagebrush surrounded by pinyon-juniper on the rocky ridges. The terrain at the study site is nearly level (slope 0 to 5%) with a northern aspect. Elevation is just over 6,000 feet.

The soil is Zeona loamy sand. It is deep and somewhat excessively drained. Runoff is slow and the erosion hazard is slight due to the flat terrain. Percent bare ground was moderately high in 1982 at 35%, but has steadily declined since and is currently 21%. Vegetative cover was high in 1995 at 34.3%, yet 70% of that cover comes from shrubs which are less effective at protecting against soil erosion from high intensity summer storms. There is an extensive cover of cryptogamic crusts (16%) which provides added soil protection.

Wyoming big sagebrush is the dominant browse species, comprising 84% of the browse cover on the site. Sagebrush canopy cover was estimated at 32% in 1988 and 21% in 1995. There were 5,132 mostly mature plants/acre estimated in 1982 which increased to 9,665 plants/acre in 1988. The large increase came from the greatly increased decadent age class which increased from 400 plants/acre in 1982 to 5,133 by 1988. The population has since declined to an estimated 4,360 plants/acre of mostly mature plants. The change is partly the result of a larger sample size used in 1995 which better estimates shrub populations which are normally clumped or discontinuous. It is apparent, however, that many of the decadent shrubs died between 1988 and 1995. This die off is likely weather related as use of the sagebrush in 1988 was moderate with only 17% displaying heavy use. Currently, vigor is generally good with poor vigor reported in 38% of the decadent shrubs which were classified as dying (>50% of crown dead). This would suggest a further decline in density in the future resulting in a smaller but healthier community.

The sampling done in 1995 estimated 1,000 mountain low rabbitbrush plants/acre along with small numbers of prickly phlox and prickly pear cactus.

The herbaceous understory occurs mainly under the canopy of sagebrush leaving large bare interspaces between individual shrubs. The dominant grasses are annual cheatgrass and sixweeks fescue which account for 81% of the grass cover. These annual species were not sampled in 1982 or 1988, so no comparisons can be made. Five perennial grass species were sampled in 1995 with thickspike wheatgrass, mutton grass, and bottlebrush squirreltail being the most abundant. Forbs combine for less than 2% cover with 8 annual species contributing 72% of that cover.

### 1982 APPARENT TREND ASSESSMENT

Apparent vegetative trend on this site is stable to declining. The apparent trend evaluation form indicates that plant composition is less than desirable. The key species, Wyoming big sagebrush, shows evidence of a high level of utilization which could eventually depress vigor and plant density. Soil trend is basically declining. Of the seven applicable soil trend parameters on the evaluation checklist, five were judged as indicating a declining trend.

### 1988 TREND ASSESSMENT

Slight changes in ground cover measurements detected in 1988 are probably not significant. The possible exception is the increase in the cover of the cryptogamic crust. Bare soil still constitutes 30% of the ground surface, but that is an improvement from 1982 when percent bare ground was estimated at 35%.

There is considerable areas of unprotected bare soil in the shrub interspaces, but serious erosion does not appear to be a significant problem on the site due to the level terrain. Trend for soil is slightly up, but in poor condition. Trend for the key browse species, Wyoming big sagebrush, is mixed. Population density has increased greatly but entirely from an increase in the decadent age class which rose from 400 plants/acre in 1982 to 5,133 by 1988. Use is currently more moderate, yet vigor has declined with 14% (733 plants/acre) of the decadent shrubs classified as dying. The data for shrub density suggests that the population has increased considerably since 1982, most likely caused by the extremely wet years of 1983 and 1984. However, the sagebrush is likely poised to decline dramatically in the future if current drought conditions persist. Trend for browse is slightly down due to the high numbers of decadent individuals even though the mature population currently appears stable. The herbaceous trend is slightly up due to an increase in quadrat frequency of grasses. Forbs have remained stable.

TREND ASSESSMENT

soil - slightly up but in poor condition

browse - slightly down and poised to decline due to abundant decadent sagebrush

herbaceous understory - slightly up but in poor condition due to the high amounts of annual species in the composition

1995 TREND ASSESSMENT

Ground cover characteristics have improved since 1988 with percent bare ground decreasing from almost 30% to 21%. Cryptogamic cover has also increased providing added soil protection. Even with this improvement, condition is still poor with large areas of bare ground between shrubs. Trend for browse is improved slightly. Overall density has declined considerably but the result is a smaller, healthier population. Heavy use has declined, vigor has improved and percent decadency has declined from 53% to 14%. Recruitment is good with 120 seedlings and 360 young plants/acre. Trend for the herbaceous understory is slightly down with sum of nested frequency of perennial grasses declining significantly for three of the five species encountered. Condition of the understory is poor due to the dominance of annual grasses and forbs. Cheatgrass and sixweeks fescue make up 81% of the grass cover while 8 annual forbs contribute 99% of the forb cover. These annual grasses and forbs were not included in the 1982 and 1988 samples so no comparisons can be made.

TREND ASSESSMENT

soil - slightly up but in poor condition

browse - slightly up, reduced in density but improved in all other categories.

herbaceous understory - slightly up, but in poor condition with a high number of species that are annuals

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 1

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	71	53	14	25	17	.33
G	Bromus tectorum	-	251	-	-	84	5.64
G	Oryzopsis hymenoides	2	-	-	1	-	-

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	<i>Poa fendleriana</i>	111	*51	10	52	23	.66
G	<i>Poa secunda</i>	-	*17	-	-	8	.40
G	<i>Sitanion hystrix</i>	50	*25	13	27	13	.23
G	<i>Stipa comata</i>	3	3	1	1	2	.06
G	<i>Vulpia octoflora</i>	-	252	-	-	84	1.82
Total for Grasses		237	652	38	106	231	9.17
F	<i>Allium</i> spp.	12	11	2	5	5	.02
F	<i>Androsace septentrionalis</i>	-	4	-	-	2	.01
F	<i>Carduus nutans</i>	-	2	-	-	2	.01
F	<i>Calochortus nuttallii</i>	1	-	4	1	-	-
F	<i>Chaenactis</i> spp.	-	2	-	-	1	.00
F	<i>Chenopodium leptophyllum</i>	-	16	-	-	9	.04
F	<i>Collinsia parviflora</i>	-	3	-	-	1	.00
F	<i>Cryptantha</i> spp.	2	*18	17	2	9	.07
F	<i>Descurainia pinnata</i>	-	92	-	-	40	.25
F	<i>Eriogonum cernuum</i>	-	2	-	-	1	.00
F	<i>Erigeron pumilus</i>	-	*8	-	-	4	.02
F	<i>Gilia</i> spp.	-	16	-	-	7	.03
F	<i>Lappula occidentalis</i>	-	3	-	-	1	.00
F	<i>Lepidium montanum</i>	12	*13	1	6	8	.06
F	<i>Machaeranthera canescens</i>	6	16	1	3	9	.04
F	<i>Oenothera pallida</i>	-	1	-	-	1	.00
F	<i>Orobanche</i> spp.	3	-	-	1	-	-
F	<i>Phlox longifolia</i>	3	11	-	1	5	.05
F	<i>Plantago patagonica</i>	-	207	-	-	73	1.23
F	<i>Polygonum douglasii</i>	-	2	-	-	1	.00
F	<i>Schoenocrambe linifolia</i>	1	5	-	1	3	.04
Total for Forbs		40	432	25	20	182	1.93

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
B	Artemisia tridentata wyomingensis	93	*70	48	49	36	21.34
B	Chrysothamnus viscidiflorus lanceolatus	1	22	-	1	10	4.00
B	Leptodactylon pungens	1	3	1	1	1	.15
Total for Browse		95	95	49	51	47	25.50

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

BASIC COVER --

Herd unit 11, Study no: 1

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	351	4.00	3.25	34.27
Rock	12	9.50	0	.02
Pavement	7	1.25	0	.01
Litter	398	68.75	55.50	43.87
Cryptograms	259	4.25	11.75	15.97
Bare Ground	281	35.25	29.50	21.13

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 1

Type	Quadrat Frequency '95
Rabbit	14
Elk	2
Deer	47

BROWSE CHARACTERISTICS --  
Herd unit 11, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	1	1	-	2	-	-	-	-	-	4	-	-	-	266		4	
	95	17	1	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	82	10	25	35	-	-	-	-	-	-	65	3	2	-	4666	23	26	70
	88	26	27	11	-	-	-	-	-	-	58	2	4	-	4266	24	21	64
	95	73	68	5	-	8	8	6	-	-	168	-	-	-	3360	33	42	168
D	82	-	1	5	-	-	-	-	-	-	-	4	1	1	400		6	
	88	30	32	14	1	-	-	-	-	-	52	1	13	11	5133		77	
	95	15	7	5	1	1	-	3	-	-	20	-	-	12	640		32	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	980		49	
Total Plants/Acre (excluding Dead & Seedlings)												'82	5132	Dec:	7%			
												'88	9665		53%			
												'95	4360		14%			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	41	-	-	2	-	-	-	-	-	43	-	-	-	860	23	32	43
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	1	-	-	-	-	-	3	-	-	1	80		4	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	1000		8%			
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	23	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Juniperus osteosperma																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	-	1	-	-	-	-	-	-	-	1	-	-	-	66	36	15	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
Leptodactylon pungens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	19	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
Opuntia spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	1	1	-	-	-	-	-	-	-	1	-	-	-	133	4	16	2
	88	3	-	-	2	-	-	-	-	-	5	-	-	-	333	3	6	5
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	13	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	399		-			
												'95	40		-			

PERCENT BROWSE COMPOSITION--

Herd unit 11, Study no: 1

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata wyomingensis	96	95	80
Chrysothamnus viscidiflorus lanceolatus	0	0	18
Gutierrezia sarothrae	0	0	0
Juniperus osteosperma	1	.65	0
Leptodactylon pungens	0	0	1
Opuntia spp.	3	4	.73

TREND STUDY 11-2-95

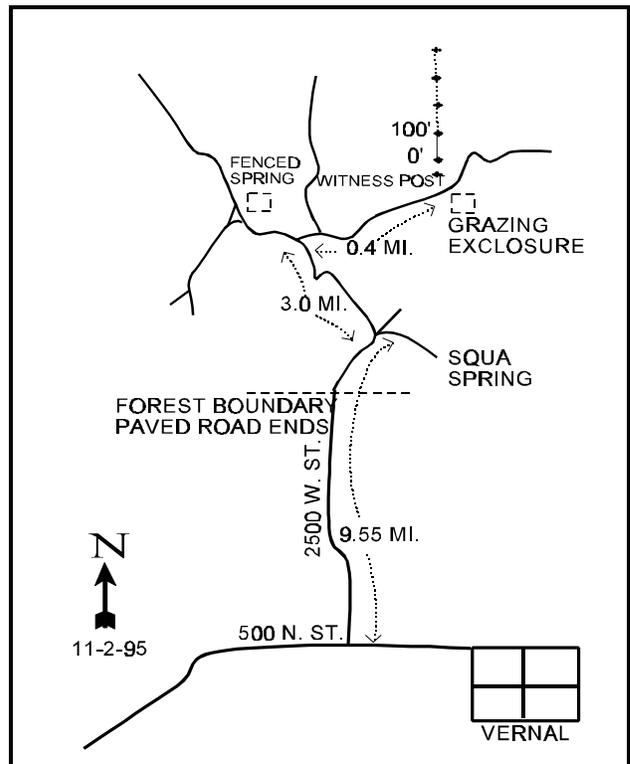
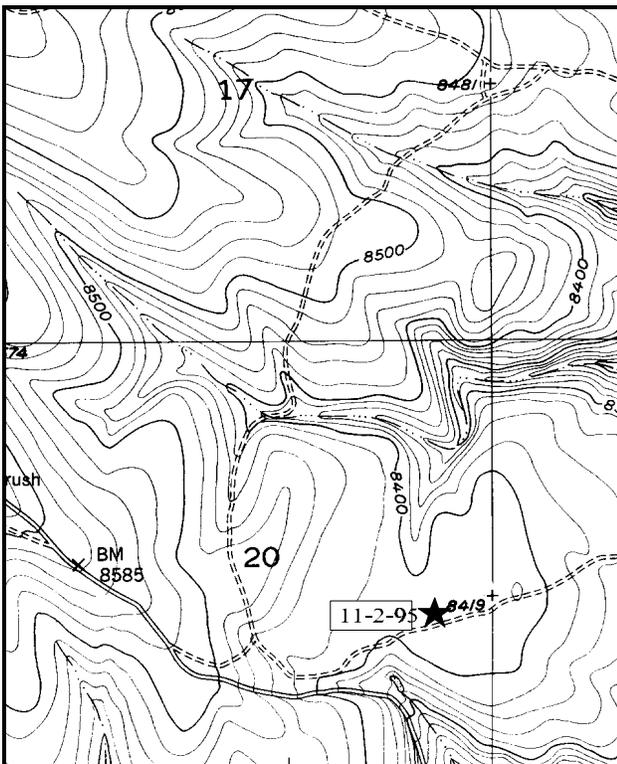
Study site name: Taylor Mountain . Range type: Sagebrush-Grass .

Compass bearing: frequency baseline 15 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (14 & 82ft), line 2 (28ft), line 3 (59ft), line 4 (77ft).

LOCATION DESCRIPTION

From Vernal, travel west on 500 North Street to 2500 West. Turn right on 2500 West and drive north 9.55 miles to the National Forest boundary. Continue north 3 miles to a fork. Turn right and go .4 miles towards the Taylor Mountain Enclosure. From the sign on the west side of the enclosure, walk 54 paces north to the 0-foot end of the baseline. It is marked by an 18 inch tall fencepost with browse tag #7091 attached.



Map Name: Dyer Mountain

Diagrammatic Sketch

Township 2S, Range 21E, Section 20

UTM COOR. 6-20-577E 12 44-98-446N

## DISCUSSION

### Trend Study No. 11-2

The trend study adjacent to the Taylor Mountain Exclosure is used year-round by big game, but perhaps is best classified as spring-fall range. Elevation on the broad open ridge top is 8,400 feet with gentle east facing slopes of 1% to 5%. This Forest Service land is a summer cattle allotment. The Taylor Mountain exclosure was built in 1962.

The soil is dark in color and moderately deep with little surface rockiness. Active erosion is slight due to the level terrain and excellent vegetation and litter cover. Percent bare ground is currently low at less than 7%.

Mountain big sagebrush and antelope bitterbrush are the key browse species on the site. Sagebrush are large and vigorous with an estimated density of 4,666 plants/acre in 1982, increasing to 6,532 by 1988. It appears that many of the numerous young plants (1,200) encountered in 1982 survived to maturity as the number of mature plants increased from 2,600 plants/acre to 4,666. The new larger sample used in 1995 estimated a population of 4,620 mostly mature plants/acre. Vigor is good and percent decadence is low at 4%. Use has been low in the past but current use is classified as moderate to heavy. Seventy-two percent of the shrubs are moderately hedged and 12% display heavy use.

Antelope bitterbrush is also an important forage species on this site with an estimated density of 2,065 plants/acre in 1982, increasing to 2,620 by 1995. These plants are prostrate, measuring only 16 inches in height. The population is generally vigorous and healthy but heavily hedged. Only 3% of the population are now classified as decadent. Currently 42% of the mature bitterbrush display heavy use.

Other browse encountered on the site include mountain low rabbitbrush, snowberry, and small numbers of serviceberry and mountain mahogany.

The herbaceous understory is diverse and abundant with grasses combining to produce 6.6% cover and forbs 13% cover. The dominant grasses include thickspike wheatgrass, mutton grass, and bottle brush squirrel tail. Thickspike was previously not sampled but picked up with the larger sample used in 1995.

Forbs are exceptionally diverse with 42 perennial species encountered in 1995. Dominant forbs consist of pussy toes, ballhead sandwort, tapertip hawksbeard, silver lupine, and rock goldenrod.

### 1982 APPARENT TREND ASSESSMENT

Both vegetative and soil trends appear stable or improving. Utilization of the key browse species is not excessive and there is adequate replacement of decadent or dead plants. Herbaceous understory composition and production are fair, but there is room for improvement.

### 1988 TREND ASSESSMENT

An increase in percent litter cover was noted, resulting in 88.5% total ground cover in 1988. The dense vegetation on the site provides excellent soil protection. The slight soil movement is not significant and there is little net loss of soil. Trend for soil is up. Trend for the key browse species, mountain big sagebrush and bitterbrush is up due to increasing population densities, good numbers of young plants, and low decadency rates. Trend for the herbaceous understory is also up due to increased quadrat frequency of grasses and forbs.

TREND ASSESSMENT

soil - improved

browse - up for sagebrush and slightly up for bitterbrush

herbaceous understory - up

1995 TREND ASSESSMENT

Soil conditions continue to improve on the site. Bare ground declined from 11.5% to 6.5%. Litter cover declined from 77% to 65% but this trend is common during the state-wide extended drought. The browse trend is stable for sagebrush and slightly improved for bitterbrush. Sagebrush density has declined since 1988, but the number of mature plants is relatively stable, percent decadency is low and vigor is good. The number of dead plants is low (300) indicating that the change in density is partly due to the larger sample used in 1995. The only negative aspects of the sagebrush population is the low number of young plants and the higher use reported in 1995. Antelope bitterbrush is also more heavily utilized but has increased in density, has a lower decadency rate, and has an adequate number of young plants. The herbaceous understory has remained stable since the last reading. Grasses declined slightly in sum of nested frequency while forbs have increased slightly.

TREND ASSESSMENT

soil - slightly up

browse - stable for sagebrush and slightly up for bitterbrush

herbaceous understory - stable

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	-	*157	-	-	62	1.12
G	Agropyron spicatum	-	2	-	-	1	.03
G	Bouteloua gracilis	-	3	-	-	1	.00
G	Bromus tectorum	-	3	-	-	1	.00
G	Carex spp.	-	*7	-	-	4	.02
G	Festuca ovina	3	19	5	2	9	.09
G	Koeleria cristata	46	*18	33	18	6	.08
G	Poa fendleriana	173	*154	29	65	54	1.96
G	Poa pratensis	22	*50	1	8	20	.99
G	Poa secunda	77	*1	48	34	1	.00
G	Sitanion hystrix	177	*106	25	71	41	1.57
G	Stipa comata	90	*46	9	38	15	.30
G	Stipa lettermani	76	*56	41	34	24	.39
Total for Grasses		664	622	191	270	239	6.59
F	Agoseris glauca	-	4	-	-	2	.01
F	Antennaria rosea	107	*59	14	41	25	1.67
F	Androsace septentrionalis	-	20	1	-	9	.04

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
F	Arabis spp.	45	*16	4	23	7	.06
F	Arenaria congesta	112	*178	22	42	54	2.25
F	Aster chilensis	-	0	-	-	3	.01
F	Astragalus convallarius	15	*5	7	7	3	.04
F	Astragalus tenellus	-	6	-	-	2	.06
F	Aster spp.	-	*9	-	-	5	.02
F	Astragalus spp.	-	2	1	-	1	.00
F	Balsamorhiza hookeri	72	72	54	35	37	.73
F	Castilleja flava	-	2	-	-	1	.00
F	Castilleja linariaefolia	15	14	2	9	6	.03
F	Cirsium spp.	-	3	-	-	1	.00
F	Collomia linearis	-	69	-	-	34	.17
F	Comandra pallida	3	4	5	3	2	.03
F	Collinsia parviflora	-	78	-	-	31	.15
F	Crepis acuminata	-	*17	-	-	7	1.06
F	Cryptantha spp.	-	2	-	-	2	.01
F	Draba spp.	-	1	7	-	1	.00
F	Eriogonum alatum	-	1	-	-	1	.00
F	Erigeron flagellaris	100	*42	38	48	21	.13
F	Eriogonum umbellatum	58	*63	23	23	28	.83
F	Gayophytum ramosissimum	-	3	-	-	1	.00
F	Hymenoxys acaulis	-	3	-	-	1	.03
F	Ipomopsis aggregata	5	4	-	2	2	.01
F	Lesquerella spp.	-	5	-	-	2	.01
F	Lithospermum spp.	-	1	-	-	1	.00
F	Lomatium spp.	-	*19	1	-	9	.09
F	Lupinus argenteus	18	*80	12	10	35	1.79
F	Lychnis drummondii	-	-	2	-	-	-
F	Mertensia spp.	-	*8	-	-	4	.02
F	Penstemon humilis	-	*40	-	-	19	.12
F	Penstemon spp.	100	*10	39	49	5	.02
F	Petradoria pumila	94	*59	29	40	29	1.12
F	Phlox austromontana	93	*23	47	39	12	.10
F	Phlox longifolia	50	60	-	25	25	.32
F	Polygonum douglasii	-	165	-	-	58	.36

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
F	Potentilla gracilis	12	28	14	6	16	.10
F	Senecio debilis	101	*33	7	47	17	.08
F	Sedum lanceolatum	-	*51	31	-	21	.25
F	Senecio multilobatus	-	2	-	-	1	.00
F	Streptanthus cordatus	-	4	-	-	1	.00
F	Taraxacum officinale	-	*33	-	-	14	.15
F	Trifolium gymnocarpon	14	*131	19	5	49	.54
F	Unknown forb-annual	-	8	-	-	3	.01
F	Unknown forb-perennial	11	-	-	5	-	-
F	Zigadenus spp.	-	*14	-	-	8	.05
Total for Forbs		1025	1496	379	459	631	12.99
B	Amelanchier alnifolia	-	-	-	-	-	.00
B	Artemisia tridentata vaseyana	70	75	40	36	35	22.71
B	Cercocarpus montanus	5	2	1	2	1	.15
B	Chrysothamnus viscidiflorus lanceolatus	8	10	8	5	4	.60
B	Eriogonum corymbosum		*38			15	.37
B	Gutierrezia sarothrae	-	-	2	-	-	-
B	Purshia tridentata	44	57	25	21	27	14.75
B	Symphoricarpos oreophilus	5	9	5	2	5	.56
Total for Browse		132	153	81	66	72	38.78

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

BASIC COVER --

Herd unit 11, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	381	11.00	7.25	50.54
Rock	53	.50	.75	.58
Pavement	123	4.25	3.25	2.70
Litter	399	63.75	77.25	65.15
Cryptograms	48	0	0	1.87
Bare Ground	122	21.00	11.50	6.45

PELLET GROUP FREQUENCY --  
Herd unit 11, Study no: 2

Type	Quadrat Frequency '95
Rabbit	2
Elk	8
Deer	21
Cattle	3

BROWSE CHARACTERISTICS --  
Herd unit 11, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	1	-	-	-	-	1	-	-	-	20	31	43	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	8	-	-	1	-	-	-	-	-	9	-	-	-	180			9
Y	82	18	-	-	-	-	-	-	-	-	18	-	-	-	1200			18
	88	14	1	-	-	-	-	-	-	-	15	-	-	-	1000			15
	95	14	5	-	-	-	-	-	-	-	19	-	-	-	380			19
M	82	31	8	-	-	-	-	-	-	-	39	-	-	-	2600	23	29	39
	88	60	9	1	-	-	-	-	-	-	70	-	-	-	4666	23	26	70
	95	22	156	24	-	-	-	-	-	-	202	-	-	-	4040	24	39	202
D	82	13	-	-	-	-	-	-	-	-	10	3	-	-	866			13
	88	11	2	-	-	-	-	-	-	-	13	-	-	-	866			13
	95	-	6	4	-	-	-	-	-	-	9	-	-	1	200			10
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15
Total Plants/Acre (excluding Dead & Seedlings)												'82	4666	Dec:	18%			
												'88	6532		13%			
												'95	4620		4%			
<i>Cercocarpus montanus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	2	-	-	-	-	-	-	2	-	-	-	40	32	41	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	88	16	-	-	-	-	-	-	-	-	16	-	-	-	1066		16	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	14	-	-	-	-	-	-	-	-	14	-	-	-	933	17	14	14
	88	21	1	-	1	-	-	-	-	-	23	-	-	-	1533	10	11	23
	95	28	-	-	2	-	-	-	-	-	30	-	-	-	600	11	13	30
Total Plants/Acre (excluding Dead & Seedlings)												'82	1533	Dec:	-			
												'88	2599		-			
												'95	600		-			
<i>Purshia tridentata</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	88	4	-	-	-	1	-	-	-	-	5	-	-	-	333		5	
	95	6	6	-	-	3	-	-	-	-	15	-	-	-	300		15	
M	82	7	13	6	-	-	-	-	-	-	26	-	-	-	1733	13	27	26
	88	-	18	4	1	-	1	-	-	-	24	-	-	-	1600	16	24	24
	95	2	34	47	-	29	-	-	-	-	112	-	-	-	2240	16	42	112
D	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66		1	
	88	1	4	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	1	3	-	-	-	-	-	-	-	1	-	-	3	80		4	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
Total Plants/Acre (excluding Dead & Seedlings)												'82	2065	Dec:	3%			
												'88	2266		14%			
												'95	2620		3%			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	3	-	-	-	-	-	4	-	-	-	80		4	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
M	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266	19	11	4
	88	3	-	-	2	-	-	-	-	-	4	-	1	-	333	14	16	5
	95	3	-	-	14	-	-	-	-	-	17	-	-	-	340	14	37	17
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	0%			
												'88	532		12%			
												'95	380		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 11, Study no: 2

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	.24
<i>Artemisia tridentata</i> <i>vaseyana</i>	55	55	56
<i>Cercocarpus montanus</i>	0	0	.48
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	18	22	7
<i>Purshia tridentata</i>	24	19	32
<i>Symphoricarpos oreophilus</i>	3	4	5

TREND STUDY 11-4-95

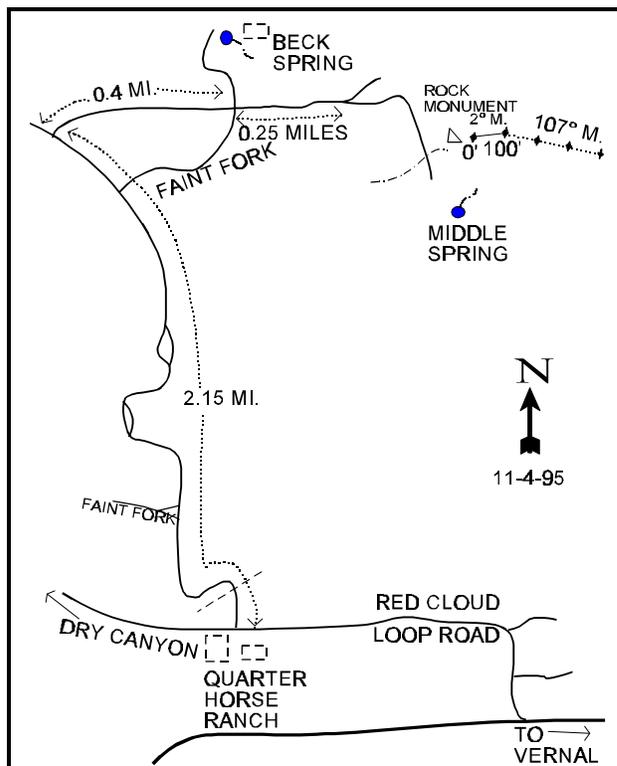
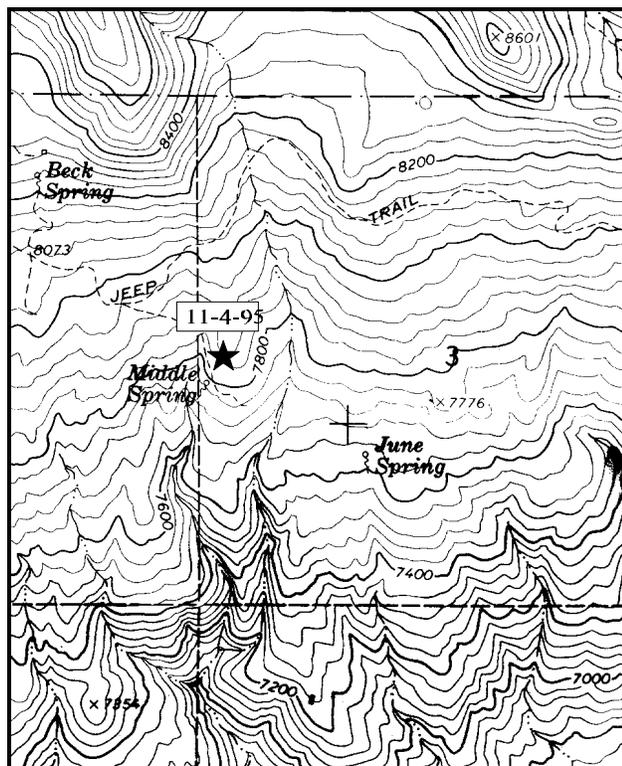
Study site name: Dry Fork Mountain . Range type: Sagebrush - Grass .

Compass bearing: frequency baseline 97 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (18 & 81ft), line 2 (33ft), line 3 (66ft), line 4 (79ft).

LOCATION DESCRIPTION

From Vernal, proceed west on 500 North to 3500 West. Turn right and go up Dry Fork 8.50 miles to the Red Cloud Loop Road. Bear right onto this road and continue up Dry Fork Canyon 1.7 miles to a horse ranch on the left. North across the road from the ranch is a dirt road. Turn right onto this road, go through the gate and go 2.15 miles to a fork. Bear right and proceed .4 miles to an intersection. Continue straight for .25 miles to a faint turnoff on the right. Turn right and drive across the meadow toward Middle Spring. Go .2 miles to the base of the hill just before Middle Spring. Walk to the highest point on the hill. There is a rock monument on top. From the monument, the 0-foot baseline stake is 12 paces bearing 105 degrees true.



Map Name: Dry Fork

Diagrammatic Sketch

Township 3S , Range 20E , Section 3 UTM COOR. 6-12-414E 12 44-93-564N

## DISCUSSION

### Trend Study No. 11-4

This study is on Dry Fork Mountain near Middle Spring at an elevation of 7,800 feet. The area is a sagebrush-grass range type administered by the BLM. Slope is a gentle 10% to 20% and exposure is east, southeast. The sagebrush slopes on the south face of Dry Fork Mountain provide important big game winter range. Cattle use the area in late summer. Deer and cattle were observed in the area when the study was re-read in mid-September of 1988.

The soil is coarse, shallow, rocky and well drained. Rooting depth does not appear to be limited however. Erosion and soil movement are minimal due to the excellent vegetation and litter cover.

Key browse on the site include mountain big sagebrush and antelope bitterbrush. Sagebrush accounts for 61% of the total browse cover while bitterbrush makes up 29%. Population of sagebrush has steadily increased over the past 3 readings. Currently there are an estimated 2,880 plants/acre, 82% of which are mature. Percent decadency has declined from a high of 42% in 1988 to 11% by 1995. Use was mostly light in 1982 and 1988. Current use is moderate to heavy with 11% of the shrubs sampled displaying heavy hedging.

Antelope bitterbrush is not as abundant as sagebrush, but is more preferred and shows heavier use. There were an estimated 800 plants/acre in 1982 increasing to 1,399 by 1988 and 1,960 in 1995. During the 1988 reading, all bitterbrush sampled displayed heavy hedging. Currently, 65% of the mature and decadent plants are heavily hedged. Even with this heavy use, vigor is good and the population appears stable to slightly increasing.

Other browse encountered on the site include abundant prickly pear cactus, mountain low rabbitbrush, broom snakeweed, Oregon grape, wax current, and snowberry.

The herbaceous understory is dominated by grasses which account for 33% of the total vegetation cover. The most numerous grasses are needle-and-thread, thickspike, and bluebunch wheatgrass. Annual cheatgrass is also fairly common. Forbs are diverse but dominated by annuals which account for 67% of the forb cover.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable with adequate ground cover and little soil movement. Vegetative trend is stable to declining. The key species, antelope bitterbrush, occurs in less than optimum numbers and does not appear to be increasing. Mountain big sagebrush currently dominates the site. The most obvious indicator of declining trend is the apparent increase of prickly pear. Grasses are in fair to good condition, although a moderately palatable increaser (i.e. needle-and-thread) is quite abundant. Forbs are much less important and composition consists largely of scarlet globemallow.

### 1988 TREND ASSESSMENT

A small increase was noted in the percentage of vegetative basal cover found in 1988, but the significant changes in ground cover occurred in the loss of cryptogams, increase in rocks on the soil surface and decline in bare ground. The loose soil is well protected by the dense shrub overstory and runoff is localized. Trend for soil is up slightly. The browse trend is slightly up for bitterbrush but heavy use of this shrub should be watched closely. Mountain big sagebrush densities have also increased but so has percent decadence now at 42%.

Trend for sagebrush is stable. One negative aspect of the browse trend is the large increase in prickly pear cactus. Age class analysis indicates 68% of the population consists of young plants. Trend for the herbaceous understory is up for grasses and stable for forbs.

TREND ASSESSMENT

soil - slightly up

browse - stable for sagebrush and slightly up for bitterbrush

herbaceous understory - stable

1995 TREND ASSESSMENT

Ground cover characteristics have improved since 1988 with percent rock cover returning to near 1982 levels along with a further decline in bare ground now at only 2%. Trend for soil is up. The key browse species, bitterbrush, displays an upward trend with an increase in density and a decline in the proportion of shrubs heavily browsed. Percent decadence has remained low at 4%. Mountain big sagebrush also shows an improving trend with a decline in percent decadence and an increase in population density. An additional improvement in the browse composition is the decline in prickly pear cactus. Trend for the herbaceous understory is stable with a decline in the sum of nested frequency of perennial grasses but an increase in frequency of perennial forbs. It appears that thickspike wheatgrass (*Agropyron dasystachyum*) was misidentified and combined with bluebunch wheatgrass in 1988.

TREND ASSESSMENT

soil - up and in excellent condition

browse - up; up for bitterbrush and slightly up for sagebrush

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 11, Study no: 4

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	-	*73	-	-	26	1.35
G	Agropyron intermedium	-	-	57	-	-	-
G	Agropyron spicatum	212	*86	2	72	29	3.33
G	Bromus tectorum	-	138	-	-	49	2.91
G	Carex spp.	6	*17	3	3	7	.37
G	Oryzopsis hymenoides	1	5	-	1	2	.06
G	Poa fendleriana	9	8	1	5	3	.16
G	Poa pratensis	-	*7	-	-	4	.31
G	Sitanion hystrix	55	*36	5	24	16	.21
G	Stipa comata	121	*234	54	47	78	11.03
G	Stipa lettermani	-	6	-	-	2	.06
G	Unknown grass - perennial	10	-	-	3	-	-
Total for Grasses		414	610	122	155	216	19.81
F	Antennaria rosea	-	-	1	-	-	-

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
F	Arabis spp.	-	3	-	-	2	.01
F	Arenaria congesta	-	-	1	-	-	-
F	Astragalus convallarius	-	*9	-	-	4	.02
F	Calochortus nuttallii	8	9	1	4	4	.02
F	Collomia linearis	-	152	-	-	57	1.64
F	Collinsia parviflora	-	58	-	-	27	.33
F	Cryptantha spp.	3	9	-	2	4	.07
F	Cymopterus longipes	-	*7	-	-	3	.01
F	Descurainia pinnata	-	1	-	-	1	.00
F	Eriogonum racemosum	2	13	1	1	6	.10
F	Heterotheca villosa	1	-	2	1	-	-
F	Hymenoxys acaulis	-	1	-	-	1	.00
F	Lactuca serriola	-	3	-	-	1	.00
F	Lepidium spp.	-	2	-	-	2	.01
F	Lithospermum spp.	-	*6	-	-	3	.16
F	Lupinus argenteus	-	*7	-	-	4	.12
F	Machaeranthera canescens	-	3	-	-	2	.01
F	Orobanche spp.	-	2	-	-	1	.00
F	Penstemon humilis	2	3	2	1	1	.03
F	Polygonum douglasii	-	28	-	-	13	.06
F	Sphaeralcea coccinea	6	*31	6	3	13	.36
F	Tragopogon dubius	-	*6	-	-	3	.04
F	Zigadenus spp.	-	*14	-	-	5	.03
Total for Forbs		22	367	14	12	157	3.08
B	Artemisia tridentata vaseyana	33	*41	23	17	22	22.85
B	Ceanothus spp.	2	-	-	1	-	-
B	Chrysothamnus viscidiflorus lanceolatus	2	-	-	1	-	.06
B	Gutierrezia sarothrae	-	-	-	-	-	.00
B	Mahonia repens	-	-	1	-	-	-
B	Opuntia spp.	83	*106	20	37	47	2.83
B	Purshia tridentata	34	*38	19	17	17	10.91
B	Symphoricarpos oreophilus	6	3	2	3	2	.56
Total for Browse		160	188	65	76	88	37.22

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

BASIC COVER --

Herd unit 11, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	353	4.005	6.50	58.21
Rock	211	9.50	17.00	9.85
Pavement	43	1.25	.50	.33
Litter	396	68.75	69.75	67.73
Cryptograms	7	4.25	0	.04
Bare Ground	67	12.25	6.25	2.08

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 4

Type	Quadrat Frequency '95
Rabbit	9
Elk	6
Deer	30
Cattle	2

BROWSE CHARACTERISTICS --

Herd unit 11, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	59	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Artemisia tridentata vaseyana</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200			3
	95	6	4	-	-	-	-	-	-	-	10	-	-	-	200			10
M	82	21	-	-	-	-	-	-	-	-	17	4	-	-	1400	27	40	21
	88	12	7	-	-	-	-	-	-	-	19	-	-	-	1266	26	31	19
	95	59	46	11	-	-	2	-	-	-	115	-	1	2	2360	30	48	118
D	82	4	-	-	-	-	-	-	-	-	2	2	-	-	266			4
	88	14	2	-	-	-	-	-	-	-	16	-	-	-	1066			16
	95	7	6	3	-	-	-	-	-	-	9	-	-	7	320			16
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	500			25
Total Plants/Acre (excluding Dead & Seedlings)												'82	1732	Dec:	15%			
												'88	2532		42%			
												'95	2880		11%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	16	20	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60	12	24	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	2	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	0%			
												'88	133		100%			
												'95	80		0%			
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	8	7	5
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	100		-			
<i>Mahonia repens</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	9	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	82	15	-	-	-	-	-	-	-	-	15	-	-	-	1000			15
	88	61	-	-	3	-	-	1	-	-	65	-	-	-	4333			65
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
M	82	39	-	-	-	-	-	-	-	-	39	-	-	-	2600	4	10	39
	88	28	-	-	1	-	-	1	-	-	30	-	-	-	2000	5	12	30
	95	207	-	-	14	-	-	-	-	-	215	-	6	-	4420	5	15	221
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	-	-	1	-	20			1
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6
Total Plants/Acre (excluding Dead & Seedlings)												'82	3600	Dec:	0%			
												'88	6333		0%			
												'95	4680		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	5	1	-	4	1	-	-	-	13	-	-	-	260			13
M	82	12	-	-	-	-	-	-	-	-	8	4	-	-	800	20	36	12
	88	-	-	19	-	-	1	-	-	-	20	-	-	-	1333	15	25	20
	95	7	18	33	1	3	19	-	-	-	81	-	-	-	1620	18	46	81
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	2	-	1	1	-	-	-	3	-	-	1	80			4
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
Total Plants/Acre (excluding Dead & Seedlings)												'82	800	Dec:	0%			
												'88	1399		4%			
												'95	1960		4%			
<i>Ribes cereum cereum</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	45	67	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Sclerocactus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	4	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Symphoricarpos oreophilus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	13	9	1
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	14	27	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	60		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 4

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	28	24	29
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	1	1	.81
<i>Gutierrezia sarothrae</i>	0	0	1
<i>Mahonia repens</i>	0	0	.40
<i>Opuntia</i> spp.	58	61	48
<i>Purshia tridentata</i>	13	13	20
<i>Ribes cereum cereum</i>	0	0	0
<i>Sclerocactus</i>	0	0	.20
<i>Symphoricarpos oreophilus</i>	0	.63	.61

TREND STUDY 11-5-95

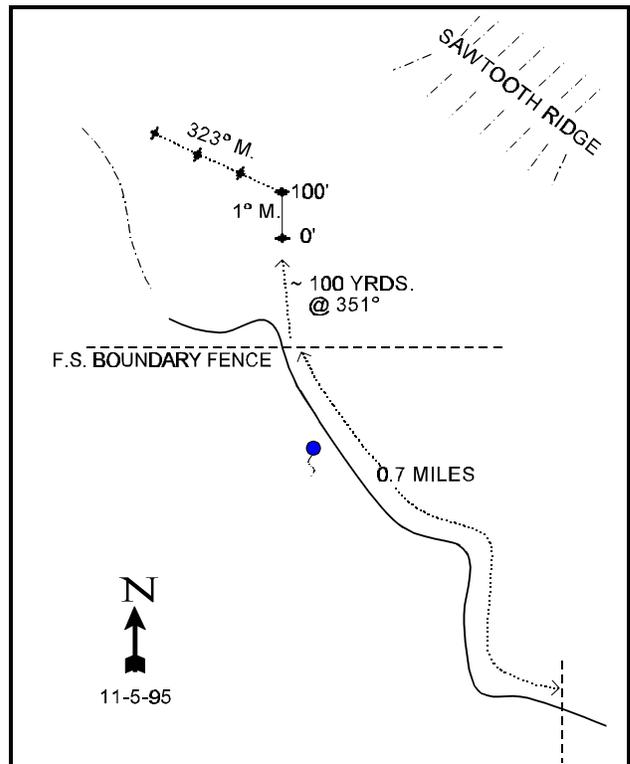
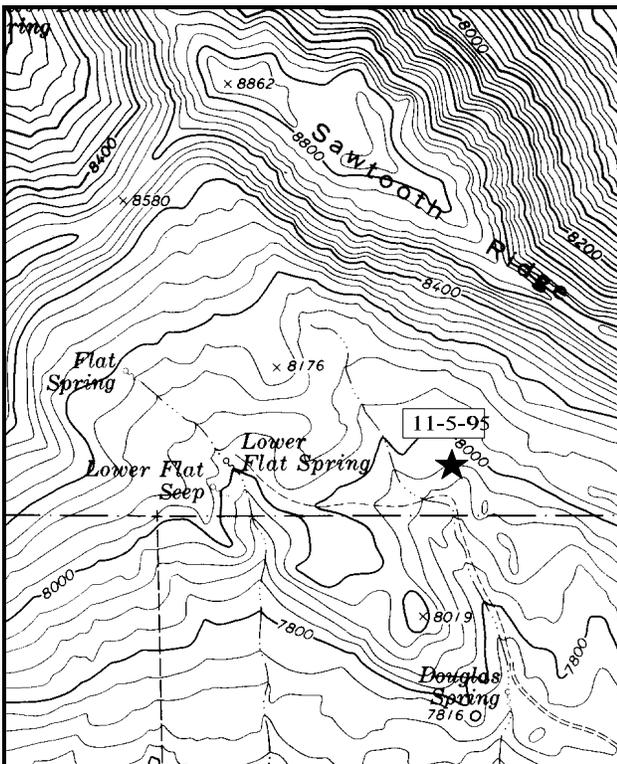
Study site name: Sawtooth-Flat Spring . Range type: Mountain Brush .

Compass bearing: frequency baseline 16 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (13 & 92ft), line 2 (40ft), line 3 (52ft), line 4 (71ft).

LOCATION DESCRIPTION

From Lapoint, drive east then turn left just before the bridge over Deep Creek. Proceed north for 6.75 miles to a fork. Bear right towards Deep Creek Ranch. Stay on this road for 9.8 miles to a dirt road on the left heading north up Pine Ridge. This road can also be reached by driving 3 miles west from Dry Fork. The gate may be locked. Turn left and drive 1.65 miles to a cattleguard. Continue 1.1 miles to a gate. Go through the gate and .7 miles to the fence on the FS boundary. Go through the gate and stop. From the yellow fencepost near the gate, walk 63 paces north ( $351^\circ$ ) to the 0-foot baseline stake.



Map Name: Lake Mountain

Diagrammatic Sketch

Township 2S , Range 19E , Section 35

## DISCUSSION

### Trend Study No. 11-5

This trend study is located on the south side of Sawtooth Ridge, east of Lows Flat Spring. Elevation is 7,960 feet and aspect is southeast. Slope varies from 5% to 10%. The study site is just outside the 1978-79 Flat Springs prescribed burn. The study samples a mountain big sagebrush/grass type with an important bitterbrush component. Quadrat frequency of deer pellet groups was moderately high in 1995 at 32% while elk was only 6%. Rabbit pellet group quadrat frequency was quite high at 45%.

Soils are moderately deep but rocky. Vegetative and litter cover are high and well dispersed, preventing most soil erosion problems. Percent bare ground has steadily declined indicating an improving soil trend and lack of surface erosion.

Key browse on the site consist of antelope bitterbrush and mountain big sagebrush. Sagebrush is more numerous with an estimated density of 1,467 plants/acre in 1982, increasing to 3,932 by 1988. Currently there is an estimated 2,040 plants/acre, which has a cover of 12.34% and accounts for 73% of the total browse cover. Vigor is generally good with light to moderate use. Percent decadency has risen from 14% in 1982, to 37% in 1988, then declined to 13% in 1995.

Antelope bitterbrush is the most preferred browse species on the site. It has an estimated cover value of nearly 4% and accounts for 23% of the total browse cover. Density varied somewhat over the past three readings, but the number of mature plants has remained relatively stable. Use has been heavy with 38% of the mature plants displaying heavy hedging in 1982, increasing to 92% by 1988. Currently 52% of the population are heavily hedged. Vigor is good with the exception of 42% (160 plants/acre or 9% of the population) of the decadent shrubs which were classified as dying. Percent decadency has increased from 0% in 1982, to 17% in 1988, and 22% by 1995. No seedlings and few young were encountered during the readings, however, with this level of precipitation (elevation), these prostrate forms of bitterbrush commonly reproduce asexually through stem layering.

Grasses and forbs are diverse and dense enough to offer rigorous competition, especially with prolonged drought, for shrub seedlings to become establishment. At the time of the 1988 reading, grass utilization was light, 30-40%, but cattle had just come on the site. Due to recent seed head removal that year, species identification was difficult for some grasses. The increaser, Kentucky bluegrass, is currently the dominant grass with needle-and-thread, letterman needlegrass, and mutton grass also being abundant. There are numerous valuable forb species, especially arrowleaf balsamroot and silver lupine which account for 74% of the forb cover.

### 1982 APPARENT TREND ASSESSMENT

Range condition is good and overall trend is stable. There is little compelling evidence for either extensive soil loss or vegetational change. The area appears capable of supporting more big game animals if livestock use remains at the current level.

### 1988 TREND ASSESSMENT

Due to the dense herbaceous understory, ground cover is excellent. Basal vegetative cover increased significantly. Percent bare ground declined slightly and there is very little detectable soil movement. Trend for soil is slightly up. The browse trend is up for mountain big sagebrush due to a large increase in

density, adequate reproductive potential, a good number of young plants, good vigor and light to moderate use. Trend for the more preferred antelope bitterbrush slightly up. Density of mature plants increased slightly but use is extremely heavy (95%) and percent decadency rose from 0% to 17%. Vigor is good and there are an adequate number of young plants. Quadrat frequency of grasses and forbs increased since 1982 indicating a slightly upward trend for the herbaceous understory.

TREND ASSESSMENT

soil - slightly up

browse - slightly up; up for sagebrush and slightly up for bitterbrush

herbaceous understory - slightly up

1995 TREND ASSESSMENT

Percent bare ground has declined by 48% since 1988, indicating a continued improvement in the soil trend. Litter also declined 14%, a common occurrence during this continuing drought. However, nested frequency of litter is very high indicating well dispersed protective cover. Herbaceous vegetation is also abundant accounting for 73% of the vegetative cover on the site, effectively limiting erosion. Trend for soil is up. Overall, trend for browse is slightly down. Mountain big sagebrush displays a slightly downward trend with a decline in density, and an increase in the proportion of decadent plants that are dying (80 plants/acre). Reproductive potential and the proportion of young plants have also declined. On the positive side, percent decadence has declined from 37% to 13%. It appears that the population may decline slightly in the future with continuing drought, but the result will be a less dense, healthier population.

Bitterbrush continues to be heavily used and appears to have a slightly downward trend as a result. Currently, 52% of the shrubs are heavily hedged (>60% of twigs browsed). Percent decadence has increased to 22%, with 42% (160 plants/acre) of these decadent shrubs classified as dying. In addition, average height/crown measurements of mature plants have steadily declined since 1982. Bitterbrush can withstand heavy use for long periods of time, but future trends should be watched closely with the continued drought.

Trend for grasses and forbs is stable. Some of the fluctuations in the nested frequency numbers of the *Poa* grasses is the result of identification problems in 1988 and not necessarily actual changes in composition.

TREND ASSESSMENT

soil - up

browse - slightly down for both sagebrush and bitterbrush

herbaceous understory - stable

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 5

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	59	*116	14	32	45	1.42
G	Carex spp.	85	*22	15	38	10	.24
G	Koeleria cristata	23	*-	33	9	-	.00
G	Poa fendleriana	315	*131	61	97	50	3.02
G	Poa pratensis	81	*138	2	30	44	7.83

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	<i>Poa secunda</i>	29	*14	9	11	4	.09
G	<i>Poa</i> spp.	-	-	2	-	-	-
G	<i>Sitanion hystrix</i>	10	*5	-	6	2	.03
G	<i>Stipa comata</i>	45	*168	29	24	60	5.97
G	<i>Stipa lettermani</i>	83	*140	37	36	48	4.17
Total for Grasses		730	734	202	283	263	22.81
F	<i>Agoseris glauca</i>	3	7	-	3	4	.02
F	<i>Allium</i> spp.	2	*118	28	1	52	.36
F	<i>Antennaria</i> spp.	5	13	2	2	6	.30
F	<i>Arabis</i> spp.	51	*6	1	23	3	.01
F	<i>Astragalus</i> spp.	4	6	-	3	2	.01
F	<i>Balsamorhiza sagittata</i>	152	*160	50	70	68	14.00
F	<i>Castilleja linariaefolia</i>	-	4	-	-	2	.01
F	<i>Calochortus nuttallii</i>	-	2	5	-	2	.01
F	<i>Chenopodium</i> spp.	-	15	-	-	7	.03
F	<i>Collomia linearis</i>	-	264	-	-	93	2.08
F	<i>Comandra pallida</i>	-	3	-	-	2	.01
F	<i>Collinsia parviflora</i>	-	173	-	-	65	1.33
F	<i>Crepis acuminata</i>	2	*21	3	1	9	.45
F	<i>Cryptantha</i> spp.	-	2	-	-	1	.00
F	<i>Cymopterus longipes</i>	-	5	-	-	2	.01
F	<i>Descurainia pinnata</i>	-	13	-	-	5	.07
F	<i>Eriogonum alatum</i>	4	-	-	2	-	-
F	<i>Erigeron flagellaris</i>	8	*1	6	3	1	.00
F	<i>Erigeron</i> spp	6	*-	5	3	-	-
F	<i>Eriogonum</i> spp.	1	-	-	1	-	-
F	<i>Eriogonum racemosum</i>	9	7	8	7	3	.09
F	<i>Eriogonum umbellatum</i>	-	*14	3	-	7	.30
F	<i>Lomatium</i> spp.	18	*6	3	7	4	.02
F	<i>Lupinus argenteus</i>	55	*91	36	30	44	3.35
F	<i>Lychnis drummondii</i>	6	13	15	3	8	.09
F	<i>Orobanche fasciculata</i>	-	8	-	-	4	.02
F	<i>Penstemon humilis</i>	52	*34	13	24	15	.17
F	<i>Phlox longifolia</i>	96	*43	1	48	20	.20
F	<i>Polygonum douglasii</i>	-	76	8	-	35	.22
F	<i>Potentilla gracilis</i>	-	3	-	-	2	.03
F	<i>Sedum</i> spp.	-	1	-	-	1	.00

T Y P e	Species	Nestd Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
F	Senecio integerrimus	-	2	-	-	1	.15
F	Senecio multilobatus	1	2	3	1	1	.03
F	Tragopogon dubius	7	7	-	3	3	.01
F	Unknown forb-perennial	5	-	-	3	-	-
F	Zigadenus paniculatus	-	4	3	-	2	.01
Total for Forbs		487	1124	193	238	474	23.47
B	Amelanchier alnifolia	1	-	-	1	-	-
B	Artemisia tridentata vaseyana	32	*46	20	20	23	12.34
B	Chrysothamnus viscidiflorus lanceolatus	-	2	1	-	1	.30
B	Echinocactus spp.	-	3	-	-	1	.03
B	Eriogonum heracleoides	-	6	-	-	2	.06
B	Mahonia repens	-	1	-	-	1	.00
B	Opuntia spp.	8	4	5	3	2	.01
B	Purshia tridentata	48	*29	24	26	14	3.87
B	Sclerocactus	2	-	-	1	-	-
B	Symphoricarpos oreophilus	11	*4	2	5	2	.30
Total for Browse		102	95	52	56	46	16.93

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

BASIC COVER --

Herd unit 11, Study no: 5

Cover Type	Nestd Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	375	7.25	12.50	61.72
Rock	111	1.75	1.50	2.08
Pavement	84	0	2.00	1.07
Litter	392	67.75	73.25	63.34
Cryptograms	-	.75	0	0
Bare Ground	157	22.50	10.75	5.61

PELLET GROUP FREQUENCY --  
Herd unit 11, Study no: 5

Type	Quadrat Frequency '95
Rabbit	5
Elk	5
Deer	31
Cattle	9

BROWSE CHARACTERISTICS --  
Herd unit 11, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier utahensis</i>																		
M	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66	10	12	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Artemisia nova</i>																		
Y	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	17	2	-	-	-	-	-	-	-	19	-	-	-	1266	8	20	19
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	1732	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	1	-	1	-	-	-	-	-	2	-	-	-	133			2
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	88	5	4	-	-	-	-	-	-	-	9	-	-	-	600			9
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	82	13	-	-	-	-	-	-	-	-	13	-	-	-	866	23	39	13
	88	21	7	-	-	-	-	-	-	-	28	-	-	-	1866	22	20	28
	95	30	46	2	-	-	-	-	-	-	76	-	-	2	1560	27	43	78
D	82	2	-	-	-	-	-	-	-	-	1	1	-	-	133			2
	88	9	9	3	1	-	-	-	-	-	21	-	1	-	1466			22
	95	1	11	2	-	-	-	-	-	-	10	-	-	4	280			14
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	380			19
Total Plants/Acre (excluding Dead & Seedlings)												'82	1399	Dec:	9%			
												'88	3932		37%			
												'95	2040		13%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Cercocarpus ledifolius</i>																		
Y	82	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666	13	16	10
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	999	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	6	-	-	-	-	-	-	-	-	6	-	-	120	14	28	6	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	120		-			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20	3	4	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Eriogonum heracleoides</i>																		
Y	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	60			3	
M	82	23	-	-	-	-	-	-	-	-	23	-	-	-	1333	9	5	23
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	60	10	13	3	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1533	Dec:	-			
												'88	0		-			
												'95	120		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666			10
	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	82	30	-	-	-	-	-	-	-	-	30	-	-	-	2000	5	6	30
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2666	Dec:	-			
												'88	0		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Mahonia repens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	5	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	80		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	1	-	-	1	-	-	5	-	1	-	400		6	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	21	1
	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66	5	4	1
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	2	5	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	1	-	-	-	-	-	3	-	1	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	0%			
												'88	732		36%			
												'95	80		0%			
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	4	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	6	1	1	1	-	-	-	-	-	9	-	-	-	180		9	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	18	-	1	-	-	-	-	19	-	-	-	1266	17	28	19
	95	3	19	7	3	4	22	-	-	-	58	-	-	-	1160	13	32	58
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	4	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	4	5	1	-	6	3	-	-	11	-	-	8	380		19	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	1865		17%			
												'95	1720		22%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Symphoricarpos oreophilus																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	2	1	-	1	-	-	-	-	-	4	-	-	-	266	18	18	
	95	3	10	-	4	-	-	-	-	-	17	-	-	-	340	19	38	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	332		-			
												'95	460		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 5

Species	Percent of Total		
	'82	'88	'95
Amelanchier utahensis	.78	0	0
Artemisia nova	20	0	0
Artemisia tridentata vaseyana	17	57	44
Cercocarpus ledifolius	12	0	0
Chrysothamnus viscidiflorus lanceolatus	0	0	3
Echinocactus spp.	0	0	.43
Eriogonum heracleoides	18	0	3
Gutierrezia sarothrae	31	0	0
Mahonia repens	0	0	2
Opuntia spp.	.78	11	2
Purshia tridentata	0	27	37
Symphoricarpos oreophilus	0	5	10

TREND STUDY 11-6-95

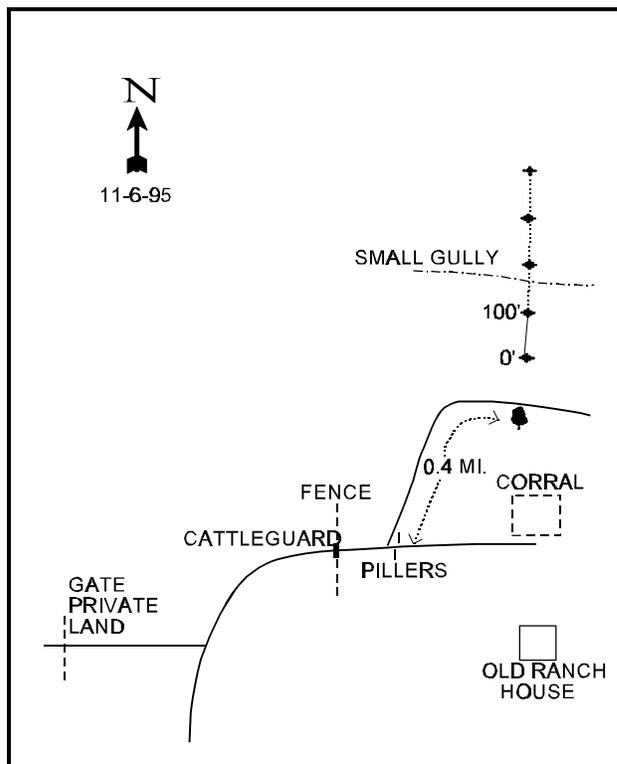
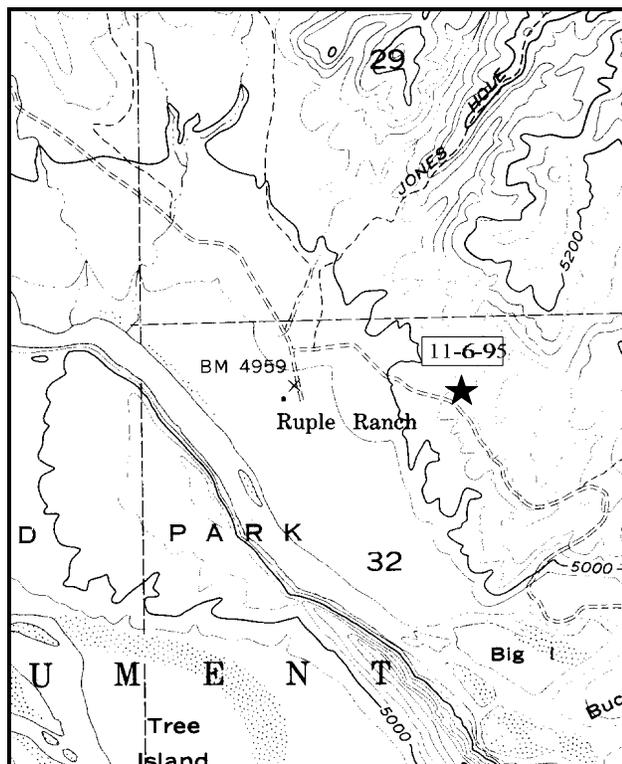
Study site name: Island Park . Range type: Sagebrush-Grass .

Compass bearing: frequency baseline 27 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (9 & 88ft), line 2 (26ft), line 3 (48ft), line 4 (73ft).

LOCATION DESCRIPTION

From the Diamond Mountain Road, take the Island Park turnoff to the right. Proceed east for 2.1 miles to a fork. Stay to the left and go 17.7 miles. Just past the Jones Hole trailhead and before Ruple Ranch, there is a turnoff to the left. The road may be closed. Go left and proceed up the ridge for .4 miles to a juniper next to the road on the right. From the juniper, the 0-foot baseline stake is 20 paces away at a bearing of 43 degrees true.



Map Name: Island Park

Diagrammatic Sketch

Township 3S , Range 25E , Section 32

UTM COOR. 6-57-993E 12 44-87-139N

## DISCUSSION

### Trend Study No. 11-6

This study is located close to the Green River on deer winter range in Island Park. This site has an elevation of approximately 5,000 feet and a slope of about 25% with an aspect to the south-southwest. The land where this trend study is located is now part of Dinosaur National Monument. It samples low elevation deer winter range on a sagebrush slope above the Green River. Deer and rabbit pellet groups are abundant, with some sign of elk use. Livestock grazing is no longer permitted.

Soils are a silty to sandy loam with little surface rock. Soil movement is noticeable, but not severe or occurring at an accelerated rate. Cryptogamic crusts have increased since 1982 with no grazing, providing added protection to the soil.

In 1982, the key browse species, identified as Wyoming big sagebrush, was in fair to poor condition and moderately hedged. Thirty percent of the stand displayed poor vigor and percent decadency was above average for a Wyoming big sagebrush site at 43%. The 1988 survey found a more decadent stand of sagebrush (29% mature, 50% decadent) with moderate to heavy hedging, poor growth, and low seed production. The drought conditions and intraspecific competition have the most influence in the poor vigor. Sagebrush cover averages 7%. During 1995, percent decadency declined to 39% with 71% (920 plants/acre or 28% of the population) of these shrubs classified as dying. Use is still moderate to heavy with 31% of the mature and decadent sagebrush displaying heavy hedging (>60% of twigs browsed). The number of dead plants/acre in 1995, indicated that 1 in every 3 plants (1,520 plants/acre) are dead, an extremely high value. It appears that the sagebrush on the site have some characteristics of both basin big sagebrush (*Artemisia tridentata tridentata*) and Wyoming big sagebrush (*A. tridentata wyomingensis*), indicating hybridization between the two subspecies.

Another sign of possible declining range condition first noted in 1982 was the abundant broom snakeweed which appeared to have an expanding population. There were an estimated 7,467 plants/acre in 1982, increasing to 8,486 by 1988. This short lived shrub declined by 58% in 1995 and currently has a population density of 3,580 plants/acre. Other shrubs encountered in 1995 include slenderbush eriogonum, prickly pear, and small numbers of prickly phlox.

The understory is dominated by needle-and-thread grass which makes up 45% of the total vegetation cover. The only other grass which makes up more than ½ of one percent cover is six weeks fescue, an annual which provides 18% of the total grass cover. Forbs are depleted and dominated by annuals that provide little useful forage.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable to declining. The estimates for ground cover show approximately 51% bare ground and less than 3% basal vegetative cover. There is active sheet and gully erosion underway and considerable quantities of soil and litter have piled up against small obstructions. Vegetative trend is probably declining. The best evidence would appear to be an aggressive and expanding population of snakeweed and the fair to poor condition of the key browse species, Wyoming big sagebrush. In addition, understory composition is less than desirable and produces little quality forage. Furthermore, grass and forbs density is inadequate to prevent or seriously impede soil movement.

1988 TREND ASSESSMENT

Percent litter cover has declined resulting in an increase in the amount of exposed bare soil, from 15% to 60%. Consequently, there is evidence of some soil loss and sedimentation. Trend for soil is slightly down. Trend for the key browse, Wyoming big sagebrush is also slightly down. Even though total population increased, the number of mature plants declined from 2,000 plants/acre to 1,666. The increase in population came primarily from the increase in decadent plants (1,666 to 2,866) which account for 50% of the population. Heavy use was also higher with 34% of the sagebrush displaying heavy hedging. Another negative factor is the abundant broom snakeweed which increased since 1982. The herbaceous trend is up especially for grasses. Quadrat frequency of grasses doubled since 1982. Composition is dominated by needle-and-thread grass. Forbs are depleted and provide little useful forage.

TREND ASSESSMENT

soil - down

browse - slightly down due to heavy use and increased decadence

herbaceous understory - up but forbs are scarce

1995 TREND ASSESSMENT

Trend for soil is up due to a large increase in cyrptogamic crusts (4.5% to 10.8%) and an obvious increase in vegetation cover noted in the data and photos. Aerial cover instead of basal cover was estimated in 1995. Percent bare ground decreased from nearly 60% to 31%. Vegetation and litter also have high nested frequencies values indicating well dispersed cover. The spring of 1995 was unusually wet and may be partly responsible for the dramatic change in some of these ground cover values. Browse trend continues to decline due to continued heavy use, high decadence, poor vigor, and declining population density. The herbaceous trend is stable for perennial grasses and slightly up for perennial forbs.

TREND ASSESSMENT

soil - up

browse - continues down

herbaceous understory - stable, but still poor for forbs

VEGETATIVE TRENDS --

Herd unit 11, Study no: 6

T Y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	62	*38	-	26	16	.10
G	Agropyron spicatum	-	4	-	-	1	.03
G	Bromus tectorum	-	40	-	-	22	.16
G	Hilaria jamesii	25	43	17	11	17	.50
G	Oryzopsis hymenoides	12	6	5	6	3	.39
G	Poa fendleriana	-	*5	-	-	3	.06
G	Poa secunda	2	4	2	1	2	.01
G	Sitanion hystrix	31	*36	8	17	18	.24
G	Stipa comata	213	*285	44	88	96	12.38
G	Vulpia octoflora	-	324	-	-	98	2.97

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover '95
		'88	'95	'82	'88	'95	
Total for Grasses		345	785	76	149	276	16.86
F	Allium spp.	9	*130	9	6	64	.42
F	Astragalus convallarius	8	18	3	6	8	.12
F	Astragalus purshii	-	*3	-	-	3	.01
F	Calochortus nuttallii	-	3	1	-	2	.01
F	Castilleja spp.	-	3	-	-	1	.03
F	Chenopodium leptophyllum	-	1	-	-	1	.00
F	Cruciferae	1	-	-	1	-	-
F	Descurainia spp.	-	57	-	-	25	.12
F	Draba spp.	-	35	-	-	12	.06
F	Erigeron spp	-	3	-	-	1	.00
F	Euphorbia robusta	-	3	-	-	1	.03
F	Ipomopsis congesta	-	*8	-	-	4	.02
F	Lepidium spp.	-	24	-	-	13	.09
F	Lesquerella spp.	1	1	-	1	1	.00
F	Lygodesmia spp.	-	3	-	-	2	.01
F	Machaeranthera grindelioides	3	-	-	1	-	-
F	Phlox longifolia	72	*23	-	35	11	.05
F	Plantago patagonica	-	16	-	-	6	.05
F	Polygonum douglasii	-	3	-	-	1	.00
F	Sisymbrium altissimum	-	3	-	-	1	.15
F	Sphaeralcea coccinea	3	18	1	1	10	.13
F	Taraxacum officinale	-	3	-	-	1	.00
F	Unknown forb-perennial	7	-	-	3	-	-
Total for Forbs		104	358	14	54	168	1.35
B	Artemisia tridentata vaseyana	58	*52	29	32	28	7.76
B	Eriogonum microthecum	11	16	13	8	7	.19
B	Gutierrezia sarothrae	158	*155	52	69	70	.98
B	Leptodactylon pungens	-	2	-	-	1	.03
B	Opuntia spp.	8	4	1	4	3	.07
Total for Browse		235	229	95	113	109	9.06

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

BASIC COVER --

Herd unit 11, Study no: 6

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	369	2.75	4.75	31.06
Rock	-	0	0	0
Pavement	2	0	0	.01
Litter	397	45.50	31.00	32.54
Cryptograms	245	1.00	4.50	10.82
Bare Ground	320	50.75	59.75	31.40

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 6

Type	Quadrat Frequency '95
Rabbit	45
Elk	6
Deer	32

BROWSE CHARACTERISTICS --

Herd unit 11, Study no: 6

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	82	-	2	-	-	-	-	-	-	-	-	2	-	-	133		133	
	88	14	3	-	-	-	-	-	-	-	17	-	-	-	1133		17	
	95	11	11	5	1	-	-	-	-	-	28	-	-	-	560		28	
M	82	12	18	-	-	-	-	-	-	-	13	17	-	-	2000	17	23	30
	88	1	13	11	-	-	-	-	-	-	22	1	2	-	1666	20	21	25
	95	13	42	17	-	-	-	-	-	-	70	-	-	2	1440	16	25	72
D	82	3	5	-	-	-	-	-	-	-	4	4	-	-	533		8	
	88	5	20	18	-	-	-	-	-	-	32	1	5	5	2866		43	
	95	10	28	26	-	1	-	-	-	-	19	-	-	46	1300		65	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1520		76	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2667	Dec:	20%			
												'88	5665		50%			
												'95	3300		39%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Eriogonum microthecum</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200	13	6	3
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	9	5	8
	95	39	2	2	-	-	-	-	-	-	43	-	-	-	860	10	10	43
D	82	3	5	-	-	-	-	-	-	-	4	4	-	-	533		8	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	733		0%			
												'95	1020		9%			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1327	-	-	1	-	-	-	-	-	1328	-	-	-	345		1328	
Y	82	12	-	-	-	-	-	-	-	-	12	-	-	-	800		12	
	88	46	-	-	-	-	-	-	-	-	46	-	-	-	3066		46	
	95	65	-	-	-	-	-	-	-	-	65	-	-	-	1300		65	
M	82	100	-	-	-	-	-	-	-	-	100	-	-	-	6667	12	10	100
	88	368	-	-	1	-	-	-	-	-	369	-	-	-	2754	8	6	369
	95	108	5	-	-	-	-	-	-	-	113	-	-	-	2260	12	13	113
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	40	-	-	-	-	-	-	-	-	35	-	5	-	2666		40	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
Total Plants/Acre (excluding Dead & Seedlings)												'82	7467	Dec:	0%			
												'88	8486		31%			
												'95	3580		0%			
<i>Leptodactylon pungens</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	4	8	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	1	-	-	-	-	1	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	2	-	-	-	-	-	-	-	-	-	2	-	-	133	3	5	2
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333	4	8	5
	95	21	-	-	-	-	-	-	-	-	21	-	-	-	420	4	16	21
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	0%			
												'88	599		0%			
												'95	440		4%			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 6

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata	25	15	39
vaseyana			
Eriogonum microthecum	2	2	12
Gutierrezia sarothrae	71	81	43
Leptodactylon pungens	0	0	.71
Opuntia spp.	2	2	5



TREND STUDY 11-7-95

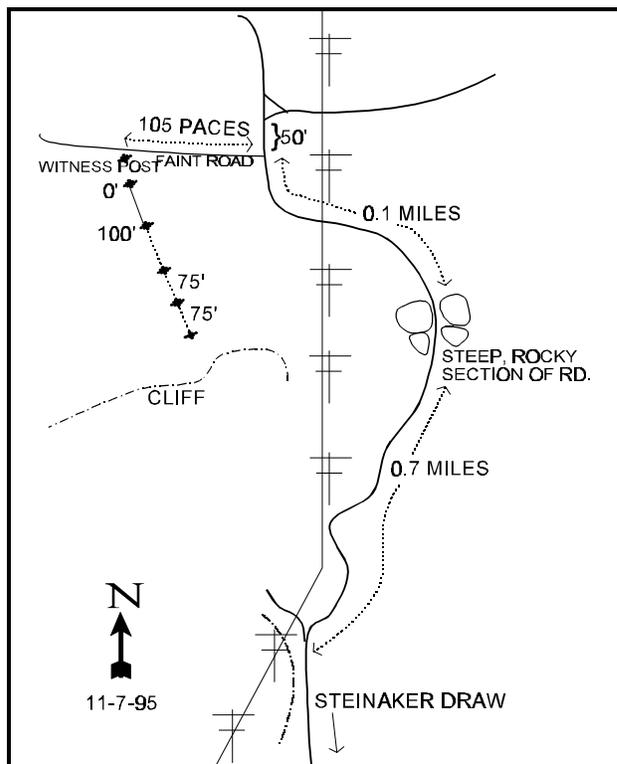
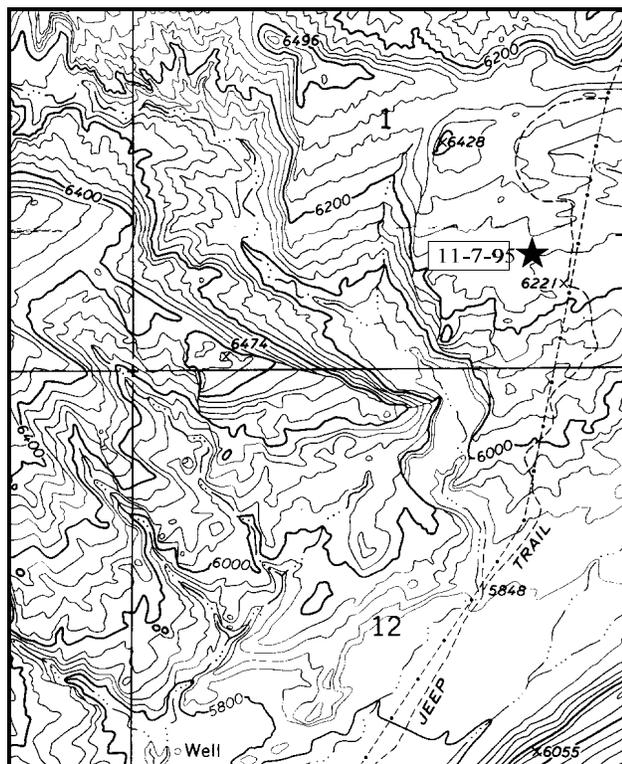
Study site name: Above Steinaker Draw . Range type: Pinyon-Juniper .

Compass bearing: frequency baseline 158 degrees.

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

LOCATION DESCRIPTION

One mile north of Steinaker Reservoir, turn left off highway US 191. Staying to the right, go northeast on the dirt road for approximately 1.4 miles. Just after crossing under the powerlines, there is a fork at the location of study #11-3-82. Bear left at this fork, going .4 miles to a fork at the base of the hill. Proceed up the right fork, following the powerlines, going approximately .85 miles to the top up a rough, sandy 4-WD road. Just after you come up a very steep, rocky section, you top out and the road bends to the right beneath the powerlines. Beyond the bend is a faint road leading off to the east. Walk along this trail about 150 yards to a witness post on the left side of the old road. The study site is in the juniper/sage on the south side of the road. The 0-foot baseline stake is 50 feet south of the witness post.



Map Name: Steinaker Reservoir

Diagrammatic Sketch

Township 3S , Range 21E , Section 1

UTM COOR. 6-27-044E 12 44-93-421N

## DISCUSSION

### Trend Study No. 11-7

This study, established in 1988, is located in an open juniper stand with an understory of Wyoming big sagebrush above Steinaker Draw. It was added to replace study number #11-3, Steinaker Draw, which was established in 1982 and sampled a little-used desert shrub range type. Sign of wintering deer and elk are abundant on the new site. Rabbit pellet groups are also common. Cattle are in the area every spring, May 5 to June 4.

The study site is in a small basin. The slope is gentle in the bottom and steeper on the short slopes which run up to the sandstone ridges. The general aspect is to the northeast. The area does not receive much snow. Annual precipitation ranges from 9 to 12 inches. The elevation at the study site is 6,250 feet.

The soil is a fine sand in the LaMarsh-Rock Outcrop complex. Soil depth varies from 20 to 40 inches to sandstone, or even more shallow where bedrock is exposed. These shallow soils without plant cover tend to support well-developed cryptogams. Although permeability is rapid, surface runoff is moderate and the erosion hazard is high. Accumulation of the fine sand results in a hummocky surface, but for this type of site the soil is fairly well protected. Erosion is localized and not severe.

The mature juniper overstory is open with an estimated point-center quarter population estimate of 99 juniper trees/acre with an average diameter of 10.2 inches in 1995.

The openings in the woodland type supports stands of Wyoming big sagebrush with estimated densities of 2,165 plants/acre in 1988 and 2,580 in 1995. Sagebrush cover averaged 14% in 1988 and 11.6% in 1995. Vigor is generally good with growth and seed production being fair. Percent decadence was high at 56% in 1988, but has since declined to 10%. Use is mostly light to moderate. Composition for young and biotic potential (percent seedlings) for sagebrush are respectively low and very low.

Spiny hopsage, numbering only 166 plants/acre in 1988 and 160 in 1995, is very palatable and is moderately utilized. Even so, it does not readily assume a hedged growth form. The ephedra is also utilized by deer. Pricklypear cactus is numerous and has increased since 1988 from 1,132 to 3,520 plants/acre. Some of the change in density is mostly due to the larger and better distributed sample used in 1995 for shrubs that have uneven distributions.

Grass distribution is extremely variable; some places support a dense stand of cheatgrass, while others are dominated by galleta (*Halaria jamesii*). Wheatgrass and needle-and-thread grass are common throughout. Areas dominated by juniper have very little grass. Forbs are rare, but 12 different perennial species and 8 annual species were encountered.

### 1988 APPARENT TREND ASSESSMENT

The percentage of vegetative cover was low (5%), but litter cover was higher than expected (55%). Cryptogams provide a substantial amount of ground cover (21%), thereby reducing the amount of bare soil to 18%, which is low for this type of site. Tend for soil appears stable. Wyoming big sagebrush displays a slightly downward trend due to its moderately high decadency rate. Apparent trend for the herbaceous understory is stable.

TREND ASSESSMENT

soil - stable

browse - slightly down

herbaceous understory - stable

1995 TREND ASSESSMENT

Bare ground increased from 18.25% to 20.29% while cryptogamic cover and litter decreased. Due to the variable ground cover on the site, the new, larger sample may be responsible for some of the changes in ground cover. Sum of nested frequency of vegetation and litter are high indicating well dispersed cover for these cover classes. Additionally, grasses and forbs account for 43% of the total vegetation cover. Sum of nested frequency of perennial grasses and forbs have also increased since 1988. Taking these factors into consideration, trend for soil is stable to slightly down. Trend for Wyoming big sagebrush is slightly up. Percent decadence has declined from 56% to 10% and heavy use has also declined. The herbaceous understory trend is slightly up due to a large increase in the sum of nested frequency of perennial grasses and forbs. Frequency of perennial grasses increased slightly while frequency of forbs increased significantly. Since grasses make up 86% of the herbaceous cover, trend is only slightly up.

TREND ASSESSMENT

soil - stable to slightly down

browse - slightly up

herbaceous understory - slightly up

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 7

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	136	*141	51	48	4.41
G	Bromus tectorum	-	212	-	67	5.16
G	Hilaria jamesii	113	*13	41	7	.13
G	Oryzopsis hymenoides	17	*4	7	2	.04
G	Poa fendleriana	23	*6	13	4	.04
G	Poa secunda	41	*40	21	16	.30
G	Sitanion hystrix	3	-	1	-	-
G	Sporobolus contractus	-	3	-	1	.38
G	Stipa comata	52	*33	25	13	.70
G	Vulpia octoflora	-	208	-	74	1.04
Total for Grasses		385	660	159	232	12.23
F	Arabis spp.	1	*6	1	2	.01
F	Calochortus nuttallii	5	1	2	1	.00
F	Chaenactis douglasii	-	1	-	1	.00
F	Chenopodium leptophyllum	-	34	-	18	.09
F	Collinsia parviflora	-	40	-	17	.08

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover '95
		'88	'95	'88	'95	
F	Cruciferae	4	-	3	-	-
F	Cryptantha spp.	1	*52	1	20	.22
F	Descurainia spp.	-	51	-	22	.21
F	Draba spp.	-	53	-	20	.14
F	Eriogonum cernuum	-	16	-	7	.03
F	Erigeron spp	-	*9	-	5	.02
F	Eriogonum spp.	-	5	-	2	.03
F	Gilia spp.	-	64	-	27	.21
F	Ipomopsis aggregata	-	*8	-	3	.04
F	Lappula occidentalis	-	78	-	30	.28
F	Lactuca serriola	-	3	-	1	.01
F	Lepidium spp.	9	*74	4	30	.27
F	Lomatium spp.	-	3	-	2	.03
F	Oenothera spp.	-	4	-	2	.01
F	Polygonum douglasii	-	25	-	12	.06
F	Senecio multilobatus	5	*70	4	31	.15
F	Sphaeralcea coccinea	1	-	1	-	-
F	Townsendia incana	-	*6	-	3	.04
Total for Forbs		26	603	16	256	1.98
B	Artemisia nova	-	2	-	1	.38
B	Artemisia tridentata wyomingensis	74	*62	36	29	11.60
B	Chrysothamnus viscidiflorus lanceolatus	-	4	-	2	1.64
B	Ephedra viridis	-	4	-	2	.15
B	Grayia spinosa	4	3	4	2	1.52
B	Gutierrezia sarothrae	-	1	-	1	.03
B	Juniperus osteosperma	6	-	2	-	2.17
B	Juniperus scopulorum	-	-	-	-	.03
B	Opuntia spp.	14	*39	6	16	1.50
Total for Browse		98	115	48	53	19.03

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

BASIC COVER --

Herd unit 11, Study no: 7

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	355	4.75	35.26
Rock	7	.25	.41
Pavement	3	0	.00
Litter	390	55.50	48.90
Cryptograms	242	21.25	11.38
Bare Ground	237	18.25	20.29

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 7

Type	Quadrat Frequency '95
Rabbit	28
Elk	29
Deer	39
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 11, Study no: 7

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia nova</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	17	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Artemisia tridentata wyomingensis</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	6	1	-	1	-	-	-	-	-	7	-	1	-	266			8
	95	21	-	-	-	-	-	-	-	-	21	-	-	-	420			21
M	88	7	10	3	-	-	-	-	-	-	20	-	-	-	666	30	24	20
	95	75	18	1	-	-	-	-	-	-	94	-	-	-	1880	26	38	94
D	88	12	18	6	1	-	-	-	-	-	36	-	1	-	1233			37
	95	10	-	-	1	-	-	3	-	-	11	-	-	3	280			14
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	380			19
Total Plants/Acre (excluding Dead & Seedlings)												'88	2165	Dec:	56%			
												'95	2580		10%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	88	1	-	-	-	-	-	-	-	-	-	-	1	33			1	
	95	2	1	-	-	-	-	-	-	-	-	-	-	60			3	
M	88	1	-	-	-	-	-	-	-	-	-	-	1	33	18	20	1	
	95	5	6	-	1	-	-	-	-	-	-	-	-	240	19	21	12	
D	88	1	-	-	-	-	-	-	-	-	-	-	1	33			1	
	95	-	-	-	1	-	-	-	-	-	-	-	-	20			1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	99	Dec:		33%		
												'95	320			6%		
<i>Ephedra viridis</i>																		
Y	88	-	1	-	1	-	-	-	-	-	-	-	-	66			2	
	95	1	-	-	-	-	-	-	-	-	-	-	-	20			1	
M	88	-	-	1	-	-	-	-	-	-	-	-	-	33	15	14	1	
	95	2	-	-	-	-	-	-	-	-	-	-	-	40	21	24	2	
D	88	-	-	1	-	-	-	-	-	-	-	-	-	33			1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	132	Dec:		25%		
												'95	60			0		
<i>Grayia spinosa</i>																		
M	88	1	1	-	-	-	-	-	-	-	-	-	-	66	22	23	2	
	95	4	2	-	1	-	-	-	-	-	-	-	-	140	27	45	7	
D	88	1	1	1	-	-	-	-	-	-	-	-	-	100			3	
	95	-	-	1	-	-	-	-	-	-	-	-	-	20			1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	166	Dec:		60%		
												'95	160			12%		
<i>Gutierrezia sarothrae</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	6	15	-	-	-	-	-	-	-	-	-	-	420	12	12	21	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:		-		
												'95	420			-		
<i>Juniperus osteosperma</i>																		
Y	88	1	-	-	2	-	-	-	-	-	-	-	-	100			3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	88	-	-	-	1	-	-	-	-	-	-	-	-	33	72	57	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:		-		
												'95	0			-		

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Opuntia spp.																	
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300		15
M	88	29	-	-	-	-	-	-	-	-	29	-	-	-	966	3 11	29
	95	161	-	-	-	-	-	-	-	-	161	-	-	-	3220	3 11	161
Total Plants/Acre (excluding Dead & Seedlings)												'88	1132	Dec:	-		
												'95	3520		-		

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 7

Species	Percent of Total	
	'88	'95
Amelanchier alnifolia	0	0
Artemisia nova	0	0
Artemisia tridentata wyomingensis	57	37
Cercocarpus montanus	0	0
Chrysothamnus viscidiflorus lanceolatus	3	5
Ephedra viridis	3	.84
Eriogonum microthecum	0	0
Grayia spinosa	4	2
Gutierrezia sarothrae	0	6
Juniperus osteosperma	3	0
Opuntia spp.	30	50
Pinus edulis	0	0
Pinus ponderosa	0	0
Purshia tridentata	0	0



TREND STUDY 11-8-95(25-7)

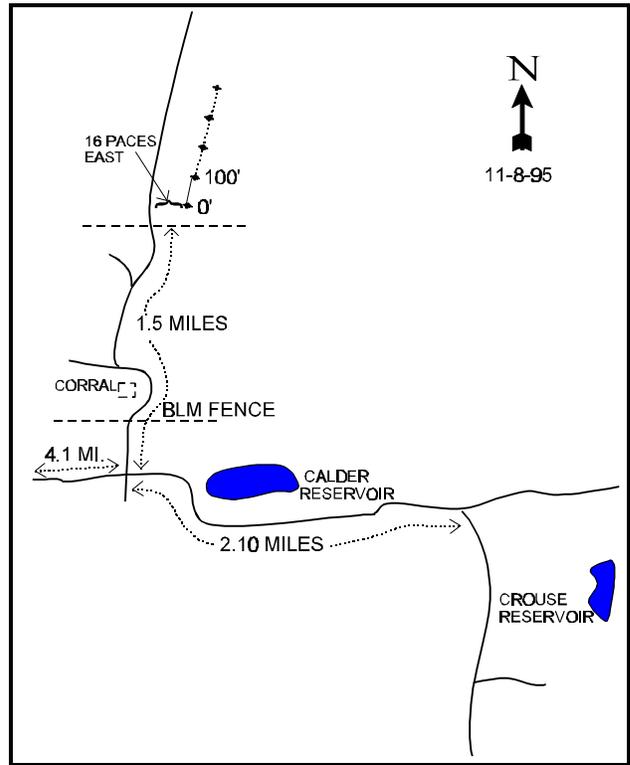
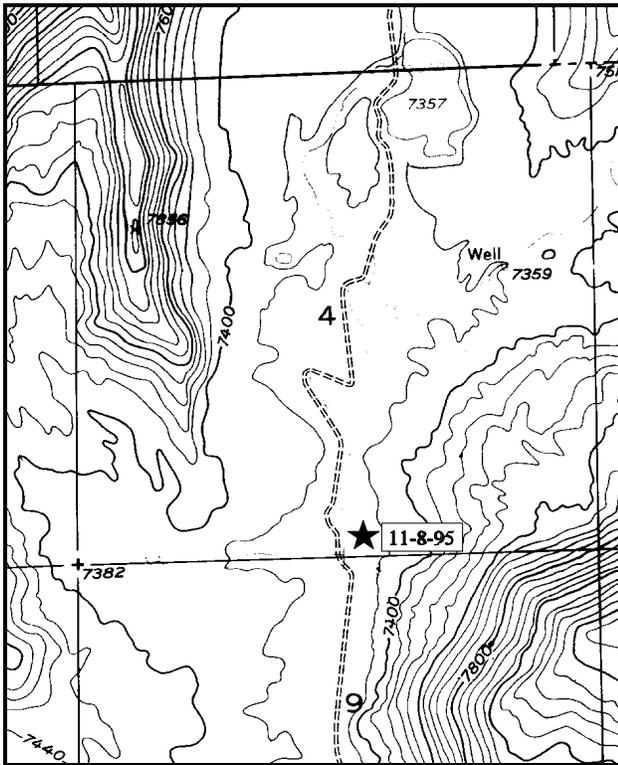
Study site name: Warren Draw . Range type: Sagebrush - Grass .

Compass bearing: frequency baseline 17 degrees.

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

LOCATION DESCRIPTION

From the road junction between Crouse and Calder Reservoirs, proceed west 2.1 miles to an intersection. Turn right (north) and go 1.5 miles, past a fence and 2 forks. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces east to the 0-foot baseline stake. The frequency baseline is marked with green steel fenceposts approximately 18 inches in height. An alternative route coming from highway 44: travel east from highway 44 towards Diamond Mountain for 8.6 miles to a fork just south of Matt Warner Reservoir. Turn right and continue 4.1 miles to a fork. Turn left (north) at this fork and travel 1.5 miles passing through one fence and coming to another. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces east to the 0-foot baseline stake. The frequency baseline is marked with green steel fenceposts approximately 18 inches in height.



Map Name: Warren Draw

Diagrammatic Sketch

Township 1S , Range 24E , Section 4

UTM COOR. 6-49-587E 12 45-13-225N

## DISCUSSION

### Trend Study No. 11-8

This trend study is located just north of the DWR boundary fence in Warren Draw. The site is on a gentle (10%) west facing slope at an elevation of approximately 7,400 feet. The area is used year-round by deer and elk and there is abundant sage grouse sign. Pellet group data suggests moderately low use by elk and deer.

Soil conditions are good with abundant protective ground cover. The site is typical of many of the wide sagebrush valleys on Diamond Mountain. Soils are alluvially deposited, fine textured, and relatively deep. Some areas close to the site contain black sagebrush indicating localized rooting depth restrictions in some areas. Erosion is slight.

The key browse specie on this site is mountain big sagebrush, which covers just over 20% of the ground surface. There were an estimated 4,933 plants/acre in 1982. Seventy-two percent of these were mature plants and the other 28% were decadent. Use was moderate with 26% of the shrubs displaying heavy hedging. Vigor was good on all but 19% of the decadent sagebrush. Density increased dramatically in 1988 when 10,732 plants/acre were estimated. Numerous seedling and young plants were encountered as well as an additional 4,066 decadent plants/acre, increasing percent decadency to 50%. The number of mature plants remained similar (3,533 to 3,866). Use was moderate with 9% of the shrubs displaying heavy use. During the 1995 reading 7,320 plants/acre were estimated; 4,940 plants were mature and 1,440 decadent. Use was moderate to heavy with 34% of the sagebrush displaying heavy hedging. Vigor was good on all but 7% of the decadent plants which were classified as dying.

The only other browse species picked up in the larger sample used in 1995 was small numbers of slenderbush eriogonum. Snowberry was also scattered around the area in small numbers. It was not picked up in the shrub density strips, but was measured for height/crown.

The herbaceous understory has an abundant grass and forb component. Grasses combine to produce nearly 15% cover while forbs combine for 24%. Pinewoods needlegrass is the dominant grass with thickspike wheatgrass, squirreltail, and needle-and-thread also fairly abundant. Forbs are diverse and abundant with 22 perennial species encountered in 1995. Dominant forbs include rose pussytoes, lupine, and desert phlox.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is definitely stable to improving. All nine categories on the apparent trend evaluation form had favorable ratings. Vegetative trend is also stable but is perhaps more precarious at least with respect to the key browse species. Mountain big sagebrush appears to be sustaining itself at the present time, but age, form and vigor class distributions tend to be borderline. Reproduction may be a problem. All of these will be important parameters to monitor in the future.

### 1988 TREND ASSESSMENT

Soil conditions have improved in some areas but declined in others. Basal vegetative cover has increased from 18.3% to 23%. Percent litter cover declined slightly while percent bare ground increased. The site is in good conditions and the soil trend is stable. The key browse species, mountain big sagebrush, displays a slightly improving trend. Even though population density increased dramatically, the proportion of decadent plants also increased from 28% to 50%. Reproductive potential is currently high at 28% and the proportion of young

plants good at 13%. The number of mature plants has also increased slightly. The current population could decline in the future if drought conditions persist and cause the high number of decadent sagebrush to die. The herbaceous trend is up due to a large increase in the quadrat frequency of grasses and forbs since 1982.

TREND ASSESSMENT

soil - stable

browse - slightly up, but with increased decadency

herbaceous understory - up

1995 TREND ASSESSMENT

Ground cover characteristics have improved in most categories since 1988. Currently 53% of the ground surface is covered by vegetation, 65% of which consist of herbaceous plants. Percent litter has declined due to the prolonged drought, but cryptogamic cover has increased and percent bare ground has declined from 16% to 14%. Trend for soil is stable to slightly up. The browse trend is slightly up. The number of mature plants increased while the number of decadent shrubs declined from 50% to 19%. The only negative aspect of the browse trend is the moderate and heavy use of the sagebrush. Thirty-four percent of the plants were heavily hedged, up from 9% in 1988. Trend for the herbaceous understory is up due to a large increase in the sum of nested frequency of grasses and forbs. Three species sampled in 1988 increased significantly in nested frequency while three others declined significantly. The main difference in composition is the appearance of thickspike wheatgrass. If identification is accurate in the past, it appears that thickspike is coming into the site and squirreltail is going out.

TREND ASSESSMENT

soil - stable to slightly up

browse - slightly up

herbaceous understory - up

VEGETATIVE TRENDS --

Herd unit 11, Study no: 8

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	-	*265	-	-	93	2.48
G	Carex spp.	26	29	28	11	13	.14
G	Festuca ovina	20	30	7	6	15	.29
G	Koeleria cristata	51	*9	2	21	4	.04
G	Poa fendleriana	41	*79	-	15	27	1.52
G	Poa pratensis	-	*27	-	-	8	.43
G	Poa secunda	89	*108	-	33	46	1.08
G	Sitanion hystrix	278	*52	-	93	25	2.23
G	Stipa comata	57	*65	-	24	30	1.72
G	Stipa pinetorum	188	*177	-	73	69	4.61
G	Trisetum spicatum	-	-	5	-	-	-
Total for Grasses		750	841	42	276	330	14.58
F	Achillea millefolium	34	33	13	15	12	.34

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Allium spp.	-	2	-	-	2	.01
F	Antennaria rosea	191	189	41	75	71	5.49
F	Androsace septentrionalis	-	36	6	-	18	.09
F	Arabis spp.	24	*1	1	8	1	.00
F	Arabis drummondii	-	*6	-	-	4	.02
F	Artemisia ludoviciana	1	-	1	1	-	-
F	Astragalus aretioides	1	1	-	1	1	.00
F	Aster spp.	15	24	1	5	9	.09
F	Chenopodium leptophyllum	-	6	-	-	3	.01
F	Collinsia parviflora	-	43	-	-	18	.26
F	Cruciferae	1	-	-	1	-	-
F	Cryptantha spp.	-	1	-	-	1	.00
F	Delphinium bicolor	-	6	-	-	2	.03
F	Descurainia spp.	-	1	-	-	1	.00
F	Erigeron eatonii	136	*157	52	62	64	.62
F	Gayophytum ramosissimum	-	18	-	-	8	.09
F	Heterotheca villosa	-	2	-	-	1	.00
F	Hymenoxys richardsonii	3	3	2	1	1	.03
F	Lupinus alpestris	24	44	21	10	25	1.44
F	Lychnis drummondii	-	*5	5	-	3	.06
F	Microsteris gracilis	-	6	-	-	4	.02
F	Navarretia spp.	-	14	-	-	6	.08
F	Orobanche spp.	-	2	-	-	1	.00
F	Orthocarpus tolmiei	-	*109	-	-	42	3.04
F	Penstemon spp.	13	*1	-	7	1	.00
F	Phlox austromontana	234	*172	48	84	55	10.77
F	Phlox longifolia	52	*81	4	26	39	.34
F	Polygonum douglasii	-	161	-	-	60	.59
F	Potentilla gracilis	-	2	2	-	1	.03
F	Taraxacum officinale	18	38	-	9	17	.13
F	Trifolium gymnocarpon	-	*113	37	-	49	.27
F	Unknown forb-annual	-	3	-	-	1	.00
F	Unknown forb-perennial	11	-	3	6	-	-
F	Zigadenus spp.	-	3	-	-	1	.00
Total for Forbs		758	1283	237	311	522	23.94

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
B	Artemisia tridentata vaseyana	110	127	58	57	64	20.41
B	Eriogonum microthecum	2	-	-	1	-	.03
Total for Browse		112	127	58	58	64	20.45

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

BASIC COVER --

Herd unit 11, Study no: 8

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	379	18.30	23.00	53.39
Rock	28	1.30	1.50	.16
Pavement	14	0	0	.07
Litter	394	65.50	59.00	50.50
Cryptograms	90	.30	.50	1.31
Bare Ground	264	14.75	16.00	13.86

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 8

Type	Quadrat Frequency '95
Rabbit	3
Elk	14
Deer	10
Cattle	2

BROWSE CHARACTERISTICS --  
Herd unit 11, Study no: 8

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	40	-	1	4	-	-	-	-	-	43	-	1	1	3000			45
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	14	5	-	2	-	-	-	-	-	19	2	-	-	1400			21
	95	27	11	9	-	-	-	-	-	-	47	-	-	-	940			47
M	82	25	15	13	-	-	-	-	-	-	53	-	-	-	3533	18	31	53
	88	8	41	8	1	-	-	-	-	-	53	1	4	-	3866	21	25	58
	95	83	75	83	6	-	-	-	-	-	247	-	-	-	4940	16	29	247
D	82	-	2	2	-	-	-	-	-	-	-	-	4	-	266			4
	88	21	55	6	-	-	-	-	-	-	71	1	6	4	5466			82
	95	15	24	32	-	1	-	-	-	-	67	-	-	5	1440			72
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	840			42
Total Plants/Acre (excluding Dead & Seedlings)												'82	3799	Dec:	7%			
												'88	10732		50%			
												'95	7320		19%			
<i>Eriogonum microthecum</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	15	5
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	100		-			
<i>Symphoricarpos oreophilus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	11	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 8

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia tridentata vaseyana</i>	100	100	99
<i>Eriogonum microthecum</i>	0	0	1
<i>Symphoricarpos oreophilus</i>	0	0	0

TREND STUDY 11-9-95(25-8)

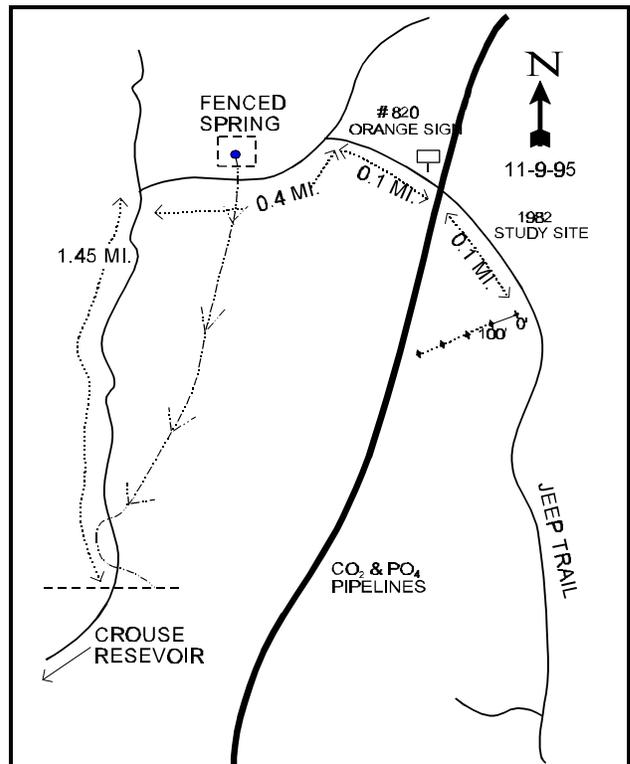
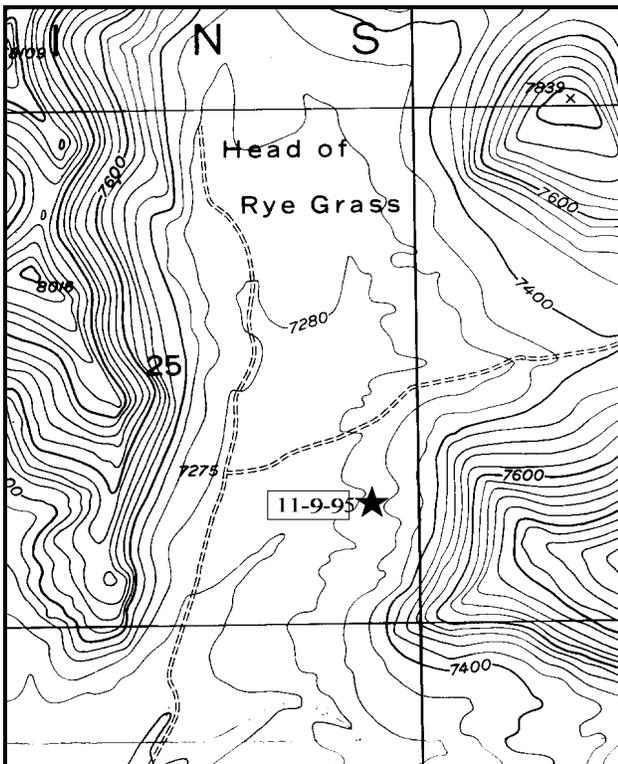
Study site name: Rye Grass . Range type: Sagebrush - Grass .

Compass bearing: frequency baseline 247 degrees.

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

LOCATION DESCRIPTION

From Crouse Reservoir, proceed north up Mail Draw for 4 miles. Turn right and go up towards the head of Rye Grass valley. Go .4 miles to a fence. Continue 1.45 miles to a fork, go right. Go .4 miles, crossing the wash, then turn right towards the pipeline. Go .1 miles to the pipeline. Cross the pipeline and head back south .1 miles to the study on the right side of the road. This study site is adjacent to the 1982 study area, which we destroyed by pipeline construction. The 0- foot baseline stake is about 10 feet west of the road. All study stakes are short green fenceposts.



Map Name: Warren Draw

Diagrammatic Sketch

Township 1N , Range 24E , Section 25

UTM COOR. 6-56-426E 12 45-16-975N

## DISCUSSION

### Trend Study No. 11-9

This study samples winter range in Rye Grass Draw on Diamond Mountain. This DWR owned property is used by a substantial number of deer and elk. There was evidence of year-round use; antler drops, recent deer pellet groups, a winter-killed fawn, elk pellet groups and the remains of a newborn calf in 1988. This important area was originally sampled with a trend study further up the slope in a mixed sagebrush and mountain mahogany type. Trend Study #25-8-82 was disturbed by underground gas pipeline construction and was relocated 175 yards to the south in a more open sage/grass flat, typical of the valley location. Data from the 1982 reading was left in the report and some changes in cover measurements and shrub densities are due to the relocation, but general trends can still be determined.

The study site is on a 5%-6% slope with a southwest exposure. The elevation is 7,300 feet. Soil depth is variable as indicated by the mixture of black sagebrush and mountain big sagebrush. The coarse-textured soil is heavy and densely compacted. Erosion is minimal.

The valley floor in Rye Grass Draw is dominated by mountain big sagebrush with a significant component of black sagebrush, grass, and forbs. The mountain big sagebrush averaged 11% cover in 1988 with a density of 4,199 plants/acre. Fifty-three percent of the population consisted of large decadent plants and 24% were mature. Reproductive potential (percent of seedlings to the population) was high at 33%, with 22% of the population classified as young. Use was light to moderate with 13% of the shrubs displaying heavy hedging. With the larger sample utilized in 1995, mountain big sagebrush averaged 16.4% cover with an estimated 4,900 plants/acre. The number of decadent plants declined to only 15%, while mature plants increased to 73% of the population. It appears that many of the decadent plants sampled in 1988 have recovered. Use is light to moderate and vigor is good on all but 15% of the decadent plants.

Black sagebrush is numerous, but only accounts for 11% of the browse cover. Mature plants are small (5" x 16") and occur in dense small patches. It was reported in the 1988 that nearly all of the black sagebrush counted that year occurred in one of the three density plots. This inflated the actual density which was reported at 7,866 plants/acre with 75% of the population being classified as decadent. Use was moderate to heavy and vigor good on all but 15% of the decadent plants. Seedlings were extremely numerous. The larger, better distributed sample taken in 1995 more accurately estimates the black sagebrush density to be 2,680 plants/acre. Percent decadency is currently only 3% and use is light to moderate.

Slenderbush eriogonum is abundant throughout and lightly hedged. Only one small, dying serviceberry was found on the 1988 study site. Serviceberry and curleaf mountain mahogany are more common on the slopes than in the valley bottom. Other shrubs sampled include mountain low rabbitbrush, broom snakeweed, and gray horsebrush.

Herbaceous vegetation is especially diverse on the site with grasses and forbs each producing around 10% cover. Nine grass species were identified in 1995, with thickspike wheatgrass, bluebunch wheatgrass, Sandberg bluegrass, and needle-and-thread accounting for 74% of the grass cover. Twenty-eight species of perennial forbs were identified in 1995, but only Hooker balsamroot, timber poisonvetch, rock goldenrod, and hoods phlox each produce more than 1% cover.

#### 1982 APPARENT TREND ASSESSMENT

Both soil and vegetative trend are stable to improving. This site is in generally good condition. A possible increase of broom snakeweed is a potential problem, but from an overall standpoint, current management seems adequate.

#### 1988 TREND ASSESSMENT

Even with a moderately dense sagebrush population and an abundant and diverse understory, there is a higher than expected estimate for bare soil on this site (38%). Basal vegetative cover is adequate at 13%, but the site is deficient in litter cover. However, bare spots are not continuous and do not encourage serious erosion. Trend for soil appears stable. Due to the extremely dry conditions, both key browse species on the site have very high decadency rates. Reproductive potential is excellent for both species and young plants are also adequate. Trend for both black sagebrush and mountain big sagebrush is slightly down. The herbaceous understory is diverse, but not particularly abundant. Herbaceous trend is up compared to the data from the original site.

##### TREND ASSESSMENT

soil - stable

browse - slightly down

herbaceous understory - up

#### 1995 TREND ASSESSMENT

Ground cover conditions have improved somewhat since the last reading. Although percent litter has declined slightly, percent bare ground has also declined from 38% to 27%. Nested frequency of grasses and forbs have declined yet herbaceous vegetation produces 50% of the vegetative cover and nested frequency for vegetation and litter are high indicating well dispersed cover. Trend for soil is slightly up. Trend for browse is up for both mountain big sagebrush and black sagebrush. The high number of decadent black sagebrush sampled in 1988 was not encountered in 1995. This transect was read in mid September of 1988 which was a very dry year. According to weather data from Flaming Gorge Dam, normal annual precipitation averages about 16 inches. In 1987 through 1989 conditions were unusually dry with only 10.2", 9.5" and 9.6" of precipitation measured respectively. Due to the lack of dead plants (20 plants/acre) it is evident that no large die off has occurred. Plants had likely dropped many of their leaves by September of 1988 and were mistakenly classified as decadent. Mature black sagebrush have increased from 1,600 plants/acre to 2,000. Decadency of mountain big sagebrush has also improved from 53% to 15%. The number of mature plants increased along with average height and crown measurements. Trend for the herbaceous understory is down due to a large decline in the sum of nested frequency of grasses and forbs. All grass species except bluebunch wheatgrass declined in nested frequency. Five species significantly declined.

##### TREND ASSESSMENT

soil - slightly up

browse - up for both black sagebrush and mountain big sagebrush

herbaceous understory - downward

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 9

T Y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	<i>Agropyron dasystachyum</i>	208	*140	60	78	51	1.38
G	<i>Agropyron spicatum</i>	68	*138	1	32	50	1.74
G	<i>Carex</i> spp.	9	5	10	7	2	.53
G	<i>Elymus cinereus</i>	4	-	-	2	-	-
G	<i>Koeleria cristata</i>	111	*46	35	56	24	.32
G	<i>Oryzopsis hymenoides</i>	-	-	2	-	-	-
G	<i>Poa</i> spp.	154	*-	22	62	-	-
G	<i>Poa fendleriana</i>	2	*93	2	1	37	.92
G	<i>Poa secunda</i>	185	*138	93	76	55	1.14
G	<i>Sitanion hystrix</i>	2	3	38	1	1	.00
G	<i>Stipa comata</i>	190	*153	62	78	59	3.41
G	<i>Stipa coronata depauperata</i>	-	-	57	-	-	-
G	<i>Stipa lettermani</i>	36	41	10	15	16	.91
Total for Grasses		969	757	392	408	295	10.38
F	<i>Allium</i>	-	-	4	-	-	-
F	<i>Antennaria rosea</i>	128	*56	-	50	23	1.21
F	<i>Arabis</i> spp.	19	*3	-	12	2	.01
F	<i>Astragalus aretioides</i>	-	3	-	-	1	.00
F	<i>Astragalus convallarius</i>	127	*86	16	63	45	2.30
F	<i>Balsamorhiza hookeri</i>	69	*36	-	32	20	.27
F	<i>Calochortus nuttallii</i>	-	*9	-	-	5	.02
F	<i>Chaenactis douglasii</i>	7	*10	1	5	4	.02
F	<i>Comandra pallida</i>	33	*16	-	17	9	.05
F	<i>Collinsia parviflora</i>	-	3	-	-	1	.00
F	<i>Crepis acuminata</i>	-	*1	-	-	1	.00
F	<i>Erigeron eatonii</i>	-	*17	-	-	9	.07
F	<i>Erigeron</i> spp	67	*16	2	34	6	.05
F	<i>Eriogonum umbellatum</i>	14	*-	1	5	-	-
F	<i>Gayophytum ramosissimum</i>	-	114	-	-	45	.42
F	<i>Gilia</i>	-	-	5	-	-	-
F	<i>Heterotheca villosa</i>	8	*14	28	3	6	.49
F	<i>Hymenoxys richardsonii</i>	11	10	-	4	5	.10
F	<i>Ipomopsis aggregata</i>	3	11	-	2	5	.02

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Lappula occidentalis	-	1	-	-	1	.00
F	Lactuca serriola	-	*5	-	-	4	.02
F	Lithospermum spp.	2	-	-	1	-	-
F	Lomatium spp.	5	4	-	4	2	.01
F	Lupinus argenteus	-	2	20	-	1	.00
F	Machaeranthera grindelioides	3	2	-	2	1	.00
F	Mammillaria spp.	3	-	-	1	-	-
F	Microsteris gracilis	-	7	-	-	4	.02
F	Orthocarpus tolmiei	-	*26	6	-	11	.47
F	Pedicularis centruthera	-	-	12	-	-	-
F	Penstemon humilis	92	*69	3	44	29	.62
F	Petradoria pumila	30	*28	-	15	11	2.60
F	Phlox hoodii	118	*71	-	46	31	1.16
F	Phlox longifolia	8	*-	-	4	-	-
F	Polygonum douglasii	-	20	-	-	9	.04
F	Sedum	-	-	2	-	-	-
F	Senecio multilobatus	6	7	6	4	3	.01
F	Sphaeralcea coccinea	62	*38	-	25	16	.25
F	Taraxacum officinale	3	*17	-	1	9	.04
F	Tragopogon dubius	-	3	-	-	1	.00
F	Trifolium gymnocarpon	4	*52	4	2	23	.21
F	Valeriana edulis	4	-	-	2	-	-
Total for Forbs		826	757	110	378	343	10.59
B	Amelanchier alnifolia	-	-	1	-	-	-
B	Artemisia nova	14	*30	1	6	12	2.40
B	Artemisia tridentata vaseyana	64	*75	50	35	37	16.35
B	Cercocarpus ledifolius	-	-	10	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	32	*5	1	16	3	.04
B	Echinocactus spp.	-	1	-	-	1	.03
B	Eriogonum microthecum	121	86	17	59	38	1.53
B	Gutierrezia sarothrae	24	29	-	10	12	.84
Total for Browse		255	226	80	126	103	21.21

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

BASIC COVER --

Herd unit 11, Study no: 9

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	366	7.25	13.00	37.97
Rock	66	1.75	1.00	.99
Pavement	206	0	4.50	2.83
Litter	395	67.75	43.25	40.59
Cryptograms	35	.75	.50	.32
Bare Ground	330	22.50	37.75	26.97

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 9

Type	Quadrat Frequency '95
Rabbit	23
Elk	24
Deer	25
Cattle	6

BROWSE CHARACTERISTICS --

Herd unit 11, Study no: 9

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	66		100%			
												'95	0		0%			
<i>Amelanchier utahensis</i>																		
M	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66	10	12	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia nova</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	83	-	1	-	-	-	-	-	-	84	-	-	-	5600		84	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	88	1	3	1	-	-	-	-	-	-	5	-	-	-	333		5	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
M	82	17	2	-	-	-	-	-	-	-	19	-	-	-	1266	8 20	19	
	88	7	11	5	-	-	1	-	-	-	24	-	-	-	1600	5 10	24	
	95	79	20	1	-	-	-	-	-	-	100	-	-	-	2000	5 16	100	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	13	35	41	-	-	-	-	-	-	76	-	13	-	5933		89	
	95	1	3	1	-	-	-	-	-	-	4	-	-	1	100		5	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1732	Dec:	0%			
												'88	7866		75%			
												'95	2680		3%			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	18	2	-	1	-	-	-	-	-	21	-	-	-	1400		21	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	88	12	1	1	-	-	-	-	-	-	14	-	-	-	933		14	
	95	19	7	-	-	-	-	-	-	-	26	-	-	-	520		26	
M	82	13	-	-	-	-	-	-	-	-	13	-	-	-	866	23 39	13	
	88	5	9	1	-	-	-	-	-	-	14	1	-	-	1000	14 20	15	
	95	76	98	6	-	-	-	-	-	-	180	-	-	-	3600	17 32	180	
D	82	2	-	-	-	-	-	-	-	-	1	1	-	-	133		2	
	88	9	19	6	-	-	-	-	-	-	30	-	2	2	2266		34	
	95	6	26	7	-	-	-	-	-	-	33	-	-	6	780		39	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	640		32	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1399	Dec:	9%			
												'88	4199		53%			
												'95	4900		15%			
<i>Ceratoides lanata</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8 16	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Cercocarpus ledifolius</i>																		
Y	82	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666	13	16	10
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	999	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	3	1	-	-	-	-	-	-	-	3	-	1	-	266			4
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	2	2	-	2	-	-	-	-	-	6	-	-	-	400			6
	95	6	-	-	1	-	-	-	-	-	7	-	-	-	140			7
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	-	-	1	-	-	-	-	-	2	-	-	-	133	5	7	2
	95	9	1	1	2	-	-	-	-	-	13	-	-	-	260	7	9	13
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	1	-	-	-	-	-	2	-	-	-	133			2
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	666		19%			
												'95	420		4%			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	5	4
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	80		-			
<i>Eriogonum microthecum</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	88	10	-	-	-	-	-	-	-	-	10	-	-	-	666			10
	95	23	-	-	1	-	-	-	-	-	24	-	-	-	480			24
M	82	20	-	-	-	-	-	-	-	-	20	-	-	-	1333	9	5	20
	88	4	2	-	2	-	-	-	-	-	8	-	-	-	533	5	5	8
	95	125	-	-	23	-	-	-	-	-	148	-	-	-	2960	5	7	148
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	1533	Dec:	0%			
												'88	1265		5%			
												'95	3440		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200			18
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666			10
	88	14	-	-	-	-	-	-	-	-	14	-	-	-	933			14
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	30	-	-	-	-	-	-	-	-	30	-	-	-	2000	5	6	30
	88	25	-	-	-	-	-	-	-	-	24	1	-	-	1666	5	6	25
	95	79	-	-	2	-	-	-	-	-	81	-	-	-	1620	8	10	81
Total Plants/Acre (excluding Dead & Seedlings)												'82	2666	Dec:	-			
												'88	2599		-			
												'95	1620		-			
<i>Opuntia spp.</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	21	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Purshia tridentata</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	52	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Tetradymia canescens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133	5	5	2
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6	8	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	133		-			
												'95	120		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 9

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	.39	0
<i>Amelanchier utahensis</i>	.78	0	0
<i>Artemisia nova</i>	20	47	20
<i>Artemisia tridentata</i> <i>vaseyana</i>	17	25	37
<i>Ceratoides lanata</i>	0	0	.15
<i>Cercocarpus ledifolius</i>	12	0	0
<i>Chrysothamnus viscidiflorus lanceolatus</i>	0	4	3
<i>Echinocactus</i> spp.	0	0	.60
<i>Eriogonum microthecum</i>	18	8	26
<i>Gutierrezia sarothrae</i>	31	15	12
<i>Opuntia</i> spp.	.78	0	0
<i>Purshia tridentata</i>	0	0	0
<i>Tetradymia canescens</i>	0	.79	.90

TREND STUDY 11-10-95(25-9)

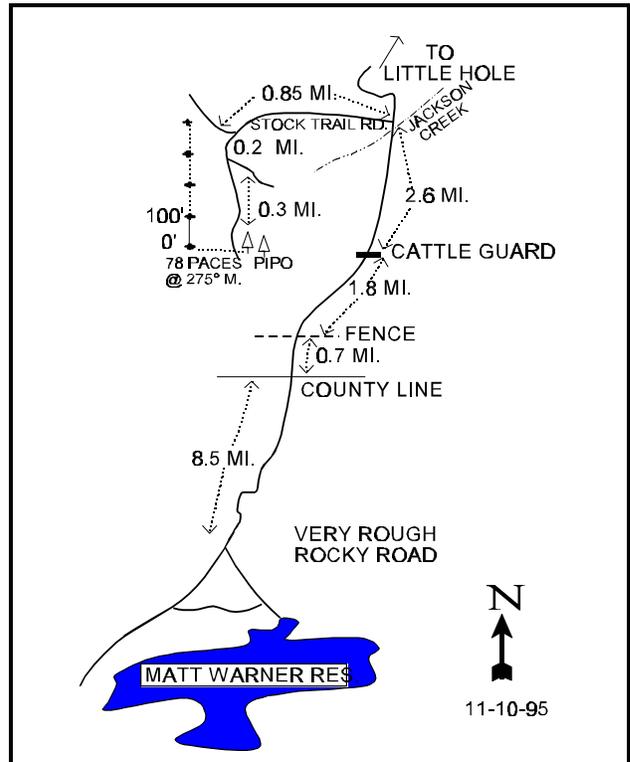
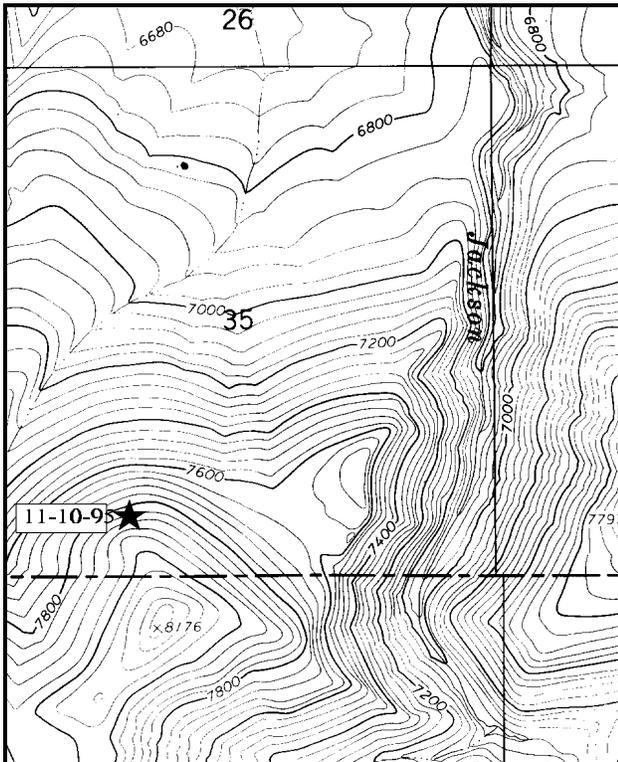
Study site name: Little Hole . Range type: Mountain Brush .

Compass bearing: frequency baseline 0 degrees.

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

LOCATION DESCRIPTION

From the intersection of Highway U.S. 191 and the Diamond Mountain Road, take the Diamond Mountain Road to the north to a fork with a sign indicating Browns Park Road 10 miles and Vernal 36 miles. Turn left (north) towards Jackson Draw and proceed down Jackson Draw towards Little Hole. Just past where you cross Jackson Creek, about 4 miles before the end of the road at the Green River, make a left turn and proceed .85 miles to an intersection. Bear left, drive about .5 miles and stop. From the 2 large ponderosa pines near the road, walk SW (236°) for 87 paces to a large rock outcropping just below another large ponderosa. From this tree, the 0-foot baseline stake is 21 paces at 221 degrees true. The frequency baseline is marked by 18 inch green fenceposts.



Map Name: Jackson Draw

Diagrammatic Sketch

Township 2N , Range 23E , Section 35

UTM COOR. 6-43-991E 12 45-25-760N

## DISCUSSION

### Trend Study No. 11-10

This study is on a north facing 20% to 30% slope overlooking Little Hole, an important winter range for deer and elk. The study samples a mixed mountain brush type with scattered pinyon, juniper, ponderosa pine, and Douglas fir trees. Elevation is 6,800 feet. This rangeland is managed by the BLM in which cattle graze during the summer season, May 16 to October 15.

Soils are derived from igneous parent material and are coarse and well drained. Additional soil data puts the study area in the Tolman family - Flynn Cove association. Depth characteristics vary, but overall it is a very cobbly, well-drained loam. The hazard of water erosion is slight.

Mountain big sagebrush and antelope bitterbrush have been designated the key browse species. Density of big sagebrush has steadily increased since 1982. Percent decadency increased substantially in 1988, likely due to sagebrush dropping their leaves as a result of extremely dry conditions. Percent decadency returned to lower levels in 1995. Currently there are an estimated 4,220 plants/acre, with 74% of them being classified as mature. Use is moderate and vigor is good on all, with 20% of the decadent plants classified as dying.

The number of bitterbrush counted increased dramatically from 400 to 2,266 plants/acre between 1982 and 1988 due to a large increase in the number of young plants. Mature plants increased from 333 plants/acre to 500 during the same period. Currently there are an estimated 1,780 plants/acre, 82% of which are mature. Use is light to moderate and vigor is good.

A small number of mountain mahogany occur on the site. These shrubs are moderate to heavily hedged. Other browse found on the site include serviceberry, mountain low rabbitbrush, slenderbush eriogonum, broom snakeweed, Oregon grape, and snowberry. The overstory is composed of 15 trees/acre of pinyon, 8 trees/acre of juniper, 9 trees/acre of ponderosa pine, and 6 trees/acre of Douglas fir.

The herbaceous understory is diverse, but not particularly abundant with grasses and forbs combining to produce 38% of the vegetative cover. Nine grasses and one sedge, identified in 1995, produce just over 11% cover. Twenty-six perennial forb species were encountered in 1995, but only one contributes more than 1% cover. Composition of grasses is similar between years with the exception of the appearance of bluebunch wheatgrass and mutton grass in 1988. This may have been caused by an identification problem in 1982. Frequency of forbs has increased with each reading.

### 1982 APPARENT TREND ASSESSMENT

Overall range trend is stable to perhaps slightly improving. An apparent increase in antelope bitterbrush is encouraging. A concurrent decline in mountain big sagebrush is less so. If the community is in a state of flux, it will be important to prevent any increase in broom snakeweed or pricklypear. Soil trend is stable.

### 1988 TREND ASSESSMENT

The ground cover data show an increase in vegetative cover which is consistent with the frequency and density data. The percentage of rocks doubled to almost 13%. Percent bare ground declined from 16% to 9%. Soil trend is up. Trend for mountain big sagebrush is down due to an increase in decadency. This condition is caused by the unusually dry conditions present this year and will improve with normal precipitation patterns. Trend for antelope bitterbrush is up due to a

large increase in seedling and young plants indicating an increasing population. The herbaceous understory trend is up with increased quadrat frequency of both grasses and forbs.

TREND ASSESSMENT

soil - up

browse - down for sagebrush and up for bitterbrush

herbaceous understory - stable

1995 TREND ASSESSMENT

Soil trend is up slightly due to a decrease in percent bare ground from 9% to 4%. Percent rock cover has declined and litter cover has remained fairly stable. The herbaceous understory makes up only 38% of the vegetative cover, but sum of nested frequency of vegetation and litter cover is high indicating well dispersed protective cover. Trend for sagebrush is up due to a major decrease in decadency. It appears that most of the previously classified decadent shrubs are now normal, mature plants with good vigor. This site was read in mid September of 1988 and decadency numbers were likely inflated due to sagebrush dropping leaves in response to the dry conditions of that year. This should have been taken into consideration when rating these shrubs. Trend for bitterbrush is slightly up due to an increase in the number of mature plants. Reproductive potential and percent young declined since 1988, but there are still sufficient seedlings and young to maintain the population. Average height and crown has also increased significantly. Overall browse trend is slightly up. The herbaceous understory trend is stable. Three of the five most numerous perennial grass species increased significantly but overall sum of nested frequency declined slightly. Sum of nested frequency of perennial forbs increased.

TREND ASSESSMENT

soil - slightly up

browse - slightly up overall; up for mountain big sagebrush and slightly up for bitterbrush

herbaceous understory - stable

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

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	53	*92	35	24	39	1.24
G	Agropyron spicatum	97	*70	-	36	30	.84
G	Bromus tectorum	-	50	-	-	18	.45
G	Carex spp.	2	9	3	2	4	.17
G	Festuca arundinacea	-	-	4	-	-	-
G	Festuca ovina	-	-	1	-	-	-
G	Koeleria cristata	61	*5	8	26	4	.02
G	Melica bulbosa	27	98	7	10	40	1.87
G	Poa fendleriana	28	*92	-	12	31	1.38
G	Poa pratensis	90	*140	1	34	46	3.18
G	Poa secunda	150	*75	50	59	30	1.00
G	Sitanion hystrix	113	*33	20	50	17	.35

T Y P e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	<i>Stipa comata</i>	144	*57	56	61	28	1.03
G	<i>Stipa lettermani</i>	8	8	1	5	4	.21
Total for Grasses		773	729	168	319	291	11.79
F	<i>Agoseris glauca</i>	-	*15	-	-	6	.06
F	<i>Antennaria rosea</i>	15	*8	2	8	4	.48
F	<i>Arabis</i> spp.	3	3	1	1	1	.00
F	<i>Astragalus convallarius</i>	1	11	-	1	4	.09
F	<i>Astragalus</i> spp.	1	-	-	1	-	-
F	<i>Castilleja linariaefolia</i>	-	1	-	-	1	.06
F	<i>Calochortus nuttallii</i>	-	3	-	-	2	.01
F	<i>Chaenactis douglasii</i>	13	*-	-	6	-	-
F	<i>Collomia linearis</i>	-	109	-	-	43	.33
F	<i>Comandra pallida</i>	-	29	-	-	14	.26
F	<i>Collinsia parviflora</i>	-	252	-	-	85	2.74
F	<i>Crepis acuminata</i>	8	*7	-	5	3	.04
F	<i>Cystopteris fragilis</i>	4	-	-	2	-	-
F	<i>Delphinium bicolor</i>	-	6	-	-	2	.01
F	<i>Descurainia pinnata</i>	-	2	-	-	1	.00
F	<i>Erigeron</i> spp	15	*1	-	6	1	.00
F	<i>Eriogonum umbellatum</i>	2	-	-	1	-	-
F	<i>Gayophytum ramosissimum</i>	-	3	-	-	1	.00
F	<i>Gilia</i> spp.	-	-	1	-	-	-
F	<i>Heterotheca villosa</i>	84	*51	12	37	22	1.01
F	<i>Ipomopsis aggregata</i>	3	6	-	2	4	.02
F	<i>Lepidium</i> spp.	-	7	-	-	4	.02
F	<i>Linum lewisii</i>	-	3	-	-	1	.00
F	<i>Lithospermum ruderales</i>	4	1	-	2	1	.03
F	<i>Lomatium</i> spp.	-	*7	-	-	3	.02
F	<i>Lupinus argenteus</i>	-	*38	-	-	19	.69
F	<i>Microsteris gracilis</i>	-	4	-	-	3	.01
F	<i>Orobanche</i> spp.	-	5	-	-	2	.03
F	<i>Penstemon</i> spp.	3	-	-	2	-	-
F	<i>Petradoria pumila</i>	7	*-	-	4	-	-
F	<i>Phlox hoodii</i>	-	2	-	-	1	.00
F	<i>Polygonum douglasii</i>	-	19	-	-	12	.06
F	<i>Sphaeralcea coccinea</i>	24	*17	-	13	8	.09

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Taraxacum officinale	17	*16	-	9	8	.07
F	Tragopogon dubius	9	*-	3	5	-	-
F	Trifolium gymnocarpon	-	*29	-	-	13	.06
F	Zigadenus paniculatus	-	2	-	-	1	.00
Total for Forbs		213	657	19	105	270	6.27
B	Amelanchier alnifolia	-	-	-	-	-	.03
B	Artemisia tridentata vaseyana	69	*57	42	43	29	15.07
B	Cercocarpus montanus	35	*14	6	18	5	1.31
B	Chrysothamnus viscidiflorus lanceolatus	1	3	1	1	1	.18
B	Eriogonum heracleoides	2	1	-	1	1	.18
B	Eriogonum microthecum	25	*33	16	16	17	1.07
B	Gutierrezia sarothrae	9	-	1	4	-	-
B	Opuntia spp.	3	-	1	1	-	-
B	Pinus edulis	7	-	-	2	-	1.74
B	Pinus ponderosa	2	3	1	1	1	.38
B	Purshia tridentata	32	*35	17	18	18	7.84
B	Symphoricarpos oreophilus	15	*16	3	5	7	1.53
Total for Browse		200	162	88	110	79	29.36

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 11, Study no: 10

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	357	8.75	12.25	52.22
Rock	112	6.00	12.50	8.00
Pavement	25	.25	.75	.20
Litter	392	64.50	61.50	64.56
Cryptograms	91	5.00	4.25	1.27
Bare Ground	113	15.50	8.75	3.90

PELLET GROUP FREQUENCY --  
Herd unit 11, Study no: 10

Type	Quadrat Frequency '95
Rabbit	4
Moose	1
Elk	4
Deer	15
Cattle	6

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

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	1	-	-	-	-	-	-	-	1	-	-	-	33	27	22	1
	88	-	-	-	1	-	-	-	-	-	1	-	-	-	33	26	20	1
	95	3	2	-	-	-	-	-	-	-	2	1	2	-	100	29	38	5
Total Plants/Acre (excluding Dead & Seedlings)												'82	33	Dec:	-			
												'88	66		-			
												'95	120		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	88	6	1	-	4	-	-	1	-	-	12	-	-	-	400		12	
	95	13	1	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	82	24	24	-	-	-	-	-	-	-	46	2	-	-	1600	17	23	48
	88	6	7	2	1	-	-	-	-	-	15	1	-	-	533	16	20	16
	95	74	76	1	6	-	-	-	-	-	157	-	-	-	3140	23	34	157
D	82	-	10	1	-	-	-	-	-	-	7	2	1	1	366		11	
	88	40	37	1	1	-	-	-	-	-	75	-	-	4	2633		79	
	95	16	19	4	1	-	-	-	-	-	32	-	-	8	800		40	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	600		30	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1999	Dec:	18%			
												'88	3566		73%			
												'95	4220		18%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	1	-	-	-	-	-	-	-	1	-	-	-	33	28	31	1
	88	-	-	1	-	-	-	-	-	-	1	-	-	-	33	22	31	1
	95	9	4	2	2	-	-	-	-	-	15	2	-	-	340	37	50	17
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	33	Dec:	-			
												'88	66		-			
												'95	380		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	11	-	-	-	-	-	-	-	-	11	-	-	-	220	16	19	11
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	220		-			
<i>Eriogonum heracleoides</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40	7	19	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Eriogonum microthecum</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	7	-	-	1	-	-	-	-	-	7	-	1	-	266		8	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	6	-	-	-	-	-	-	-	-	5	-	1	-	200	9	8	6
	88	7	-	-	4	-	-	-	-	-	10	-	1	-	366	7	6	11
	95	95	-	-	-	-	-	-	-	-	95	-	-	-	1900	11	16	95
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	732		13%			
												'95	1960		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Gutierrezia sarothrae</i>																		
M	82	8	-	-	-	-	-	-	-	-	8	-	-	-	266	9	6	8
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166	7	6	5
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160	10	10	8
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	-			
												'88	166		-			
												'95	160		-			
<i>Mahonia repens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	40			2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	4	5	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Opuntia spp.</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	5	-	-	1	-	-	-	-	-	5	-	1	200			6	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	82	7	-	-	-	-	-	-	-	-	7	-	-	233	6	9	7	
	88	3	-	-	-	-	-	-	-	-	1	-	2	100	4	6	3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	4	7	0	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	33			1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	233	Dec:	0%			
												'88	333		9%			
												'95	0		0%			
<i>Pinus edulis</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	-	-	-	1	-	-	1	-	-	2	-	-	66			2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	33			1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	33			1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	33	Dec:	-			
												'88	33		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Pinus ponderosa</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	88	2	-	-	2	-	-	-	-	-	4	-	-	-	133		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33	41	69	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	133		-			
												'95	0		-			
<i>Purshia tridentata</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	7	-	-	1	-	-	4	-	-	12	-	-	-	400		12	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	88	26	5	-	5	-	-	3	-	-	38	-	1	-	1300		39	
	95	5	6	-	4	-	-	-	-	-	15	-	-	-	300		15	
M	82	6	4	-	-	-	-	-	-	-	10	-	-	-	333	22	32	10
	88	4	8	3	-	-	-	-	-	-	14	-	1	-	500	17	24	15
	95	30	37	-	5	1	-	-	-	-	73	-	-	-	1460	22	50	73
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	1	-	-	-	-	-	-	2	-	-	-	66		2	
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	40		2		
Total Plants/Acre (excluding Dead & Seedlings)												'82	399	Dec:	0%			
												'88	1866		3%			
												'95	1780		1%			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	7	-	-	1	-	-	-	-	-	8	-	-	-	160		8	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300	20	43	15
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	460		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	22	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 10

Species	Percent of Total		
	'82	'88	'95
Amelanchier alnifolia	1	.95	1
Artemisia tridentata vaseyana	61	51	45
Cercocarpus montanus	1	.95	4
Chrysothamnus viscidiflorus lanceolatus	0	0	2
Eriogonum heracleoides	0	0	.42
Eriogonum microthecum	6	11	21
Gutierrezia sarothrae	8	2	2
Mahonia repens	0	0	.42
Opuntia spp.	7	5	0
Pinus edulis	1	.47	0
Pinus ponderosa	2	2	0
Purshia tridentata	12	27	19
Symphoricarpos oreophilus	0	0	5
Tetradymia canescens	0	0	0

TREND STUDY 11-11-95(25-11)

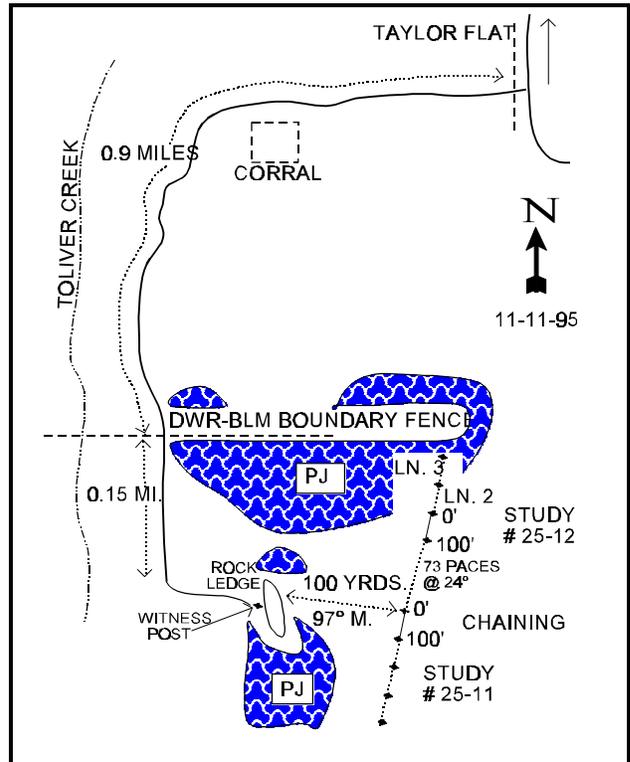
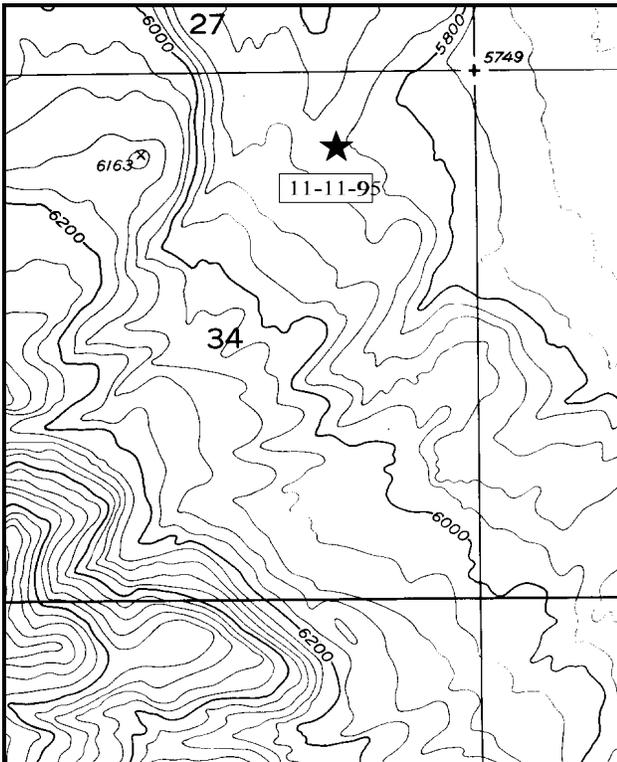
Study site name: Toliver Creek Chaining . Range type: Chained, Reseeded PJ .

Compass bearing: frequency baseline 204 degrees.

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

LOCATION DESCRIPTION

From the north side of the Green River at the Taylor Flat bridge, go south across the river 1.95 miles. Turn right and go through a gate. Go .2 miles to a gate by a corral. Continue south and west .7 miles to the DWR-BLM boundary fence. Go through the gate and continue .15 miles to the end of the road. There is PJ covered, rocky ledge about 75 feet east. From the ledge, walk 60 paces SE into the chaining to a short green fencepost tagged #909 which marks the start of the frequency baseline.



Map Name: Warren Draw

Diagrammatic Sketch

Township 2N , Range 24E , Section 34

## DISCUSSION

### Trend Study No. 11-11

This is a study established in 1988 to monitor a pinyon-juniper chaining. Study #11-12, was established in an adjacent undisturbed pinyon-juniper stand to provide comparative baseline data for species composition and trend assessment. The Tolver Creek chaining was completed in the fall of 1986. It was two-way chained and seeded with grasses, forbs, and shrubs. The BLM-administered site, as with all of Browns Park area, is considered critical deer winter range.

The study site is located in the foothills above Taylor Flat. The area has a northern aspect with a slope of 2-3%. Elevation is 5,900 feet. The soil is shallow and extremely rocky, with rock and pavement cover of 23%. The surface layer is a sandy loam, now well-protected with litter resulting from the chaining. Although localized run-off continues, soil loss has been controlled by the establishment of annual and perennial grasses and forbs.

Due to the shallow, rocky nature of the site, the control of pinyon and juniper was close to 100%. Few seedlings were observed and none were hit in the density plots of 1988. Point-center quarter data from 1995 estimate 5 pinyon trees/acre and 13 juniper trees/acre. Average diameter of pinyon is 6 inches while that of juniper is 3.4 inches. Thirty-three percent of the junipers sampled consisted of mature tipped trees which were not eradicated by the chaining treatment.

Browse are not abundant on the site but mountain big sagebrush, fourwing saltbush, and rubber rabbitbrush provide some forage. Currently the density of sagebrush is 380 plants/acre while fourwing saltbush population is 160 plants/acre. Increaser species including prickly pear and broom snakeweed are present but only snakeweed has increased numbers since 1988. Density of this shrub increased 90% and average height/crown nearly tripled. Seedlings and young are present but not in numbers which would suggest a further large increase in density.

The herbaceous understory is dominated by annual grasses and forbs which account for 66% of the total vegetation cover. Annuals were normally not included in pre-1992 data, but annuals were included in the 1988 summary. Annual cheatgrass dominates the site and has increased significantly in its sum of nested frequency value. Currently it has a cover value of 23% while it makes up 80% of the grass cover. The only perennial grass which produces more than 1% cover is crested wheatgrass (4.3% cover or only 15% of the grass cover). It has increased significantly since 1988 along with intermediate wheatgrass, but together they only provide 17% of the total grass cover. Indian ricegrass and squirreltail were not sampled in 1995 while orchardgrass and Sandberg bluegrass declined significantly in nested frequency. Nine annual forb and 10 perennial forb species were detected in 1995. The only seeded forb noted was alfalfa which has declined significantly since 1988 with prolonged drought.

### 1988 APPARENT TREND ASSESSMENT

Large rocks are prominent on the surface and account for 23% of the ground cover. Debris from the chaining provides a substantial amount of surface litter cover (54%). Percent bare ground decreased to only 5%. Trend for soil appears stable at this time. There are low densities for shrubs on the site but fourwing saltbush and mountain big sagebrush should increase in time. The herbaceous understory contains a good variety of seeded and native grasses but annual cheatgrass is currently the most abundant grass. Trend for grasses and forbs is improved from prechained conditions, however the abundance of annual grasses and forbs is a concern.

TREND ASSESSMENT

soil - stable

browse - improved but still in small numbers

herbaceous understory - improved but continues to be dominated by annuals

1995 TREND ASSESSMENT

Ground cover characteristics have improved since the chaining. Currently there is only 5% bare soil and litter cover has remained high at 54%. Trend for soil is up. The browse trend is improved for sagebrush and fourwing saltbush. One negative aspect is the increase of broom snakeweed which has increased 90% since 1988, but appears to be stabilizing with a mostly mature population and much lower biotic potential (percent of seedlings to mature population). The herbaceous trend is down due to the dominance of annual grasses and forbs. Cheatgrass makes up 80% of the grass cover and 66% of the total vegetative cover. Annual forbs account for 39% of the forb cover. Drought conditions since 1987 have intensified this condition. Two perennial seeded grasses, crested and intermediate wheatgrass, did increase significantly in nested frequency since the last reading. These and other perennial grasses should eventually gain dominance of this site.

TREND ASSESSMENT

soil - up

browse - improved but still in small numbers

herbaceous understory - down due to the over dominance of annuals

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 11

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron cristatum	84	*165	42	66	4.30
G	Agropyron intermedium	3	*25	2	8	.55
G	Agropyron spicatum	-	4	-	2	.03
G	Aristida longiseta	-	-	-	-	.03
G	Bromus tectorum	210	*363	80	100	22.82
G	Dactylis glomerata	73	*16	33	8	.16
G	Oryzopsis hymenoides	17	*-	8	-	-
G	Poa secunda	11	*1	5	1	.00
G	Sitanion hystrix	33	*-	15	-	.00
G	Sporobolus cryptandrus	2	6	1	2	.01
G	Stipa comata	-	*20	-	7	.69
G	Unknown grass - perennial	39	-	16	-	-
G	Vulpia octoflora	-	22	-	8	.06
Total for Grasses		472	622	202	202	28.68
F	Calochortus nuttallii	-	5	-	3	.01
F	Chenopodium album	7	-	5	-	-
F	Chenopodium spp.	22	-	11	-	-

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Cruciferae	19	*-	11	-	-
F	Cymopterus longipes	-	2	-	2	.01
F	Cymopterus spp.	-	1	-	1	.00
F	Descurainia pinnata	-	20	-	8	.44
F	Draba reptans	7	83	4	31	.23
F	Erodium cicutarium	-	26	-	9	.41
F	Gilia spp.	-	18	-	11	.05
F	Lappula occidentalis	-	1	-	1	.00
F	Lactuca serriola	-	*70	-	35	.30
F	Leucelene ericoides	37	40	19	19	.73
F	Lepidium spp.	-	7	-	3	.01
F	Machaeranthera canescens	-	4	-	2	.01
F	Melilotus officinalis	24	*7	13	2	.21
F	Medicago sativa	-	6	-	2	.31
F	Phlox hoodii	-	6	-	2	.06
F	Sanguisorba minor	5	*-	3	-	-
F	Sisymbrium altissimum	-	50	-	22	.48
F	Sphaeralcea coccinea	-	*23	-	10	.71
F	Tragopogon dubius	-	*6	-	3	.04
F	Unknown forb-annual	7	-	3	-	-
F	Unknown forb-perennial	9	3	4	1	.15
Total for Forbs		137	378	73	167	4.21
B	Artemisia tridentata vaseyana	2	10	1	4	.33
B	Atriplex canescens	3	1	1	1	.15
B	Chrysothamnus nauseosus albicaulis	-	-	-	-	.41
B	Gutierrezia sarothrae	1	*40	1	19	1.61
B	Juniperus osteosperma	-	3	-	2	.96
B	Medicago sativa	-	3	-	1	.03
B	Opuntia spp.	22	*11	9	6	.57
Total for Browse		28	68	12	33	4.07

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 11, Study no: 11

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	376	3.00	38.45
Rock	268	12.25	22.84
Pavement	94	1.50	.37
Litter	392	54.75	54.20
Cryptograms	24	0	.09
Bare Ground	157	28.50	5.06

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 11

Type	Quadrat Frequency '95
Rabbit	18
Elk	7
Deer	12
Cattle	3

BROWSE CHARACTERISTICS --

Herd unit 11, Study no: 11

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	6	-	-	-	-	-	6	-	-	-	120		6	
Y	88	1	-	-	-	-	-	-	-	-	-	1	-	-	33		1	
	95	4	-	-	10	-	-	-	-	-	14	-	-	-	280		14	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	3	2	-	-	-	-	-	-	-	5	-	-	-	100	13	16	
Total Plants/Acre (excluding Dead & Seedlings)												'88	33	Dec:		-		
												'95	380			-		
<i>Atriplex canescens</i>																		
S	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	27	36	
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:		-		
												'95	160			-		

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Chrysothamnus nauseosus albicaulis																		
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33	11	8	1
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	28	31	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	33	Dec:	-			
												'95	60		-			
Echinocactus spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	2	3	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
Gutierrezia sarothrae																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	80			4	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	100			5	
M	88	6	-	-	-	-	-	-	-	-	6	-	-	200	4	6	6	
	95	91	-	-	-	-	-	-	-	-	91	-	-	1820	11	17	91	
Total Plants/Acre (excluding Dead & Seedlings)												'88	200	Dec:	-			
												'95	1920		-			
Opuntia spp.																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	66			2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	88	16	-	-	-	-	-	-	-	-	16	-	-	533			16	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
M	88	10	-	-	1	-	-	-	-	-	11	-	-	366	4	12	11	
	95	27	-	-	-	-	-	-	-	-	27	-	-	540	3	12	27	
D	88	5	-	-	-	-	-	-	-	-	1	-	4	166			5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	1065	Dec:	15%			
												'95	560		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 11, Study no: 11

Species	Percent of Total	
	'88	'95
Artemisia tridentata vaseyana	2	12
Atriplex canescens	9	5
Chrysothamnus nauseosus albicaulis	2	2
Echinocactus spp.	0	0
Gutierrezia sarothrae	14	62
Opuntia spp.	73	18

TREND STUDY 11-12-95(25-12)

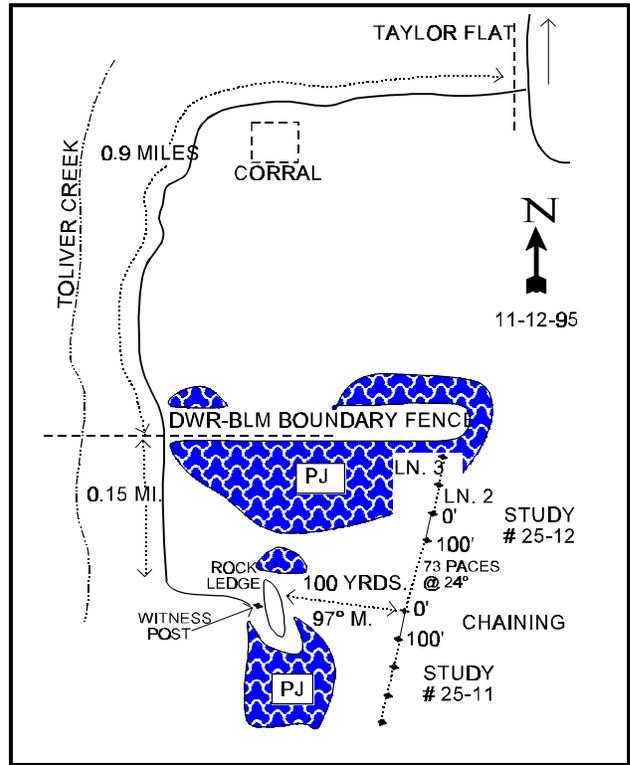
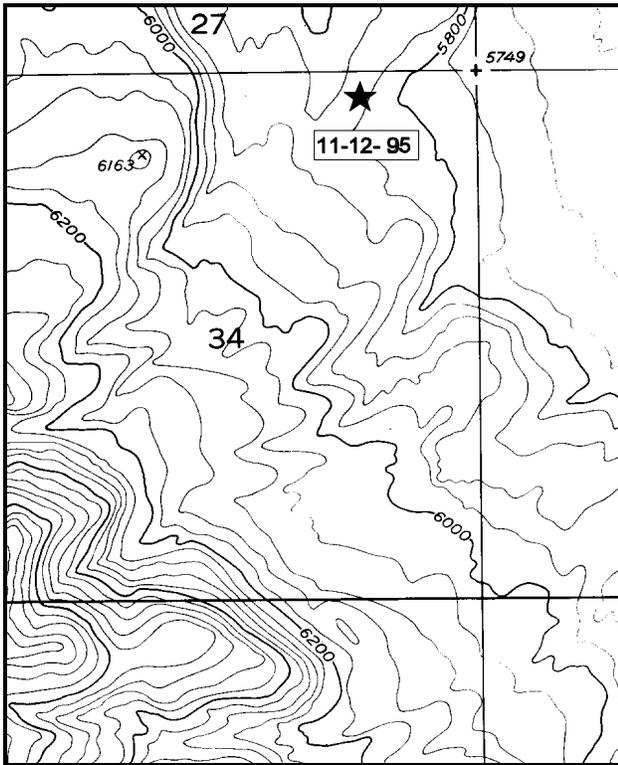
Study site name: Toliver Creek PJ . Range type: Juniper-Pinyon .

Compass bearing: frequency baseline 205 degrees.

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

LOCATION DESCRIPTION

From the trend study in the Toliver Creek chaining, study #9 -11-95, walk 73 paces north ( $24^\circ$  true) into the unchained patch of juniper and pinyon. The first stake encountered should be the 100-foot baseline stake. The start of the frequency baseline is 100 feet north ( $25^\circ$ ).



Map Name: Warren Draw

Diagrammatic Sketch

Township 2N , Range 24E , Section 34

## DISCUSSION

### Trend Study No. 11-12

The Toliver Creek pinyon-juniper trend study is located in a mature pinyon-juniper stand adjacent to the chaining treatment sampled by trend study #11-11, and represents the situation on the chained site before treatment. This type provides necessary escape and thermal cover, but forage is very limited.

The study is on a west-facing 5% slope and an elevation of 5,900. The land is managed by DWR. The soil, being shallow and sandy, is similar to that found on the adjacent study site. One apparent difference is the prevalence of exposed sandstone slabs, as opposed to the smaller, rounded rocks on the chained site. There is considerable runoff due to the lack of understory and light litter cover.

Using line intercept to estimate tree canopy cover, the juniper and pinyon overstory covers approximately 41% of the ground surface. Tree density was estimated at 298 juniper trees/acre and 108 pinyon trees/acre using the point-centered quarter method. Average diameter of juniper is 12 inches while that of pinyon is 4.3 inches. Most of the junipers have been highlined. The only other browse sampled was pricklypear and broom snakeweed.

Annual grasses and forbs were not included in the 1988 sample. No perennial forbs were observed on the study site that year and the only perennial grass encountered was a few bottlebrush squirreltail. Data from 1995 show that this depleted understory totals to only 6% cover. It is dominated by annuals which account for 89% of the grass cover and 99% of the forb cover.

### 1988 APPARENT TREND ASSESSMENT

Due to the lack of understory, there is very little vegetative ground cover. The litter cover associated with the mature juniper and pinyon is insubstantial and does not provide much soil protection. Rock cover is a significant percentage of the total cover at 27%, with percent bare ground at 24%. This site is in poor condition but the soil trend appears stable. The site does not support any useful browse except pinyon and juniper which are useful as thermal and escape cover. The herbaceous understory is in poor condition and depleted.

#### TREND ASSESSMENT

soil - stable but in very poor condition

browse - lacking

herbaceous understory - depleted and in poor condition and composition

### 1995 TREND ASSESSMENT

Conditions are still poor but have improved, likely due to the unusually wet spring this year. Percent bare ground has declined to only about 8% while cover for cryptogams has increased to almost 7%. Trend for soil is up but still in poor condition. The only browse which occur on the site consist of cactus and broom snakeweed, both are useless as forage. The herbaceous understory is in poor condition and dominated by annuals but has improved slightly since the last reading.

TREND ASSESSMENT

soil - up, but still in poor condition

browse - no useful species present

herbaceous understory - slightly improved, but still in very poor condition with a poor composition

VEGETATIVE TRENDS --

Herd unit 11, Study no: 12

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Bromus tectorum	-	212	-	74	2.48
G	Poa secunda	-	*27	-	12	.24
G	Sitanion hystrix	10	*6	4	2	.01
G	Vulpia octoflora	-	12	-	4	.04
Total for Grasses		10	257	4	92	2.78
F	Androsace septentrionalis	-	10	-	5	.02
F	Arabis spp.	-	1	-	1	.00
F	Calochortus nuttallii	-	3	-	1	.00
F	Chenopodium album	-	3	-	1	.00
F	Chenopodium fremontii	-	4	-	3	.01
F	Cryptantha spp.	-	33	-	14	.12
F	Descurainia pinnata	-	223	-	84	1.88
F	Draba reptans	-	153	-	58	.76
F	Erodium cicutarium	-	1	-	1	.00
F	Gilia spp.	-	41	-	19	.22
F	Lappula occidentalis	-	10	-	4	.02
F	Lactuca serriola	-	8	-	3	.01
F	Ranunculus testiculatus	-	3	-	1	.00
F	Sisymbrium altissimum	-	2	-	1	.00
Total for Forbs		0	495	0	196	3.10
B	Gutierrezia sarothrae	7	*14	4	6	.08
B	Juniperus osteosperma	11	12	4	6	7.46
B	Opuntia spp.	5	*9	3	3	.91
B	Pinus edulis	8	*-	4	-	2.32
Total for Browse		31	35	15	15	10.77

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

BASIC COVER --

Herd unit 11, Study no: 12

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	298	.75	19.33
Rock	299	27.00	32.45
Pavement	75	.75	2.13
Litter	377	44.75	35.00
Cryptograms	193	2.75	6.59
Bare Ground	189	24.00	8.39

PELLET GROUP FREQUENCY --

Herd unit 11, Study no: 12

Type	Quadrat Frequency '95
Rabbit	9
Deer	13

BROWSE CHARACTERISTICS --

Herd unit 11, Study no: 12

A G E	YR	Form Class (No. of 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	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17	9	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Echinocactus spp.</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	6	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Gutierrezia sarothrae</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33	4	5	1
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300	9	14	15
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7
Total Plants/Acre (excluding Dead & Seedlings)												'88	99	Dec:	0%			
												'95	380		5%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Juniperus osteosperma																		
Y	88	-	-	1	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	6	-	-	6	-	-	-	200	73	88	6
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	-	-	2	-	-	-	-	1	-	3	-	-	-	100			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	30%			
												'95	0		0%			
Opuntia spp.																		
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	11	-	-	-	-	-	-	-	-	10	-	1	-	366	4	12	11
	95	22	-	-	-	-	-	-	-	-	22	-	-	-	440	3	18	22
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	33			1
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'88	499	Dec:	6%			
												'95	480		8%			
Pinus edulis																		
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	-	-	-	-	-	-	1	-	-	1	-	-	-	33	150	142	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:	-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 11, Study no: 12

Species	Percent of Total	
	'88	'95
Artemisia tridentata vaseyana	0	0
Echinocactus spp.	0	2
Gutierrezia sarothrae	9	43
Juniperus osteosperma	31	0
Opuntia spp.	47	55
Pinus edulis	13	0

TREND STUDY 11-13-95(25-13)

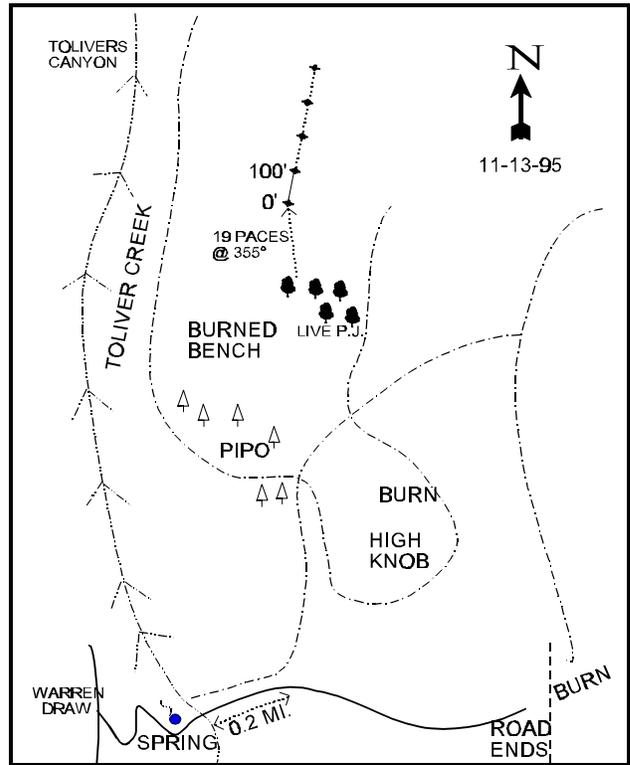
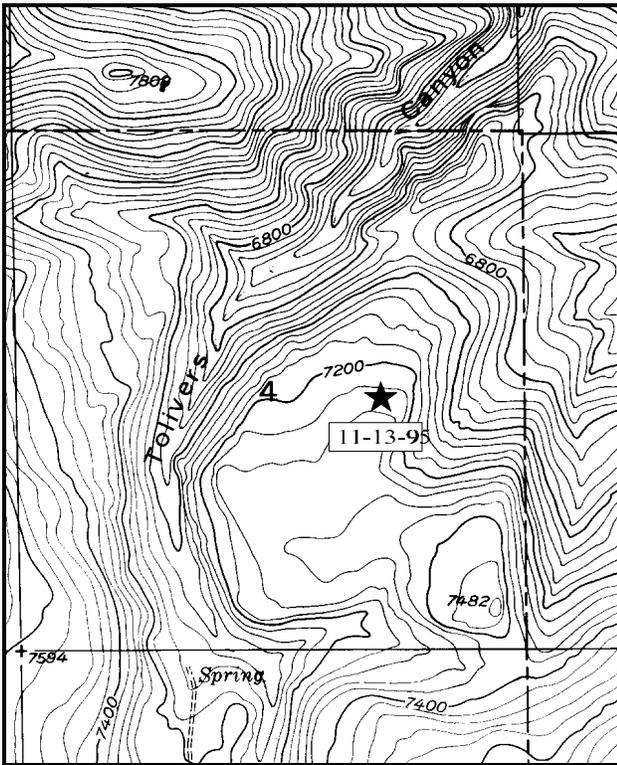
Study site name: Browns Park Burn & PJ . Range type: Pinyon-Juniper .

Compass bearing: frequency baseline 16 degrees.

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

LOCATION DESCRIPTION

From the Warren Draw trend study, #9-7-82/95, proceed north 3.2 miles to a locked gate onto private land. Continue 2.1 miles to a fork by a stockpond, stay left. Go .45 miles to a fork, stay right. In another .45 miles, again bear right. Continue .4 miles down to the creek bottom. Head up for .2 miles, to beneath a low point on the bench to the north If you continue driving, in .3 miles you reach a fence at the end of the road. It is probably easiest to hike up to the bench from the low pass. Hike north, about 1/2 mile, over the top and down the burned bench. From the level ponderosa pine bench, continue north down the increasing slope where hopefully you will locate the short green fencepost marking the burned PJ portion of the study.



Map Name: Warren Draw

Diagrammatic Sketch

Township 1N , Range 24E , Section 4

UTM COOR. 6-51-069E 12 45-23-706N

## DISCUSSION

### Trend Study No. 11-13

A prescribed burn was conducted by the BLM in the upper Toliver Creek drainage in 1986. The burn encompassed 420 acres containing several different range types; mixed mountain brush, ponderosa pine, pinyon-juniper, and curlleaf mountain mahogany. The trend study was established in the more prevalent pinyon-juniper-curlleaf mountain mahogany type. A standard Interagency study was established in the burn.

The study site is on a north-facing slope of about 10-15% and an elevation of 7,200 feet. The soil on this particular slope is quite shallow where large rocks and boulders are prevalent on the surface. The soil itself is a coarse textured sandy loam. Since the fire and the 1988 reading, there had been significant erosion due to the loss of duff and understory vegetation. Nearby unburned areas also showed serious erosion and soil loss due to the naturally sparse understory and runoff from surrounding bare areas. Loss of the already shallow soil exposed plant roots and more rocks. Bare ground was estimated at 63% in 1988 declining to only 10% by 1995. Litter cover increased from 7% to 47% while rock cover remained fairly constant. Erosion was not noted in 1995 due to the excellent protective ground cover.

Unburned areas are dominated by an overstory of pinyon and juniper. Scattered curlleaf mountain mahogany, true mountain mahogany, and snowberry occur in the understory. Vigor is excellent and utilization on the palatable species is generally light and evidence of big game use is uncommon. Tree species were completely killed by the fire, but many standing snags remain. The only browse encountered on the burn site in 1988 was sprouting mountain lover which numbered 333 plants/acre measuring only 4 x 3 inches. Currant and elderberry are also resprouting but were not encountered in the density plots. Pre-burn pinyon density was estimated to be 467 trees/acre. During the 1995 reading several new browse species were encountered including serviceberry, manzanita, mountain big sagebrush, curlleaf mountain mahogany, true mountain mahogany, rubber rabbitbrush, and snowberry. No species is very abundant, but all are in good vigor with only light utilization.

The site supports several native grasses including muttongrass, bluebunch wheatgrass, squirreltail, fescue, and sedge. Herbaceous vegetation was scarce in 1988 with few grasses and forbs appearing in the quadrats. No vegetation was hit with the points of the quadrats so there was no vegetation data estimated in 1988. Only annuals, mainly coyote tobacco (*Nicotiana attenuata*), was present. During the 1995 reading, 8 species of perennial grass and one sedge were encountered which combine to produce 16% cover. Seeded species including crested and intermediate wheatgrass, smooth brome, and orchard grass were sampled. Crested wheatgrass was dominate, accounting for 63% of the grass cover. Smooth brome is the second most numerous perennial grass which occurs in dense isolated patches. Annual cheatgrass is also present and fairly abundant, but only contributes 17% of the total grass cover. Eleven species of perennial and 9 species of annual forbs were noted. No species are very abundant and none make up more than 1/2 of one percent cover.

### 1988 APPARENT TREND ASSESSMENT

With such a low density of living plants on the burn, no vegetative cover was sampled. The majority of the ground surface (63%) was bare soil. Rock and pavement cover was almost 30%. Litter was reduced by the fire, but will recover to significant soil protection levels. Trend appears stable but in poor condition. Browse are lacking on the site but this should change over time. The herbaceous understory is sparse and needs time to become established.

TREND ASSESSMENT

soil - stable but in very poor condition

browse - lacking

herbaceous understory - lacking

1995 TEND ASSESSMENT

Ground cover characteristics have improved dramatically since 1988. Percent litter cover has increased from 7% to 47% while percent bare ground has declined from 63% to only 10%. Herbaceous vegetation has also increased significantly adding needed protective cover. Trend for soil is up. Browse are still lacking on the site but more species are coming in. Trend is up. The herbaceous understory has increased dramatically in sum of nested frequency. An additional 8 perennial species were encountered in 1995 with seeded crested wheatgrass and smooth brome being the most numerous. Sum of nested frequency of forbs also increased significantly. Trend for herbaceous understory is up.

TREND ASSESSMENT

soil - up and improving

browse - up but still not abundant

herbaceous understory - up and improving

VEGETATIVE TRENDS --  
Herd unit 11, Study no: 13

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron cristatum	13	*269	8	92	11.86
G	Agropyron intermedium	-	*23	-	8	.64
G	Agropyron spicatum	-	3	-	1	.15
G	Bromus inermis	-	*86	-	38	2.09
G	Bromus tectorum	-	130	-	49	3.29
G	Carex spp.	-	*6	-	3	.18
G	Dactylis glomerata	-	*10	-	6	.49
G	Festuca ovina	-	1	-	1	.03
G	Oryzopsis hymenoides	4	-	2	-	-
G	Poa fendleriana	-	*17	-	7	.11
G	Sitanion hystrix	-	*20	-	8	.41
Total for Grasses		17	565	10	213	19.28
F	Allium spp.	-	*18	-	7	.04
F	Arabis spp.	-	*14	-	6	.03
F	Balsamorhiza hookeri	-	3	-	2	.19
F	Carex spp.	-	4	-	1	.15
F	Chenopodium album	1	-	1	-	-
F	Collomia linearis	-	4	-	2	.01
F	Collinsia parviflora	-	12	-	8	.04
F	Crepis acuminata	-	*7	-	3	.21
F	Cruciferae	3	-	1	-	-

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	<i>Cymopterus longipes</i>	-	*11	-	5	.05
F	<i>Descurainia pinnata</i>	-	105	-	50	.30
F	<i>Erigeron spp</i>	-	*5	-	3	.05
F	<i>Gayophytum ramosissimum</i>	-	16	-	8	.04
F	<i>Heterotheca villosa</i>	-	5	-	2	.41
F	<i>Lappula occidentalis</i>	-	6	-	3	.01
F	<i>Lactuca serriola</i>	-	*19	-	8	.04
F	<i>Melilotus officinalis</i>	3	-	1	-	-
F	<i>Microsteris gracilis</i>	-	42	-	16	.27
F	<i>Polygonum douglasii</i>	-	9	-	4	.02
F	<i>Sisymbrium altissimum</i>	-	5	-	2	.01
F	<i>Taraxacum officinale</i>	-	6	-	2	.03
F	<i>Tragopogon dubius</i>	-	2	-	2	.04
Total for Forbs		7	293	3	134	1.96
B	<i>Cercocarpus ledifolius</i>	-	1	-	1	.38
B	<i>Chrysothamnus nauseosus albicaulis</i>	-	-	-	-	.66
B	<i>Chrysothamnus viscidiflorus</i>	-	-	-	-	.00
B	<i>Mahonia repens</i>	5	-	2	-	-
B	<i>Pachistima myrsinites</i>	2	-	2	-	-
B	<i>Sambucus cerulea</i>	-	-	-	-	.56
B	<i>Symphoricarpos oreophilus</i>	-	2	-	1	.03
Total for Browse		7	3	4	2	1.63

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 11, Study no: 13

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	331	0	23.90
Rock	310	28.00	27.12
Pavement	138	1.75	.41
Litter	390	7.00	46.50
Cryptograms	41	0	.36
Bare Ground	237	63.25	9.69

PELLET GROUP FREQUENCY --  
Herd unit 11, Study no: 13

Type	Quadrat Frequency '95
Rabbit	10
Elk	4
Deer	12
Cattle	2

BROWSE CHARACTERISTICS --  
Herd unit 11, Study no: 13

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	32	36	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Arctostaphylos spp.</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	13	50	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Artemisia tridentata vaseyana</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	34	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Cercocarpus ledifolius</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	23	34	2
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	40		-			
<i>Cercocarpus montanus</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	41	50	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Chrysothamnus nauseosus albicaulis</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	32	45	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	100		-			

A G E	YR	Form Class (No. of 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
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	16	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Mahonia repens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	11	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Pachistima myrsinites</i>																		
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	6	-	-	-	-	-	-	-	-	6	-	-	-	200	4	3	6
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6	22	2
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	-			
												'95	40		-			
<i>Ribes cereum cereum</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	29	48	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Sambucus cerulea</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	82	99	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Symphoricarpos oreophilus</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	16	52	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	80		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 11, Study no: 13

Species	Percent of Total	
	'88	'95
<i>Amelanchier alnifolia</i>	0	0
<i>Arctostaphylos</i> spp.	0	6
<i>Artemisia tridentata</i> <i>vaseyana</i>	0	0
<i>Cercocarpus ledifolius</i>	0	13
<i>Cercocarpus montanus</i>	0	0
<i>Chrysothamnus nauseosus albicaulis</i>	0	31
<i>Chrysothamnus viscidiflorus</i>	0	6
<i>Mahonia repens</i>	0	0
<i>Pachistima myrsinites</i>	100	13
<i>Ribes cereum cereum</i>	0	0
<i>Sambucus cerulea</i>	0	6
<i>Symphoricarpos oreophilus</i>	0	25

## SUMMARY

### DEER HERD UNIT - 11 - VERNAL

The study sites on the Vernal unit sample a variety of vegetation types including Wyoming big sagebrush, mountain big sagebrush, pinyon-juniper, a prescribed burn in pinyon-juniper, a p-j chaining and two sites in mountain brush. The two sites sampling Wyoming big sagebrush-grass, Red Mountain Allotment (#11-1) and Island Park (#11-6), were first read in 1982. Both sites have improving soil trends but the soil conditions on the Red Mtn Allotment are poor. Herbaceous understory trends are stable to improved but in poor condition on Red Mtn due to the abundance of annual cheatgrass. Both sites show a decline in population densities. Red Mtn has a slightly improving browse trend however due to improved form and vigor. The browse trend on Island Park is down due heavy use and increased decadency.

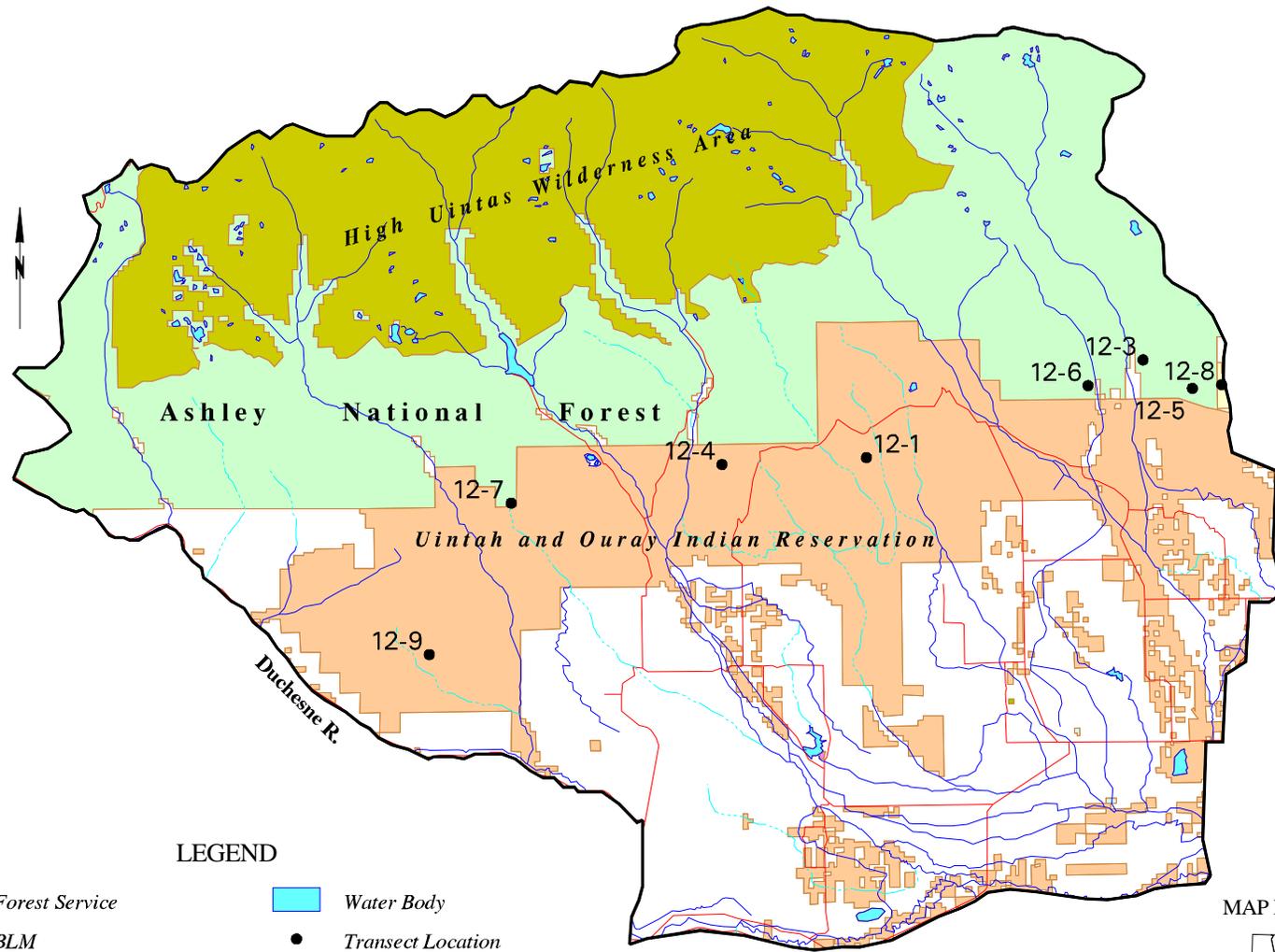
Study sites at Taylor Mountain (#11-2), Dry Fork Mountain (#11-4), Warren Draw (#11-8) and Rye grass (#11-9) sample Mountain big sagebrush-grass. All of these sites except Rye grass, were established in 1982. Soil trends on all sites are up to slightly up. Herbaceous trends are stable to improving on all sites except Rye grass which has a downward trend. Browse trends are improving on all sites except Taylor Mtn which has a stable trend.

Sites at Sawtooth-Flat Spring (#11-5) and Little Hole (#11-10) sample mountain brush types. These areas have been monitored since 1982 and display upward soil and stable to improving herbaceous trends. Browse trends on these sites are stable to improving overall but Sawtooth-Flat Spring shows a slightly downward trend since 1988.

Pinyon-juniper sites, sampled by study sites at Steinaker Draw (#11-7) and Toliver Creek p-j(#11-12), were established in 1988. Soil trends are stable to slightly declining for Steinaker Draw but improved at Toliver Creek. Herbaceous trends are improving for both sites but condition is poor at Toliver Creek. The browse trend at Steinaker Draw is improving while Toliver Creek has no useful browse species.

The chaining treatment at Toliver Creek (#11-11) displays an improved soil and browse trend but a downward herbaceous trend due to the dominance of annuals. The prescribed burn sampled by Brown's Park Burn (11-13) has upward trends in all categories.

# Deer Management Unit 12 –1995 Transect Locations



## LEGEND

- |                                                                                                                 |                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  Forest Service              |  Water Body          |
|  BLM                         |  Transect Location   |
|  Native American             |  Road                |
|  Private Land                |  Perennial Stream    |
|  High Uintas Wilderness Area |  Intermittent Stream |

Map Scale 1:500,000  
1 inch = 8 miles

## MAP LOCATION



## DEER HERD UNIT 12 - SOUTH SLOPE

### Boundary Description

Duchesne, Uintah and Wasatch counties - Boundary begins at the confluence of the Duchesne and Uinta Rivers; northerly along the Uinta River to Deep Creek; northerly along this creek to the Forest Service road #104 (Paradise Park Reservoir road); northerly along this road to Paradise Park Reservoir and the Dry Fork - Whiterocks drainage divide; north along this drainage divide to the summit of the Uinta Mountains (Uintah-Daggett and the Duchesne-Summit county lines); west along this summit to Highway SR-150; southwesterly on SR-150 to the Provo-Duchesne River drainage divide; south on this drainage divide to Wolf Creek Summit and Highway SR-35; east on SR-35 to Highway SR-87; south on SR-87 to Highway US-40 at Duchesne; east on US-40 to the Duchesne River; southeasterly on this river to the Uinta River (excluding all Ute Indian tribal lands within this boundary).

### Herd Unit Description

The South Slope deer herd unit on the south side of the Uinta Mountains contains approximately 1.2 million acres. Forty six percent of the herd unit is administered by the USDA Forest Service. Private land encompasses 32% of the unit while Indian land takes up 22%. Summer range, occurring mostly on Forest Service land, is plentiful while winter range is limiting. A complication in the management of this winter range along the base of the Uinta Mountain's is the that a majority (59%) is on the Uintah and Ouray Indian Reservation. There is some winter range, mainly mixed mountain brush and pinyon-juniper, above the Forest Service boundary which makes up an additional 17% of the winter range. A description of the vegetative community types can be found in the 1966 Range Inventory Report, Coles and Pederson (1967).

Six study sites were established in 1982, three on USFS land and three on Indian land. All study sites sample winter range, with some on higher elevation winter range which is likely used year-round. A new study, which samples a mixed mountain brush winter range, was established in 1988 at Mosby Spring (#12-8). During the 1995 season, the site at Cart Hollow (#12-6) on Indian land, was not read due to road closures. A new study site was placed at Farm Creek, just over the USFS boundary to sample critical winter range. Most of these studies sample mixed mountain brush communities with a varying element of mountain big sagebrush which is the key browse species on several sites. Others have a strong component of true mountain mahogany, serviceberry and/or bitterbrush. Most of the studies are at the higher end of the winter range. All sites except the 7,350 foot John Starr Flat (#12-1) occur above 7,600 feet.

### Grazing Summary

Grazing by domestic livestock had not been a recent influence on the two trend studies on Ute land. The study by Burton Reservoir on BLM land (#12-8) shows evidence of heavy pressure from cattle grazing on the limited grass resource at the study site. The Ashley National Forest provided information on the grazing and management history of the four study sites on the Forest. Two studies are in the Mosby Mountain allotment (different units) which has been in a rest-rotation system since 1960 and currently is permitted for 402 cattle from June 11 to September 30. The study site near the bottom of Red Pine Canyon receives rather concentrated cattle use. Cattle use is more moderate at the Mosby Mountain site, which is a very important area for elk in winter and spring. This area was burned by wildfire in September 1988, just after the study was read.

The new site at Farm Creek is in the Farm Creek allotment. The allotment has a four unit rest-rotation system permitted for 576 cattle with a season of use from

June 11 to September 10. The study site appears to receive light use from cattle. The tremendous numbers of ants on the Gooseberry Spring sites could be responsible for some of the reduced vigor on many of the plants. There is more sign of cattle use at the Gooseberry Spring study in the Pigeon Water allotment, where 172 cattle are permitted in a rest-rotation system with a season of use from June 16 to September 25.

#### Big Game Trends

Current management objectives (1997) for the unit included a target winter herd size of 12,000 (modeled number). The harvest objective is for 1,500 bucks annually. Current objectives are to increase and maintain deer numbers compatible with forage resources and provide a quality hunting experience for sportsmen by maintaining a high percentage of mature bucks in the harvest. When the target population is met, Antlerless harvests will be used to stabilize the herd and/or reduce it when there are depredation problems on private lands, or significant downward trends on critical winter ranges.

Deer harvest statistics indicate that from 1972 through 1981, an average of approximately 478 deer were lawfully taken annually. Deer harvest by members of the Ute Indian Tribe is unknown but would be an addition to these figures. The trend in the harvest has been upward since the five-year average of 1979-83 which was 596 bucks per year. The harvest was 786 bucks per year from 1984-88. Percent success also shows a general increase, up to 40% in 1988. In the 1988 season, the deer harvest on the unit exceeded the harvest objective for (non-tribal) for the first time since buck-only hunting was initiated in 1975. Harvest declined again in the next two years however, to 626 bucks taken in 1990. Harvests declined dramatically during the 1993 and 1994 hunts due to high winter mortality of the 1992-93 winter. Ratio of fawns/100 does averaged 59 fawns between 1990 and 1995. A low of 36 fawns/100 does was reported during the 1993/94 season and a high of 77 reported the following season. This illustrates the variability one can expect with the extremes in weather we can get year to year.

TREND STUDY 12-1-95

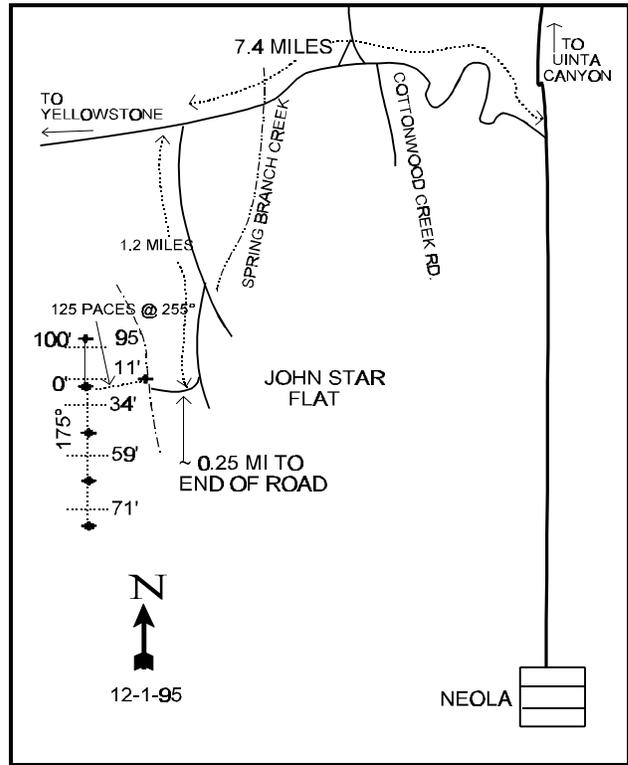
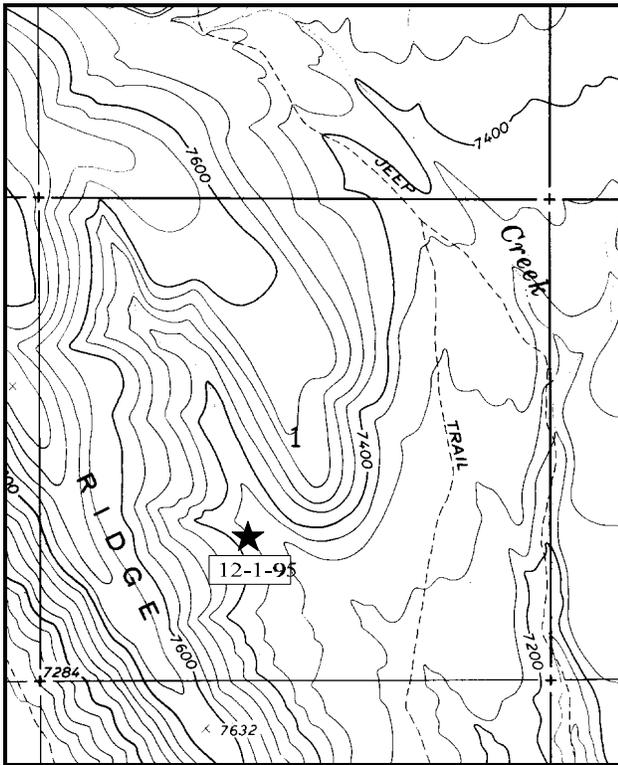
Study site name: John Starr Flat. Range type: Mountain Brush.

Compass bearing: frequency baseline 10 degrees.

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

LOCATION DESCRIPTION

From Neola, drive north to a major fork. Turn left, west, (right fork goes to Uinta Canyon) and travel towards Yellowstone for 7.4 miles on the main road. At this point, turn left (south). Go 1.4 miles to a major fork. Take the right fork in a westerly direction for approximately .25 miles to the end. From the end of the road, the 0-foot baseline stake is located 145 paces away at an azimuth of 260 degrees true. From the 0-foot baseline stake, the first density plot is 10 paces away bearing 195° true. The frequency baseline stakes are marked by green steel fenceposts approximately 18" in height. Browse tag #7020 is on the first baseline stake.



Map Name: HELLER LAKE

Diagrammatic Sketch

Township 1 N, Range 3W, Section 1

GPS COOR. 5-69-908E 12 44-84-548N

## DISCUSSION

### Trend Study No. 12-1

This trend study is located at the northwest edge of John Starr Flat near the base of Tower Ridge. The area is within the Ute Indian Reservation and the study was established with assistance of a tribal biologist. The study site is on critical winter range for both deer and elk. Domestic livestock graze during the remainder of the year. The range type is mixed mountain brush on a northerly aspect with a 10% slope.

Soils in the area are moderately deep but rocky. Erosion is minimal but there is some rock and pavement present, about 11%. Percent bare ground is moderately low averaging between 13% and 16% since 1982.

The key preferred browse species is true mountain mahogany which makes up 47% of the total browse cover. Estimated density was 2,866 mostly mature plants/acre in 1982. Density increased to 5,000 plants/acre in 1988 then declined to 3,580 by 1995. The dramatic increase in 1988 was due to the large number of seedlings (800 plants/acre) and young (3000 plants/acre) encountered. Looking just at the mature plants, population density increased from 2,133 plants/acre in 1982 to 2,760 by 1995. Percent decadence is low, but an increasing proportion of the shrubs are heavily hedged (7% in 1982 up to 30% by 1995).

Other key browse include serviceberry, black sagebrush, mountain big sagebrush, bitterbrush, and snowberry. All of these shrubs display moderate to heavy use. The most abundant browse (relative to quadrat frequency) is prickly pear cactus, but it only contributes 6% of the total browse cover. Density of this plant increased from 2,333 plants/acre in 1982 to 12,133 by 1988. There appears to have been a problem determining what an individual was, and here the clone is one individual not a number of individuals. This is a difficult plant to determine its density. Currently there are an estimated 5,440 prickly pear per acre on the site.

The herbaceous understory accounts for 40% of the total vegetative cover. Grasses as a group provide 13% cover while forbs account for 27%. Quadrat frequency of grasses increased slightly between 1982 and 1988, but has since declined by 48%. Forbs are especially diverse with 29 perennial species encountered in 1995. Quadrat frequency of forbs has steadily increased since 1982.

### 1982 APPARENT TREND ASSESSMENT

Range trend, both for soil and vegetation, is considered stable to improving. Soil movement and loss are negligible. Vegetative and litter cover provide adequate soil protection. Vegetatively, the browse component appears healthy, although rather heavily utilized. However, stand maintenance and productivity seem assured under current levels of animal use. Grasses are vigorous, diverse and productive. No apparent problems are evident. Forb composition and productivity is somewhat deficient, but not seriously so.

### 1988 TREND ASSESSMENT

Soil trend appears stable with continued adequate protective ground cover. The browse trend is slightly up for the key preferred species true mountain mahogany. The number of mature plants declined slightly, but the number of seedlings and young increased dramatically. Percent decadence is still low at 8% yet more shrubs display heavy use and poor vigor. Trend for the herbaceous understory is stable to slightly improving. Quadrat frequency of bluebunch wheatgrass, Sandberg bluegrass, and needle-and-thread increased while frequency of

squirreltail, Indian ricegrass and prairie June grass declined.

TREND ASSESSMENT

soil - stable

browse - slightly up for key species

herbaceous understory - stable to slightly improving

1995 TREND ASSESSMENT

Soil conditions are still stable with adequate protective ground cover. Trend for browse is slightly up for mahogany. Although total density declined from 5,000 plants/acre to 3,580, the number of mature plants increased. It should also be noted that 60% of the population in 1988 was classified as young plants, and with the accompanying drought, many would have been lost. In addition, percent decadence declined from 8% to 1% and vigor has improved. The only negative aspect is the increased heavy use (23% to 30%). A few bitterbrush were picked up in the larger sample used in 1995. Fifty percent of the mature plants were heavily hedged. Snowberry also showed more moderate to heavy use in 1995. Trend for the herbaceous understory is down for grasses and slightly up for forbs. Overall the trend is slightly down.

TREND ASSESSMENT

soil - stable

browse - slightly up for key species

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 12, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron scribneri	-	-	4	-	-	-
G	Agropyron smithii	-	-	4	-	-	-
G	Agropyron spicatum	125	*67	29	53	29	.66
G	Bouteloua gracilis	12	*4	1	6	2	.03
G	Bromus tectorum	-	61	-	-	21	1.28
G	Carex spp.	93	*110	30	43	45	1.67
G	Koeleria cristata	5	*-	25	3	-	-
G	Oryzopsis hymenoides	7	21	20	3	7	.36
G	Poa fendleriana	-	-	2	-	-	-
G	Poa secunda	171	*3	34	65	1	.00
G	Sitanion hystrix	59	*22	30	23	9	.18
G	Stipa comata	175	*76	47	70	36	.85
Total for Grasses		647	364	226	266	150	5.05
F	Antennaria rosea	8	*-	-	5	-	-
F	Arabis spp.	3	*45	23	1	17	.16
F	Arenaria spp.	-	-	8	-	-	-
F	Artemisia ludoviciana	6	*21	3	3	9	.15
F	Astragalus convallarius	7	6	-	4	2	.04

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Astragalus spatulatus</i>	2	1	-	1	1	.03
F	<i>Astragalus</i> spp.	-	-	1	-	-	-
F	<i>Balsamorhiza hookeri</i>	155	*123	45	69	56	1.11
F	<i>Castilleja linariaefolia</i>	-	*26	-	-	12	.13
F	<i>Calochortus nuttallii</i>	6	*3	8	4	1	.00
F	<i>Chenopodium leptophyllum</i>	-	22	-	-	10	.05
F	<i>Collomia linearis</i>	-	133	-	-	61	.80
F	<i>Comandra pallida</i>	43	*13	10	18	8	.14
F	<i>Crepis acuminata</i>	-	4	-	-	2	.03
F	<i>Cryptantha</i> spp.	15	37	33	8	20	.27
F	<i>Cymopterus longipes</i>	7	6	-	5	4	.02
F	<i>Descurainia pinnata</i>	-	19	-	-	8	.04
F	<i>Draba</i> spp.	-	58	-	-	22	.11
F	<i>Erigeron flagellaris</i>	21	14	-	11	5	.02
F	<i>Erigeron pumilus</i>	2	12	3	2	6	.03
F	<i>Eriogonum umbellatum</i>	5	13	3	4	7	.08
F	<i>Happlopappus nuttallii</i>	-	-	5	-	-	-
F	<i>Helianthella microcephala</i>	58	*76	33	28	33	1.40
F	<i>Heuchera parvifolia</i>	4	5	-	1	3	.01
F	<i>Hymenoxys acaulis</i>	-	1	-	-	1	.00
F	<i>Lappula occidentalis</i>	-	104	-	-	43	.51
F	<i>Lepidium</i> spp.	-	174	-	-	65	1.28
F	<i>Linum lewisii</i>	-	*5	-	-	2	.01
F	<i>Lithospermum ruderale</i>	15	*3	4	7	2	.04
F	<i>Lomatium</i> spp.	-	-	1	-	-	-
F	<i>Lychnis drummondii</i>	3	3	-	1	1	.03
F	<i>Machaeranthera grindelioides</i>	14	18	-	8	7	.39
F	<i>Orobancha</i> spp.	-	3	-	-	1	.00
F	<i>Penstemon caespitosus</i>	12	-	-	5	-	-
F	<i>Penstemon humilis</i>	35	*14	-	18	9	.09
F	<i>Penstemon</i> spp.	-	-	38	-	-	-
F	<i>Petradoria pumila</i>	46	60	18	20	21	1.45
F	<i>Phlox longifolia</i>	72	*51	13	33	23	.19
F	<i>Polygonum douglasii</i>	-	79	-	-	35	.35

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Schoenocrambe linifolia	-	*57	-	-	26	.43
F	Sedum lanceolatum	55	*22	14	22	13	.16
F	Senecio multilobatus	8	*3	-	5	1	.63
F	Sphaeralcea coccinea	12	*21	5	7	11	.19
F	Tragopogon dubius	4	*-	-	2	-	-
F	Zigadenus elegans	-	*12	-	-	5	.02
Total for Forbs		618	1267	268	292	553	10.48
B	Amelanchier utahensis	22	*13	9	9	5	1.33
B	Artemisia nova	22	*21	16	13	10	1.24
B	Artemisia tridentata vaseyana	28	*35	16	14	15	5.35
B	Cercocarpus montanus	66	*88	39	29	42	10.75
B	Chrysothamnus depressus	2	2	-	1	1	.06
B	Chrysothamnus viscidiflorus	21	14	7	9	7	.68
B	Echinocactus spp.	3	*-	-	1	-	-
B	Gutierrezia sarothrae	12	15	3	6	7	.56
B	Juniperus osteosperma	-	2	-	-	1	.85
B	Opuntia spp.	105	*92	34	51	47	1.28
B	Pinus edulis	-	2	-	-	1	.00
B	Purshia tridentata	5	3	4	4	3	.49
B	Symphoricarpos oreophilus	7	*3	3	4	3	.45
B	Tetradymia cnescens	-	-	1	-	-	-
Total for Browse		293	290	132	141	142	23.08

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 12, Study no: 1

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	351	0	7.50	41.08
Rock	214	0	4.75	9.96
Pavement	137	0	2.50	1.25
Litter	393	0	68.75	46.87
Cryptograms	15	0	.75	.23
Bare Ground	239	12.75	15.75	13.88

PELLET GROUP FREQUENCY --  
Herd unit 12, Study no: 1

Type	Quadrat Frequency '95
Rabbit	8
Elk	10
Deer	23

BROWSE CHARACTERISTICS --  
Herd unit 12, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier utahensis</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	2	-	2	-	-	-	-	-	5	-	-	-	333		5	
	95	8	-	-	1	-	-	-	-	-	9	-	-	-	180		9	
M	82	-	5	-	-	-	-	-	-	-	2	3	-	-	333	24	24	5
	88	-	2	1	-	-	-	-	-	-	2	1	-	-	200	26	25	3
	95	-	4	3	6	9	1	-	-	-	23	-	-	-	460	24	32	23
Total Plants/Acre (excluding Dead & Seedlings)												'82	333	Dec:	-			
												'88	533		-			
												'95	640		-			
<i>Artemisia nova</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	3	-	-	1	-	-	-	-	-	4	-	-	-	266		4	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	82	3	2	-	-	-	-	-	-	-	5	-	-	-	333		5	
	88	14	1	1	2	-	-	-	-	-	17	-	1	-	1200		18	
	95	6	7	-	-	-	-	-	-	-	13	-	-	-	260		13	
M	82	12	14	-	-	-	-	-	-	-	13	13	-	-	1733	12	17	26
	88	19	5	-	1	-	-	-	-	-	22	2	1	-	1666	14	15	25
	95	18	30	10	1	3	-	-	-	-	62	-	-	-	1240	9	15	62
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	13	5	-	1	-	-	-	-	-	16	-	2	1	1266		19	
	95	1	-	2	-	-	-	-	-	-	2	-	-	1	60		3	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2066	Dec:	0%			
												'88	4132		30%			
												'95	1560		3%			

A G E	YR	Form Class (No. of 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	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	1	-	-	-	-	-	2	-	-	-	133		2	
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300		15	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	9	5	1	-	-	-	-	-	-	14	-	-	1	300		15	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	8	22	7	2	1	-	-	-	-	40	-	-	-	800	21	33	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	4	6	4	-	-	-	-	-	-	6	-	-	8	280		14	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	266		24%			
												'95	1380		20%			
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	8	1	-	1	-	-	2	-	-	11	-	1	-	800		12	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	82	6	3	-	-	-	-	-	-	-	9	-	-	-	600		9	
	88	23	17	4	1	-	-	-	-	-	39	-	6	-	3000		45	
	95	11	22	4	-	2	-	-	-	-	39	-	-	-	780		39	
M	82	6	23	3	-	-	-	-	-	-	27	5	-	-	2133	21	27	
	88	2	11	10	-	1	-	-	-	-	17	-	7	-	1600	30	36	
	95	6	28	41	2	55	6	-	-	-	138	-	-	-	2760	27	38	
D	82	-	2	-	-	-	-	-	-	-	-	2	-	-	133		2	
	88	-	4	2	-	-	-	-	-	-	4	-	2	-	400		6	
	95	-	-	2	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2866	Dec:	4%			
												'88	5000		8%			
												'95	3580		1%			
<i>Chrysothamnus depressus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	3	-	-	1	-	-	-	-	-	4	-	-	-	266	4	6	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	7	13	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	332		19%			
												'95	60		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	53	-	-	-	-	-	-	-	-	16	-	-	-	1060	14	17	53
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	1080		-			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	3	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Eriogonum corymbosum</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9	9	1
	88	10	-	-	-	-	-	1	-	-	10	-	1	-	733	8	6	11
	95	19	-	-	-	-	-	-	-	-	19	-	-	-	380	10	11	19
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	0%			
												'88	799		8%			
												'95	400		5%			
<i>Juniperus osteosperma</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	47	39	1
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	53	55	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Opuntia</i> spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	21	-	-	1	-	-	1	-	-	23	-	-	-	1533		23	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	50	-	-	1	-	-	12	-	-	63	-	-	-	4200		63	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
M	82	35	-	-	-	-	-	-	-	-	35	-	-	-	2333	2	7	35
	88	83	-	-	1	-	-	6	-	-	83	-	6	1	6000	2	6	90
	95	243	-	-	-	-	-	-	-	-	243	-	-	-	4860	3	8	243
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	29	-	-	-	-	-	-	-	-	18	-	5	6	1933		29	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2333	Dec:	0%			
												'88	12133		15%			
												'95	5440		0%			
<i>Pinus edulis</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	3	6	2	-	-	-	-	-	12	-	-	-	240	17	31	12
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	280		-			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	15	-	-	-	-	-	-	-	-	15	-	-	-	1000		15	
	88	11	-	-	1	-	-	1	-	-	9	-	4	-	866		13	
	95	1	2	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400	7	4	6
	88	1	-	-	1	-	-	2	-	-	3	-	1	-	266	9	14	4
	95	5	1	2	5	-	-	-	-	-	13	-	-	-	260	13	26	13
Total Plants/Acre (excluding Dead & Seedlings)												'82	1400	Dec:	-			
												'88	1132		-			
												'95	320		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	1	-	-	2	-	-	-	133		2	
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	3	1	-	-	-	-	-	-	1	2	1	-	266	13	14	4
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	7	10	1
	95	-	4	1	1	-	-	-	-	-	6	-	-	-	120	9	13	6
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	0%			
												'88	199		0%			
												'95	160		12%			

PERCENT BROWSE COMPOSITION--

Herd unit 12, Study no: 1

Species	Percent of Total		
	'82	'88	'95
Amelanchier utahensis	4	2	4
Artemisia nova	22	17	10
Artemisia tridentata vaseyana	0	1	9
Cercocarpus montanus	30	20	24
Chrysothamnus depressus	0	1	.40
Chrysothamnus viscidiflorus	0	0	7
Echinocactus spp.	0	0	.26
Eriogonum corymbosum	0	0	.13
Gutierrezia sarothrae	.70	3	3
Juniperus osteosperma	.70	.27	0
Opuntia spp.	25	49	36
Pinus edulis	0	.27	0
Purshia tridentata	0	0	2
Symphoricarpos oreophilus	15	5	2
Tetradymia canescens	3	.81	1

TREND STUDY 12-3-95

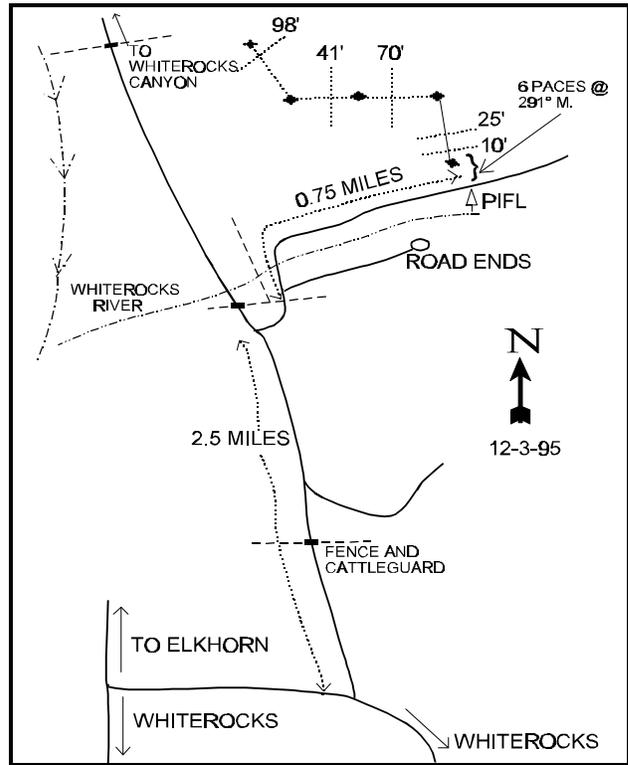
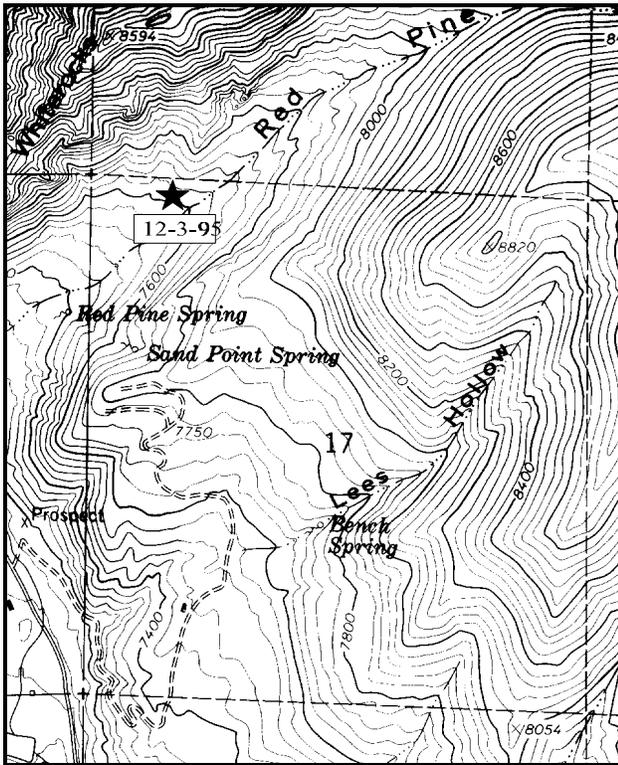
Study site name: Red Pine Canyon . Range type: Mountain Brush .

Compass bearing: frequency baseline 0 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (10 & 25ft), line 2 (70ft), line 3 (41ft), line 4 (98ft).

LOCATION DESCRIPTION

From the town of Whiterocks, go east 1.75 miles to a "T" intersection. Turn left and proceed north approximately 4.5 miles to the point where the road makes a sharp bend to the west. Just after the bend, turn north onto the Whiterocks Canyon Road. Proceed approximately 2.5 miles to a dirt road to the east. Turn right, before the cattleguard. Follow the road along the fence, cross the creek then bear right and go up the canyon about .75 miles to a lone pine on the right side of the road. From the pine tree, the 0-foot baseline stake is located 12 paces away at a bearing of 315 degrees. The 0-foot stake is marked with a browse tag #9038. The frequency baseline stakes are marked by green fenceposts 12-18 inches in height.



Map Name: Ice Cave Peak

Diagrammatic Sketch

Township 2N Range 1W , Section 17

GPS COOR. 5-91-934E 12 44-92-327N

## DISCUSSION

### Trend Study No. 12-3

This study is located in the Whiterocks River drainage on the north side of Red Pine Canyon. The area is within the National Forest and is considered critical winter range for deer and elk. In addition, an occasional moose has been found using the area. The study site is on a southerly exposure with a 10% to 20% slope. The range type is mixed mountain brush.

Soils on the site are alluvially derived and not well consolidated in recognizable horizons. Large boulders and cobbles are present on the surface and in the profile. The soil appears highly erodible but currently is in good condition due primarily to a abundant vegetative and litter cover. If, however, the site should ever become seriously depleted, the potential for soil movement be extensive.

Shrubs dominate the site providing 73% of the vegetation cover. Key browse species include mountain big sagebrush and antelope bitterbrush with small numbers of serviceberry and true mountain mahogany. Population density was estimated at 3,199 plants/acre for mountain big sagebrush in 1982, increasing to 4,332 by 1988. Young plants comprised 38% of the population in 1982 and 38% in 1988. Utilization was generally light with percent decadency increasing from 8% in 1982 to 15% by 1988. During the 1995 reading the population estimate for mature plants remained similar to densities reported in 1988 (2,266 to 2,320) but the number of young plants encountered dropped from 1,400 plants/acre to only 20. Percent decadence declined to 11% with 67% of the these decadent plants (200 plants/acre) classified as dying. Vigor was good and utilization light on the mature shrubs. Height/crown measurements have steadily increased since 1982 and currently average 36 x 48 inches for mature plants.

Antelope bitterbrush density was estimated at 1,466 in 1982, 1,599 in 1988, and 1,860 plants/acre by 1995. Few seedlings and young were encountered in either 1982 or 1995. Percent decadency was 20% in 1988, but only 3% by 1995. Utilization is generally light to moderate with heavier use reported in 1988 when 53% of the mature plants were heavily hedged. Currently only 7% of the mature bitterbrush display heavy use.

Grasses are diverse yet only two species provide more than 1% cover on the site. Unfortunately cheatgrass is the most abundant grass and accounts for 66% of the grass cover. Kentucky bluegrass is the second most common grass. Forbs are very diverse but not very common, producing only 2.5% total cover. The most common useful forbs include silvery lupine and low penstemon.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable but somewhat precarious. This site is likely a rather sensitive one. Vegetative trend is also stable but could decline if significantly heavier animal use were to be applied. The browse component is healthy with a possibly expanding mountain big sagebrush population. Antelope bitterbrush appears more static but with adequate vegetative reproduction occurring. Grasses and forbs provide a moderate amount of herbage and valuable ground cover, which is essential on this site.

### 1988 TREND ASSESSMENT

Soil trend appears stable with no significant changes in the ground cover percentages. The gully through the site is well vegetated and erosion is limited by the abundant vegetation and litter cover. The Browse trend is stable for the key species, mountain big sagebrush and antelope bitterbrush. Bitterbrush

displays more heavy use and increased decadency, but the number of mature plants/acre is similar to that of 1982 and recruitment from seed appears better with 200 seedlings/acre and 266 young plants/acre estimated. Trend for the herbaceous understory is slightly improved. Quadrat frequency of grasses increased while frequency of forbs remained the same.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly improving

1995 TREND ASSESSMENT

Soil trend remains stable to improving with adequate ground cover from vegetation and litter. The browse trend is stable for mountain big sagebrush and bitterbrush. Density of sagebrush declined overall but population density of mature plants remained similar. Bitterbrush decadence declined from 20% to 3% since 1988 while the proportion of heavily utilized plants also declined. Trend for the herbaceous understory is down likely due to the effects of drought and dominance of the site by shrubs. Sum of nested frequency of perennial grasses declined by 44% with the frequency of forbs also declining slightly. Cheatgrass is currently the dominate grass on the site.

TREND ASSESSMENT

soil - stable to improving

browse - stable

herbaceous understory - down with a high amount of cheatgrass in the understory

VEGETATIVE TRENDS --

Herd unit 12, Study no: 3

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	169	*89	43	72	43	.80
G	Bouteloua gracilis	7	*14	7	3	4	.36
G	Bromus tectorum	-	208	-	-	60	8.42
G	Carex spp.	-	*18	1	-	9	.41
G	Poa fendleriana	38	*24	5	18	10	.56
G	Poa pratensis	38	*76	1	17	25	1.77
G	Poa secunda	80	*-	-35	36	-	-
G	Sitanion hystrix	-	*3	-	-	1	.00
G	Sporobolus cryptandrus	11	*-	3	4	-	-
G	Stipa comata	105	*27	40	51	14	.51
Total for Grasses		448	459	135	201	166	12.85
F	Antennaria rosea	3	3	1	1	1	.15
F	Arabis spp.	15	*9	4	6	5	.02
F	Artemisia ludoviciana	6	*6	4	4	2	.01
F	Castilleja chromosa	-	*3	-	-	1	.00

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Chenopodium spp.	6	1	-	3	1	.00
F	Chenopodium leptophyllum	-	14	-	-	5	.02
F	Comandra pallida	8	-	-	3	-	-
F	Collinsia parviflora	-	21	-	-	9	.07
F	Cryptantha spp.	4	16	11	3	8	.09
F	Cymopterus spp.	2	3	-	1	1	.03
F	Descurainia spp.	-	3	-	-	1	.00
F	Eriogonum racemosum	12	*13	13	6	6	.13
F	Eriogonum umbellatum	5	*-	5	3	-	-
F	Helianthus nuttallii	-	-	3	-	-	-
F	Ipomopsis aggregata	-	*3	-	-	1	.15
F	Lappula occidentalis	-	4	-	-	3	.01
F	Lepidium spp.	-	4	-	-	2	.01
F	Lupinus argenteus	10	10	7	6	5	1.02
F	Microsteris gracilis	-	1	-	-	1	.00
F	Mirabilis linearis var. linearis	13	*-	-	7	-	-
F	Oenothera pallida	42	*15	-	21	6	.05
F	Penstemon humilis	-	*15	-	-	6	.37
F	Penstemon spp.	22	*9	13	11	4	.21
F	Phlox longifolia	3	-	-	1	-	-
F	Polygonum douglasii	-	3	-	-	2	.01
F	Schoenocrambe linifolia	-	*8	-	-	4	.04
F	Senecio integerrimus	-	*7	-	-	3	.06
F	Senecio multilobatus	-	*3	17	-	1	.00
F	Tragopogon dubius	-	1	-	-	1	.00
F	Unknown forb-perennial	4	-	-	1	-	-
Total for Forbs		155	175	78	77	79	2.52
B	Amelanchier alnifolia	9	3	1	3	1	.36
B	Artemisia tridentata vaseyana	34	*42	23	18	24	21.55
B	Cercocarpus montanus	10	*6	6	5	4	1.89
B	Chrysothamnus viscidiflorus lanceolatus	7	2	4	3	1	.53
B	Eriogonum heracleoides	-	*7	-	-	3	.09
B	Mahonia repens	25	*10	7	11	4	.60

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
B	Opuntia spp.	6	*18	5	4	8	.43
B	Pinus edulis	-	-	-	-	-	.63
B	Prunus virginiana	8	*-	3	4	-	-
B	Purshia tridentata	38	*18	23	21	12	9.26
B	Sambucus cerulea	-	*6	-	-	3	.68
B	Symphoricarpos oreophilus	20	*24	6	10	10	5.85
Total for Browse		157	136	78	79	70	41.90

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 12, Study no: 3

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	350	9.00	6.25	47.95
Rock	192	5.25	9.25	13.94
Pavement	12	0	.25	.03
Litter	392	75.25	74.50	59.10
Cryptograms	27	4.00	1.50	.64
Bare Ground	93	9.00	8.25	4.92

PELLET GROUP FREQUENCY --

Herd unit 12, Study no: 3

Type	Quadrat Frequency '95
Rabbit	22
Elk	2
Deer	20
Cattle	1

BROWSE CHARACTERISTICS --  
Herd unit 12, Study no: 3

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	1	-	-	-	-	-	-	-	3	-	60		3	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	3	-	1	2	-	-	-	-	-	1	1	4	-	120	32	32	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	180		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
Y	82	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	88	17	1	1	2	-	-	-	-	-	21	-	-	-	1400		21	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	23	-	-	3	-	-	-	-	-	25	1	-	-	1733	27	32	
	88	32	2	-	-	-	-	-	-	-	31	3	-	-	2266	31	32	
	95	93	23	-	-	-	-	-	-	-	116	-	-	-	2320	36	48	
D	82	3	1	-	-	-	-	-	-	-	2	-	1	1	266		4	
	88	9	1	-	-	-	-	-	-	-	8	-	2	-	666		10	
	95	10	5	-	-	-	-	-	-	-	5	-	-	10	300		15	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3199	Dec:	8%			
												'88	4332		15%			
												'95	2640		11%			
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	1	1	1	-	-	-	-	-	-	3	-	-	-	200	35	31	
	88	-	1	1	-	-	-	-	-	-	2	-	-	-	133	47	39	
	95	5	4	1	-	-	-	-	-	-	10	-	-	-	200	36	39	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	1	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	199		0%			
												'95	280		14%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	14	17	2
	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66	20	7	1
	95	9	-	-	2	-	-	-	-	-	11	-	-	-	220	21	25	11
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	1	-	-	-	-	-	-	-	1	-	1	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	0%			
												'88	199		66%			
												'95	220		0%			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	6	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Eriogonum heracleoides</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	6	-	-	3	-	-	-	-	-	9	-	-	-	180	11	10	9
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	180		-			
<i>Mahonia repens</i>																		
Y	82	100	-	-	-	-	-	-	-	-	100	-	-	-	6666			100
	88	145	56	-	-	-	-	-	-	-	201	-	-	-	13400			201
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
M	82	212	-	-	-	-	-	-	-	-	212	-	-	-	14133	7	2	212
	88	54	149	-	-	-	-	124	-	-	320	7	-	-	21800	6	4	327
	95	42	-	-	11	-	-	-	-	-	53	-	-	-	1060	4	5	53
Total Plants/Acre (excluding Dead & Seedlings)												'82	20799	Dec:	-			
												'88	-30336		-			
												'95	1200		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	8	-	-	-	-	-	-	-	-	8	-	-	-	533	2	5	8
	88	6	-	-	1	-	-	-	-	-	7	-	-	-	466	4	7	7
	95	26	-	-	2	-	-	-	-	-	28	-	-	-	560	4	17	28
Total Plants/Acre (excluding Dead & Seedlings)												'82	533	Dec:	-			
												'88	799		-			
												'95	600		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Purshia tridentata</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	1	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	1	-	3	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	6	12	2	1	-	-	-	-	-	17	1	3	-	1400	31 38	21	
	88	1	6	8	-	-	-	-	-	-	14	-	1	-	1000	29 35	15	
	95	49	18	6	11	6	-	-	-	-	90	-	-	-	1800	25 44	90	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	4	1	-	-	-	-	-	-	5	-	-	-	333		5	
	95	1	-	-	1	1	-	-	-	-	-	-	-	3	60		3	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1466	Dec:	0%			
												'88	1599		20%			
												'95	1860		3%			
<i>Sambucus cerulea</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	2	-	-	7	-	-	-	140	48 46	7	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	140		-			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	1	-	-	-	-	-	6	-	-	-	400		6	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	8	1	2	-	-	-	-	-	-	10	-	1	-	733		11	
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240		12	
M	82	3	3	-	-	-	-	-	-	-	6	-	-	-	400	14 23	6	
	88	3	-	1	-	-	-	-	-	-	4	-	-	-	266	15 19	4	
	95	53	1	-	15	-	-	-	-	-	69	-	-	-	1380	27 57	69	
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	-			
												'88	999		-			
												'95	1620		-			

PERCENT BROWSE COMPOSITION--

Herd unit 12, Study no: 3

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	0	0	2
<i>Artemisia tridentata</i> <i>vaseyana</i>	12	10	30
<i>Cercocarpus montanus</i>	.74	.46	3
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	.49	.46	2
<i>Echinocactus</i> spp.	0	0	.22
<i>Eriogonum heracleoides</i>	0	0	2
<i>Mahonia repens</i>	78	81	13
<i>Opuntia</i> spp.	2	2	7
<i>Purshia tridentata</i>	5	4	21
<i>Sambucus cerulea</i>	0	0	2
<i>Symphoricarpos oreophilus</i>	1	2	18

TREND STUDY 12-4-95

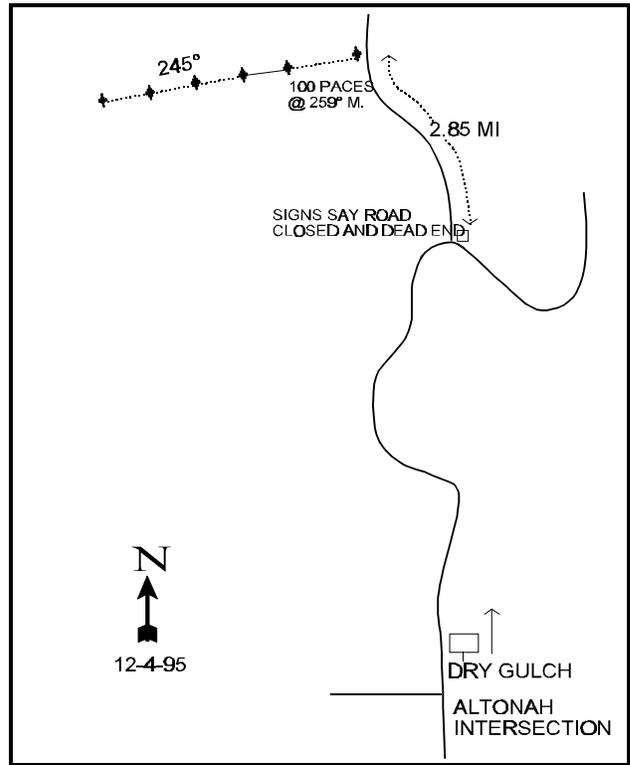
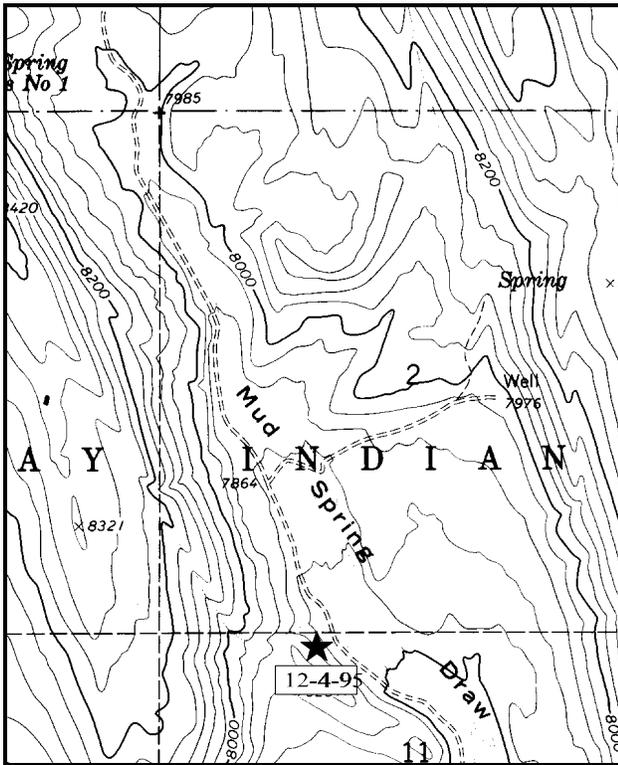
Study site name: Mud Springs Draw. Range type: Mountain Brush.

Compass bearing: frequency baseline 343 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (7 & 96ft), line 2 (32ft), line 3 (50ft), line 4 (79ft).

LOCATION DESCRIPTION

From the town of Altonah, proceed north for 2.0 miles to an intersection. Take the road which runs to the northwest for 2.65 miles until you come to another intersection. Go straight through the intersection and go up Mud Spring Draw for 2.85 miles to a red stake on the left side of the road. From the stake, the 0-foot baseline stake is 125 paces away at a bearing of 267° true. The frequency baseline stakes are marked by green steel fenceposts cut to 12-18" in height.



Map Name: Burnt Mill Springs

Diagrammatic Sketch

Township 1N, Range 4W, Section 11

GPS COOR. 5-58-392E 12 44-83-993N

## DISCUSSION

### Trend Study No. 12-4

This study is located within the Ute Indian Reservation in Mud Spring Draw at approximately 7,000 feet elevation. Cattle grazing and winter use by big game are the principal resource values. The range type is mixed mountain brush with a westerly aspect and a 50% slope.

Soils are rocky and moderately shallow with numerous large rocks on the surface. Vegetation and litter cover are abundant and adequately protect the soil from erosion.

The key preferred browse species is true mountain mahogany which accounts for 50% of the browse cover on the site. Population density has remained somewhat similar in 1982 and 1995, with a notable increase in 1988 due mostly to an increase in the number of young (69% of population was classified as young). This portion of the population can easily be lost when experiencing prolonged drought. Percent decadence is low and vigor generally good. Utilization is light to moderate with heavier use reported in 1988.

Other important secondary species include serviceberry, mountain big sagebrush, antelope bitterbrush, and snowberry. Together these species contribute 26% of the browse cover. Serviceberry, mountain big sagebrush, and bitterbrush number from 500 to 600 plants/acre, and are moderately to heavily hedged. Sagebrush displays a slightly increased decadency from 1988 (36%, but still quite high) and heavy use. Dead plants number 460 plants/acre which means that almost 50% are dead.

Grasses and forbs are diverse and quite abundant. Grasses provide a total cover of 9%, while forbs account for 12% cover. Bluebunch wheatgrass, slender wheatgrass, Carex, and mutton bluegrass are the most abundant grass species. Annual forbs dominate the forb component with 8 species accounting for 68% of the forb cover. Common perennial species include hooker balsamroot, sulfur eriogonum, and silvery lupine.

### 1982 APPARENT TREND ASSESSMENT

Current soil condition is fair with stable to perhaps slightly downward trend. In spite of good vegetative and litter cover, some soil loss is occurring. Slope steepness (50%) is undoubtedly a major contributing factor. Vegetative conditions look good and trend, from a big game winter range standpoint, is stable to improving. The condition of the key browse species is especially encouraging.

### 1988 TREND ASSESSMENT

The soil trend on this site is improving due to the accumulation of litter and minimal evidence of soil movement. Slightly less bare soil was measured in 1988 due to increases in the percentage of basal vegetative cover. The key browse species, true mountain mahogany, continues an upward trend. It was rated in excellent condition. Individuals were moderately hedged, in good vigor, with few decadent shrubs. Browsing appears to have increased over the years, but it is still well within acceptable levels. Although frequency of the several valuable browse species was unchanged, density of the mountain mahogany, serviceberry and big sagebrush increased. These shrubs also have healthy populations of young plants. In 1988, these species were classified as 16% heavily hedged, 53% moderately hedged and the rest only lightly used. Trend for the herbaceous understory is improving with significant increases in quadrat frequency of grasses and forbs.

TREND ASSESSMENT

soil - improved

browse - slightly up for key species

herbaceous understory - up

1995 TREND ASSESSMENT

Soil conditions continue to improve. Litter cover declined from 71.5% to 57% likely due to prolonged drought, but percent bare ground declined to only 4%. Trend for the key browse species is slightly improved since 1988. Less seedling and young plants were encountered in 1995, but the number of mature plants has remained stable since 1982. It appears that some mature plants might have been classified as young in 1988 resulting in a lower population density for mature plants and an inflated estimate of young plants. Currently percent decadence is low, vigor is good and utilization is moderate. Trend for the herbaceous understory is slightly down for grasses, but improved for forbs. Overall the trend appears stable.

TREND ASSESSMENT

soil - up slightly

browse - slightly improved

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 12, Study no: 4

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	-	*47	-	-	15	.69
G	Agropyron spicatum	263	*118	23	93	43	1.91
G	Agropyron trachycaulum	-	*115	-	-	40	2.37
G	Bouteloua gracilis	3	*-	-	1	-	-
G	Carex spp.	54	83	12	25	34	1.22
G	Elymus salina	-	*10	-	-	4	.07
G	Oryzopsis hymenoides	-	-	1	-	-	-
G	Poa fendleriana	256	*115	46	92	49	2.05
G	Poa secunda	47	*-	11	19	-	-
G	Sitanion hystrix	9	6	18	5	3	.01
G	Stipa comata	50	95	39	24	39	1.04
Total for Grasses		682	589	150	259	227	9.38
F	Agoseris glauca	-	*16	-	-	9	.07
F	Allium spp.	-	*147	6	-	64	.59
F	Arabis spp.	6	7	6	4	3	.01
F	Artemisia ludoviciana	23	*13	3	11	7	.16
F	Astragalus convallarius	4	*-	-	4	-	-
F	Balsamorhiza hookeri	55	*50	-	27	25	.83

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Castilleja chromosa	11	*2	1	6	1	.00
F	Calochortus nuttallii	-	*23	4	-	12	.11
F	Chaenactis douglasii	2	-	-	1	-	-
F	Collomia linearis	-	143	-	-	70	.82
F	Comandra pallida	15	11	3	8	5	.17
F	Collinsia parviflora	-	238	-	-	80	4.19
F	Crepis acuminata	-	*3	-	-	1	.00
F	Cryptantha spp.	-	2	-	-	1	.00
F	Delphinium bicolor	-	1	-	-	1	.00
F	Descurainia pinnata	-	156	-	-	50	2.56
F	Draba spp.	-	55	-	-	19	.29
F	Erigeron spp.	-	-	3	-	-	-
F	Eriogonum spp.	-	-	4	-	-	-
F	Eriogonum umbellatum	19	*10	6	9	6	.25
F	Gilia spp.	-	5	-	-	3	.04
F	Heterotheca villosa	-	*4	2	-	2	.03
F	Lappula occidentalis	-	3	-	-	1	.00
F	Lepidium spp.	-	13	-	-	6	.08
F	Lesquerella spp.	-	-	2	-	-	-
F	Linum lewisii	-	-	-	-	-	.03
F	Lithospermum multiflorum	14	*3	2	7	2	.30
F	Lupinus argenteus	25	27	12	12	13	.56
F	Machaeranthera grindelioides	5	2	-	2	1	.15
F	Mammillaria spp.	3	*-	-	2	-	-
F	Pedicularis centranthera	-	-	12	-	-	-
F	Penstemon spp.	30	*6	11	15	4	.03
F	Petradoria pumila	3	5	2	1	2	.30
F	Phlox longifolia	1	-	-	1	-	-
F	Polygonum douglasii	-	15	-	-	7	.03
F	Schoenocrambe linifolia	-	2	-	-	2	.01
F	Sedum spp.	35	*14	-	16	8	.09
F	Sphaeralcea coccinea	1	-	-	1	-	-
F	Taraxacum officinale	-	2	-	-	1	.00
F	Tragopogon dubius	2	2	-	1	1	.01
F	Unknown forb-perennial	-	2	-	-	1	.01

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
Total for Forbs		254	982	79	128	408	11.81
B	Amelanchier alnifolia	18	*11	8	10	5	1.86
B	Artemisia tridentata vaseyana	38	*11	26	22	4	1.89
B	Cercocarpus montanus	44	58	19	17	31	15.03
B	Chrysothamnus viscidiflorus viscidiflorus	22	*15	7	9	6	1.84
B	Echinocerus spp.	-	-	2	-	-	-
B	Eriogonum spp.	12	*-	-	5	-	-
B	Mahonia repens	78	150	15	28	58	4.90
B	Opuntia spp.	32	57	11	18	29	.46
B	Purshia tridentata	15	10	4	7	4	2.01
B	Symphoricarpos oreophilus	32	*40	11	17	18	2.25
Total for Browse		291	352	103	133	155	30.27

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

BASIC COVER --

Herd unit 12, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	356	6.75	12.25	45.35
Rock	231	3.50	7.50	14.46
Pavement	30	0	.50	.53
Litter	389	73.50	71.50	56.93
Cryptograms	31	3.00	1.00	.43
Bare Ground	148	13.25	7.25	4.13

PELLET GROUP FREQUENCY --

Herd unit 12, Study no: 4

Type	Quadrat Frequency '95
Rabbit	9
Elk	15
Deer	29

BROWSE CHARACTERISTICS --  
Herd unit 12, Study no: 4

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	1	2	-	-	-	-	-	-	4	-	2	-	400		6	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	4	1	2	-	-	-	-	-	-	5	2	-	-	466	27	25	7
	88	-	2	1	-	-	-	-	-	-	3	-	-	-	200	45	53	3
	95	9	14	2	1	1	-	-	-	-	27	-	-	-	540	30	35	27
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	-	-	-	-	1	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	466	Dec:	0%			
												'88	666		9%			
												'95	600		3%			
<i>Artemisia tridentata vaseyana</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	1	-	-	-	-	-	-	-	2	1	-	-	200		3	
	95	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	2	1	-	-	-	-	-	-	-	2	1	-	-	200	22	29	3
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	22	20	1
	95	2	10	1	1	-	-	-	-	-	14	-	-	-	280	23	25	14
D	82	1	-	-	-	-	-	-	-	-	-	1	-	-	66		1	
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	3	4	1	-	1	-	-	-	-	6	-	-	3	180		9	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	460		23	
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	24%			
												'88	399		33%			
												'95	500		36%			

A G E	YR	Form Class (No. of 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>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	9	-	-	2	-	-	-	-	-	11	-	-	-	733		11	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	9	3	-	-	-	-	-	-	-	10	2	-	-	800		12	
	88	12	32	5	1	-	-	-	-	-	50	-	-	-	3333		50	
	95	22	6	-	2	-	-	-	-	-	30	-	-	-	600		30	
M	82	25	10	-	-	-	-	-	-	-	35	-	-	-	2333	33 24	35	
	88	-	12	8	-	-	-	-	-	-	20	-	-	-	1333	43 43	20	
	95	14	118	8	-	2	-	-	-	-	142	-	-	-	2840	35 42	142	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	4	3	-	-	-	-	-	-	4	-	2	2	160		8	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3133	Dec:	0%			
												'88	4799		2%			
												'95	3600		4%			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	24	-	-	-	-	-	-	-	-	24	-	-	-	1600	18 13	24	
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	10 11	8	
	95	33	-	-	-	-	-	-	-	-	33	-	-	-	660	16 21	33	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	9	-	-	-	-	-	-	-	-	3	-	6	-	600		9	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1600	Dec:	0%			
												'88	1199		50%			
												'95	680		2%			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1 4	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Mahonia repens</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	39	-	-	-	-	-	-	-	-	39	-	-	-	2600		39	
	95	40	-	-	-	-	-	-	-	-	40	-	-	-	800		40	
M	82	29	-	-	-	-	-	-	-	-	29	-	-	-	1933	5	7	29
	88	427	-	-	-	-	-	-	-	-	423	-	4	-	6621	4	3	427
	95	1324	-	-	22	-	-	-	-	-	1346	-	-	-	705	4	6	1346
	82	30	-	-	-	-	-	-	-	-	30	-	-	-	2000		30	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3933	Dec:	-			
												'88	9221		-			
												'95	1505		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	14	-	-	-	-	-	-	-	-	14	-	-	-	933		14	
	95	17	-	-	1	-	-	-	-	-	18	-	-	-	360		18	
M	82	15	-	-	-	-	-	-	-	-	15	-	-	-	1000	2	5	15
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	87	-	-	-	-	-	-	-	-	87	-	-	-	1740	2	8	87
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1000	Dec:	0%			
												'88	933		0%			
												'95	2120		0%			
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	1	2	-	-	-	-	-	-	-	3	-	-	200	17	25	3
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133	19	25	2
	95	4	19	2	1	-	-	-	-	-	26	-	-	-	520	22	41	26
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	133		0%			
												'95	600		3%			

A G E	YR	Form Class (No. of 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	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	95	12	-	-	2	-	-	-	-	-	14	-	-	-	280		14	
M	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666	13 15	10	
	88	9	2	-	-	-	-	-	-	-	11	-	-	-	733	12 16	11	
	95	45	1	-	29	-	-	-	-	-	75	-	-	-	1500	14 25	75	
Total Plants/Acre (excluding Dead & Seedlings)												'82	999	Dec:	-			
												'88	1199		-			
												'95	1780		-			
Tetradymia canescens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11 17	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 12, Study no: 4

Species	Percent of Total		
	'82	'88	'95
Amelanchier alnifolia	4	2	2
Artemisia tridentata vaseyana	2	.99	1
Cercocarpus montanus	27	12	10
Chrysothamnus viscidiflorus viscidiflorus	14	3	2
Echinocactus spp.	0	0	.05
Mahonia repens	34	77	74
Opuntia spp.	9	2	6
Purshia tridentata	2	.33	2
Symphoricarpos oreophilus	9	3	5
Tetradymia canescens	0	0	0

TREND STUDY 12-5-94

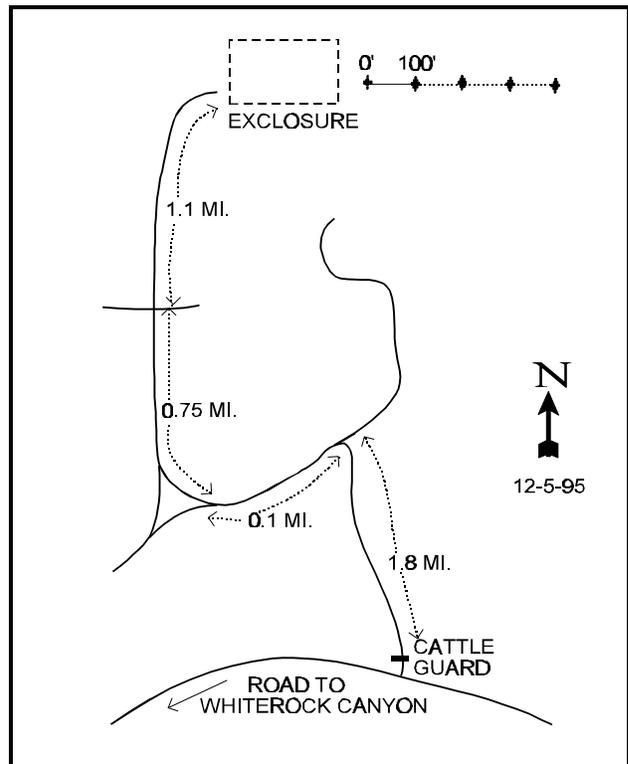
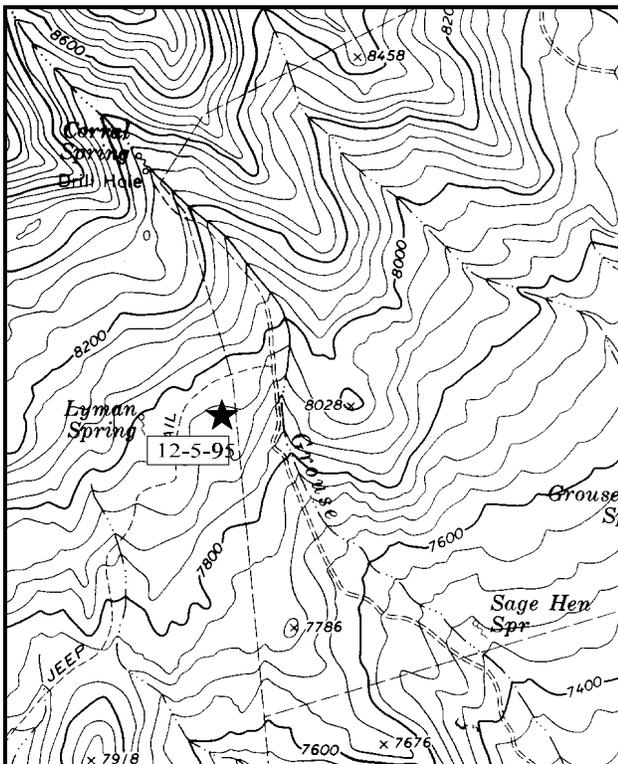
Study site name:   Mosby Mountain  . Range type:   Sagebrush - Grass  .

Compass bearing: frequency baseline 170 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 96ft), line 2 (30ft), line 3 (50ft), line 4 (72ft).

LOCATION DESCRIPTION

From the town of Whiterocks, go east for approximately 1.75 miles to a "T" in the road. Turn left (north) and go 3.5 miles to an intersection where 2 roads fork off to the right Turn right then take the left fork. Head north for approximately 4.0 miles to the Mosby Mountain Exclosure. The 0-foot baseline stake is located 12 paces from the southwest corner of the big game exclosure bearing 225 degrees true.



Map Name:   Lake Mountain  

Diagrammatic Sketch

Township   3S  , Range   18E  , Section   14  

GPS COOR.   5-95-876E     12 44-90-59N

## DISCUSSION

### Trend Study No. 12-5

This study samples a sagebrush-grass type with scattered serviceberry and bitterbrush at an elevation of 8,280 feet. It has a slope of 5% to 8% and a south aspect. The high elevation may limit or prohibit big game use during severe winters. The study site is in close proximity to the Mosby Mountain big game exclosure and pellet group transect. Soon after the reading of this study in August 1988, the area was burned by a wildfire. During the 1995 reading it was noted that the belts one and five from the original baseline were not burned while belts 2, 3, and 4 were burned. As a result, most of the shrubs on the burned belts were eliminated.

Soil on the site is relatively shallow and rocky with deeper soil further down slope. On nearby steeper slopes, noticeable soil movement was reported in 1988. Past and present cattle use is heavy with cattle still on the site during the 1995 reading on August 2. Cattle use was higher than either elk or deer, as indicated by the pellet group transects. Moderately high numbers of elk and deer pellet-groups were also encountered.

Browse on the site are scattered and account for only 8% total vegetative cover. The most abundant shrub consists of mountain big sagebrush which had a density of 2,400 "mature" plants/acre in 1982, 1,933 "mature" plants in 1988, and 1,360 "mature" plants by 1995. This shows a consistent downward trend for the "mature" portion of the mountain big sagebrush population. The 1988 burn was spotty over the study site with many sagebrush surviving. Small numbers of seedlings and young sagebrush were encountered in 1995. Percent decadence declined from a high of 27% in 1988 to 7% in 1995. Utilization was more pronounced on the surviving sagebrush, however 24% of the mature plants displayed heavy use.

Secondary browse species consist of serviceberry and bitterbrush. Total density of serviceberry declined from 1,265 plants/acre in 1988 to 460 by 1995 while the number of "mature" plants increased from 333 plants/acre to 420. This increase is probably a function of the increased sample size used in 1995. The survivors from the wildfire show moderate to heavy use with 43% of the shrubs displaying heavy use. Vigor is good. Bitterbrush currently number only 240 plants/acre down from a high of 599 in 1988. During the 1982 reading, use of these shrubs was reported heavy with a clubbed growth forms and depressed vigor on many shrubs. Most of the current years growth in 1982 was inward where it was protected from use. Currently, bitterbrush displays a prostrate growth form (only 10 inches in height) with moderate to heavily hedging and good vigor.

The herbaceous understory is quite diverse and accounts for 74% of the total vegetative cover. Grasses provide about 17% cover, 50% of which comes from thickspike wheatgrass. Kentucky bluegrass, mutton grass, and needle-and-thread are also common. Forbs are diverse with 26 species providing 28% of the herbaceous ground cover. Many of the forb species are weedy increasers however. The most common perennial species includes hooker balsamroot, pussytoes, and aster.

### 1982 APPARENT TREND ASSESSMENT

Within the immediate area of the study site, soil trend is stable to declining. On nearby steeper sites, the trend is more downward. Vegetative condition is below optimum. Browse density, especially of the more preferred species, is substandard. Animal use is almost certainly the causative factor. Many increaser species of all vegetative classes are present and may be expanding. Range trend is slightly downward.

1988 TREND ASSESSMENT

The soil trend appears stable. Percent bare ground increased slightly while percent litter cover declined. However, basal vegetative cover increased from 7% to 13%. Mountain big sagebrush has increased in density due to a significant increase in the number of seedlings and young plants. Percent decadence increased from 4% to 27%, but vigor is generally good. The majority of the sagebrush is lightly hedged so this increase in decadence is more a reflection of the age of the stand in conjunction with drought. The more preferred serviceberry and bitterbrush show improved recruitment, but serviceberry displays heavy use on 100% of the mature plants with an increased rate of decadence. Overall trend for browse is stable. Trend for the herbaceous understory is significantly improved. Quadrat frequency of grasses and forbs nearly doubled since 1982. Quadrat frequency of thickspike wheatgrass and mutton grass increased from 52% and 53% respectively to 92% and 95%.

TREND ASSESSMENT

soil - stable

browse - stable for key species with improved recruitment

herbaceous understory - up

1995 TREND ASSESSMENT

Trend for soil is stable with a good stand of rhizomatous grasses to help prevent erosion. The fire that burned the site in 1988 reduced the population density of the shrubs, but did not eliminate them. The remaining stand of mountain big sagebrush and serviceberry, though smaller, are healthier with less decadence. Use is still heavy yet vigor is good. Trend is stable. Trend for the herbaceous understory is slightly down. Sum nested frequency of perennial grasses and perennial forbs has declined since 1988.

TREND ASSESSMENT

soil - stable

browse - stable for key species

herbaceous understory - slightly down for perennial species

VEGETATIVE TRENDS --

Herd unit 12, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	260	*266	52	92	85	8.28
G	Bromus tectorum	-	115	-	-	37	1.28
G	Poa fendleriana	277	*149	53	95	59	2.87
G	Poa pratensis	4	*105	-	2	39	1.05
G	Poa secunda	182	*33	53	72	13	.31
G	Sitanion hystrix	16	*19	6	10	9	.09
G	Stipa comata	21	*63	2	12	27	1.77
G	Stipa lettermani	53	*58	20	22	24	.84
Total for Grasses		813	808	186	305	293	16.51

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Agoseris glauca</i>	-	*3	4	-	1	.00
F	<i>Allium</i> spp.	3	*60	5	2	30	.15
F	<i>Alyssum</i> spp.	-	13	-	-	6	.06
F	<i>Antennaria rosea</i>	61	*31	10	26	12	.93
F	<i>Arabis</i> spp.	60	*12	5	32	6	.03
F	<i>Astragalus purshii</i>	28	*7	6	9	3	.06
F	<i>Aster</i> spp.	68	*65	34	26	29	.95
F	<i>Astragalus</i> spp.	19	*2	1	6	1	.00
F	<i>Balsamorhiza hookeri</i>	157	*104	24	69	45	1.15
F	<i>Calochortus nuttallii</i>	3	*-	-	1	-	-
F	<i>Collomia linearis</i>	-	75	-	-	33	.24
F	<i>Collinsia parviflora</i>	-	60	-	-	25	.27
F	<i>Crepis acuminata</i>	-	*18	-	-	9	.07
F	Cruciferae	23	*-	-	11	-	-
F	<i>Cryptantha</i> spp.	-	1	-	-	1	.00
F	<i>Cymopterus</i> spp.	-	3	-	-	1	.00
F	<i>Descurainia pinnata</i>	-	27	-	-	15	.10
F	<i>Eriogonum alatum</i>	122	*3	4	47	3	.01
F	<i>Erigeron flagellaris</i>	19	*30	11	9	13	.09
F	<i>Eriogonum umbellatum</i>	6	*1	4	4	1	.03
F	<i>Heterotheca villosa</i>	-	*13	-	-	6	.20
F	<i>Lappula occidentalis</i>	-	1	-	-	1	.00
F	<i>Lactuca serriola</i>	-	*5	-	-	3	.01
F	<i>Lepidium</i> spp.	-	79	-	-	39	.19
F	<i>Lithospermum ruderale</i>	8	*15	-	4	8	.41
F	<i>Lupinus argenteus</i>	17	*3	8	9	2	.06
F	<i>Microsteris gracilis</i>	-	4	-	-	2	.01
F	<i>Penstemon</i> spp.	15	*8	3	10	3	.01
F	<i>Phlox longifolia</i>	24	*16	-	11	7	.03
F	<i>Polygonum douglasii</i>	-	177	15	-	65	1.08
F	<i>Potentilla gracilis</i>	-	1	-	-	1	.00
F	<i>Sedum lanceolatum</i>	5	1	1	2	1	.00
F	<i>Sphaeralcea coccinea</i>	13	*19	8	6	8	.11
F	<i>Taraxacum officinale</i>	-	*28	-	-	13	.16
F	<i>Tragopogon dubius</i>	10	*6	-	8	3	.04
Total for Forbs		661	891	143	292	396	6.55
B	<i>Amelanchier alnifolia</i>	16	*11	8	7	5	1.81
B	<i>Artemisia tridentata vaseyana</i>	65	*20	31	32	12	3.40

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
B	Ceanothus fendleri	-	*9	-	-	4	1.92
B	Chrysothamnus nauseosus nauseosus	1	-	1	1	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	3	6	-	1	2	.18
B	Eriogonum heracleoides	-	*7	-	-	3	.56
B	Gutierrezia sarothrae	-	-	1	-	-	-
B	Opuntia spp.	-	-	1	-	-	-
B	Purshia tridentata	3	*-	2	1	-	.03
B	Symphoricarpos oreophilus	3	1	1	1	1	.06
Total for Browse		91	54	64	43	27	7.98

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 12, Study no: 5

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	369	7.00	13.00	39.93
Rock	193	.25	2.50	6.85
Pavement	94	.50	1.00	.23
Litter	395	72.00	56.50	49.51
Cryptograms	2	.75	5.25	.00
Bare Ground	282	19.50	21.75	14.68

PELLET GROUP FREQUENCY --

Herd unit 12, Study no: 5

Type	Quadrat Frequency
	'95
Rabbit	3
Horse	1
Elk	21
Deer	16
Cattle	24

BROWSE CHARACTERISTICS --

Herd unit 12, Study no: 5

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	4	-	-	-	-	-	-	-	1	3	-	-	266		4	
	88	8	1	-	-	-	-	1	-	-	9	-	1	-	666		10	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	2	10	-	-	-	-	-	-	-	11	1	-	800	23	25	12
	88	-	-	5	-	-	-	-	-	-	5	-	-	-	333	35	37	5
	95	2	8	9	2	-	-	-	-	-	21	-	-	-	420	23	34	21
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	3	1	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1066	Dec:	0%			
												'88	1265		21%			
												'95	460		4%			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	88	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	95	4	2	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	34	2	-	-	-	-	-	-	-	32	4	-	-	2400	16	21	36
	88	19	9	-	1	-	-	-	-	-	29	-	-	-	1933	25	29	29
	95	11	41	16	-	-	-	-	-	-	68	-	-	-	1360	14	21	68
D	82	1	1	-	-	-	-	-	-	-	-	2	-	-	133		2	
	88	13	1	-	1	-	-	-	-	-	14	-	1	-	1000		15	
	95	-	6	-	-	-	-	-	-	-	6	-	-	-	120		6	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2933	Dec:	4%			
												'88	3599		27%			
												'95	1600		7%			
<i>Ceanothus fendleri</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	13	-	-	-	-	-	-	-	-	13	-	-	-	260	9	54	13
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	260		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus nauseosus nauseosus</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	19	15	1
	88	-	-	-	1	-	-	-	-	-	-	-	1	-	66	29	9	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	11	0
Total Plants/Acre (excluding Dead & Seedlings)											'82	66	Dec:	-				
											'88	66		-				
											'95	0		-				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	88	4	-	-	-	-	-	-	-	-	1	-	3	-	266			4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266	10	14	4
	88	6	-	-	-	-	-	-	-	-	3	-	3	-	400	7	9	6
	95	3	-	1	-	-	-	-	-	-	4	-	-	-	80	8	13	4
Total Plants/Acre (excluding Dead & Seedlings)											'82	399	Dec:	-				
											'88	666		-				
											'95	80		-				
<i>Eriogonum heracleoides</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	18	-	-	-	-	-	-	-	-	18	-	-	-	360	5	16	18
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	0		-				
											'95	540		-				
<i>Eriogonum microthecum</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200	4	7	3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	266		-				
											'95	0		-				
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	9	12	6
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	0		-				
											'95	120		-				

A G E	YR	Form Class (No. of 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</i> spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	2	-	2	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	1	12	2
	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400	4	9	6
	95	7	-	-	-	-	-	-	-	-	5	-	2	-	140	3	14	7
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	666		-			
												'95	140		-			
<i>Purshia tridentata</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	1	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	3	2	-	-	-	-	-	-	5	-	-	-	333	7	19	5
	88	-	2	3	-	-	-	-	-	-	5	-	-	-	333	10	19	5
	95	1	6	2	-	-	-	-	-	-	9	-	-	-	180	10	32	9
Total Plants/Acre (excluding Dead & Seedlings)												'82	333	Dec:	-			
												'88	599		-			
												'95	240		-			
<i>Symphoricarpos oreophilus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66	16	14	1
	95	2	1	3	-	-	-	-	-	-	6	-	-	-	120	11	19	6
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	200		-			

PERCENT BROWSE COMPOSITION--

Herd unit 12, Study no: 5

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	22	18	13
<i>Artemisia tridentata</i> <i>vaseyana</i>	59	50	44
<i>Ceanothus fendleri</i>	0	0	7
<i>Chrysothamnus</i> <i>nauseosus nauseosus</i>	1	.92	0
<i>Chrysothamnus</i> <i>viscidiflorus</i> <i>viscidiflorus</i>	8	9	2
<i>Eriogonum</i> <i>heracleoides</i>	0	0	15
<i>Eriogonum microthecum</i>	0	4	0
<i>Gutierrezia sarothrae</i>	0	0	3
<i>Opuntia</i> spp.	3	9	4
<i>Purshia tridentata</i>	7	8	7
<i>Symphoricarpos</i> <i>oreophilus</i>	0	.92	5

TREND STUDY 12-6-95

Study site name: Cart Hollow. Range type: Mountain Brush

Compass bearing: frequency baseline 331 degrees.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) 7, 24, 44, 67, 92.

Density plot sizes: grasses and forbs 9.6 ft<sup>2</sup>, browse 0.005 acres.

LOCATION DESCRIPTION

From Neola, proceed North from Neola to Uinta Canyon until you come to a sign pointing to Elkhorn and Whiterocks. Turn right and travel 3.55 miles until you come to a cattleguard. Turn left at Cart Hollow Spring and proceed 2.1 miles to a fence. Drive through the fence and proceed 1.2 miles to another fence just before a fork in the road. Turn right at the fork and travel 0.9 miles passing through a stand of *Pinus ponderosa*. At approximately 0.9 miles, you should be in a clearing which has a capped drill casing in the middle of it. From the post, the 0-foot baseline stake is 72 paces away at a bearing of 54 degrees true. The first density plot is located 12 paces away from the 0-foot baseline stake at a bearing of 75 degrees true. Both the frequency and the density studies are marked by green steel 'T' posts approximately 12 to 18 inches in height.

**\*\*NOTE\*\* This site was not read in 1995 due to closed roads which made the site inaccessible. Study number 12-10 (Farm Creek) was established as a replacement.**

Map Name: Dry Mountain

Diagrammatic Sketch

Township 1N, Range 6W, Section 13

## DISCUSSION

### Trend Study No. 12-6

This trend study is located in Cart Hollow at an elevation of approximately 7,760 feet. The area is big game winter range administered by the Ashley National Forest. The range type is mixed mountain brush with a few scattered ponderosa pine trees. Exposure is southerly with a 20% to 30% slope.

Soil is coarse and shallow with many large surface rocks. Erosion and soil movement are moderate. Almost 15% bare ground was measured along with 8% erosion pavement and 11% rock. There is ample opportunity for runoff during storms of moderate to heavy intensity.

The percentages calculated show an increase in bare soil and a decrease in litter since 1982, while the vegetative cover has increased to 10%. Soil movement is slight.

Data comparisons indicate this is a dynamic site in terms of the browse component. Total density for the true mountain mahogany is higher than in 1982, due to an increase in the number of young plants, while the density of mature mahogany declined, partly due to an increase in the percentage of shrubs classified as decadent. However, the frequency of occurrence of mahogany is consistent between years. Hedging tends to be moderate to heavy. The other important browse, big sagebrush and serviceberry, also display conflicting results between the frequency and density data. While sage increased in frequency, the density of plants declined although more seedlings and young were counted in 1988. The only unequivocal change is the obvious increase in the number of broom snakeweed, a short-lived species which responds favorably to periods of above-average moisture and/or disturbance. Overall, there is adequate reproduction and the key browse species appear stable. With the exception of mahogany, the shrubs display good vigor. The mahogany and some of the serviceberry are heavily infested with biting red ants. As also noted in 1982, many of the older mahogany have been defoliated and have poor vigor which must be related to the ants.

The frequency of occurrence of most grasses has remained the same since 1982, with the exception of needle-and-thread. It still ranks in the top three species, slipping from first to third, but density dropped from approximately 30,000 to 3,000 plants per acre. Unless an error was made in plant identification, a considerable reduction in the abundance of this species has occurred in the last six years. Overall, grass density has not changed significantly, since bluebunch wheatgrass density nearly doubled.

Hairy goldenaster and 9tonecrop remain the most common forbs on the site. The mean occurrence for both species has at least tripled and the density of the unpalatable hairy goldenaster has quadrupled (from 12,000 to 47,000 plants/acre).

### 1982 APPARENT TREND ASSESSMENT

The apparent trend evaluation for this site indicates a stable to declining soil trend. Signs of erosion and soil movement are obvious but the magnitude of soil loss does not appear great. Vegetative trend is more difficult to evaluate. The key species seems to be maintaining itself but may be approaching a threshold insofar as animal use is concerned. Reduced vigor may prove to be temporary, given the highly fluctuating nature of insect populations. Secondary browse plants appear fairly stable, however, the frequency of undesirable increasers is a matter of some concern. Herbaceous composition and production, while substantially below optimum, is not seriously depleted. Lacking more data, a stable trend is probably the best estimate.

1988 TREND ASSESSMENT

The ground cover percentages calculated show an increase in bare soil and a decrease in litter since 1982, while the vegetative cover has increased to 10%. Soil movement is slight. With the exception of mahogany, the shrubs display good vigor. The mahogany and some of the serviceberry are heavily infested with biting red ants. As also noted in 1982, many of the older mahogany have been defoliated and have poor vigor, which must be related to the ants. Overall, grass density has not changed significantly, since bluebunch wheatgrass density nearly doubled.

1995 TREND ASSESSMENT

**\*\*NOTE\*\*** This site was not read in 1995 due to closed roads which made the site inaccessible. Study number 12-10 (Farm Creek) was established as a replacement.

VEGETATIVE TRENDS --  
Herd unit 22 , Study no: 6

T y p e	Species	Quadrat Frequency	
		'82	'88
G	Agropyron spicatum	26	33
G	Carex spp.	26	27
G	Oryzopsis hymenoides	13	4
G	Sitanion hystrix	11	8
G	Sporobolus cryptandrus	4	2
G	Stipa comata	40	21
Total for Grasses		120	95
F	Arabis spp.	1	2
F	Artemisia ludoviciana	2	1
F	Astragalus argophyllus	1	-
F	Astragalus mollissimus	2	-
F	Balsamorhiza hookeri	-	5
F	Cryptantha spp.	-	1
F	Descurainia spp.	9	-
F	Erigeron spp.	4	-
F	Eriogonum alatum	2	1
F	Eriogonum umbellatum	5	2
F	Fritillaria spp.	7	-
F	Hackelia patens	1	-
F	Heterotheca villosa	16	64
F	Linum lewisii	3	4
F	Machaeranthera grindelioides	-	2

T y p e	Species	Quadrat Frequency	
		'82	'88
F	Mammillaria spp.	-	9
F	Pedicularis spp.	5	-
F	Penstemon spp.	5	3
F	Petradoria pumila	-	6
F	Phlox longifolia	7	-
F	Polygonum spp.	2	-
F	Sedum spp.	15	44
F	Sphaeralcea coccinea	8	3
F	Unknown forb-perennial	-	2
Total for Forbs		95	149
B	Amelanchier alnifolia	5	8
B	Artemisia tridentata vaseyana	20	14
B	Ceanothus fendleri	1	1
B	Cercocarpus montanus	20	23
B	Chrysothamnus viscidiflorus	1	-
B	Gutierrezia sarothrae	9	32
B	Leptodactylon pungens	-	5
B	Mammillaria spp.	18	6
B	Mahonia repens	1	2
B	Opuntia spp.	1	11
B	Pinus ponderosa	1	2
B	Purshia tridentata	11	20
B	Rosa woodsii	-	1
B	Symphoricarpos oreophilus	3	3
Total for Browse		94	128

BASIC COVER --

Herd unit 22 , Study no: 6

Cover Type	Average Cover %	
	'82	'88
Vegetation	3.00	9.75
Rock	10.75	15.25
Pavement	7.75	5.00
Litter	60.00	47.00
Cryptograms	3.75	2.00
Bare Ground	14.75	21.00

BROWSE CHARACTERISTICS --  
Herd unit 22 , Study no: 6

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	3	-	-	3	-	-	-	200		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	1	-	1	-	-	3	-	-	9	-	-	-	600		9	
M	82	-	2	-	-	-	-	-	-	-	2	-	-	-	133	19	21	
	88	-	2	1	-	1	-	-	-	-	4	-	-	-	266	55	55	
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	866		-			
<i>Artemisia frigida</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	13	17	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
M	82	9	1	-	-	-	-	-	-	-	10	-	-	-	667	18	22	
	88	2	2	-	-	-	-	-	-	-	4	-	-	-	266	24	31	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	667	Dec:	0%			
												'88	465		28%			
<i>Cercocarpus montanus</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	67		1	
	88	3	-	-	-	-	-	3	-	-	5	-	1	-	400		6	
Y	82	4	-	-	-	-	-	-	-	-	4	-	-	-	267		4	
	88	9	13	-	3	-	-	2	-	-	21	-	4	2	1800		27	
M	82	3	23	9	-	-	-	-	-	-	8	22	5	-	2333	19	24	
	88	4	9	4	-	-	-	-	-	-	1	2	12	2	1133	23	27	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	8	1	-	-	-	1	-	-	-	2	7	2	733		11	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2600	Dec:	0%			
												'88	3666		19%			
<i>Chrysothamnus nauseosus nauseosus</i>																		
M	82	4	5	-	-	-	-	-	-	-	9	-	-	-	600	13	25	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
Total Plants/Acre (excluding Dead & Seedlings)												'82	600	Dec:	-			
												'88	0		-			

A G E	YR	Form Class (No. of 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>																		
M	82	2	-	-	-	-	-	-	-	-	2	-	-	133	10	10	2	
	88	1	-	-	-	-	-	-	-	-	-	-	1	66	8	8	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	66		-			
<i>Mammillaria spp.</i>																		
M	82	11	-	-	-	-	-	-	-	-	11	-	-	733	2	2	11	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	733	Dec:	-			
												'88	0		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	9	-	-	-	-	-	-	-	-	9	-	-	600			9	
M	82	13	-	-	-	-	-	-	-	-	13	-	-	867	8	14	13	
	88	137	-	-	-	-	-	-	-	-	137	-	-	9133	8	6	137	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	15	-	-	-	-	-	-	-	-	15	-	-	1000			15	
Total Plants/Acre (excluding Dead & Seedlings)												'82	867	Dec:	0%			
												'88	10733		9%			
<i>Pinus ponderosa</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	66			1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	66			1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	2	1	1	-	-	-	1	-	-	5	-	-	333			5	
M	82	3	6	-	-	-	-	-	-	-	4	5	-	600	15	24	9	
	88	1	2	1	-	-	-	-	-	-	3	-	1	266	9	15	4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	600	Dec:	-			
												'88	599		-			
<i>Symphoricarpos oreophilus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	1	-	-	-	-	-	1	-	-	2	-	-	133			2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	2	-	-	1	-	-	-	-	-	3	-	-	200	15	15	3	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	333		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	1	5	2	-	-	-	-	-	-	8	-	-	-	533	12	20	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	799		16%			

PERCENT BROWSE COMPOSITION--  
Herd unit 22 , Study no: 6

Species	Percent of Total	
	'82	'88
Amelanchier alnifolia	2	5
Artemisia frigida	1	.37
Artemisia tridentata vaseyana	10	3
Cercocarpus montanus	41	21
Chrysothamnus nauseosus nauseosus	9	0
Chrysothamnus viscidiflorus viscidiflorus	2	.37
Gutierrezia sarothrae	13	61
Mammillaria spp.	11	0
Pinus ponderosa	1	.37
Purshia tridentata	9	3
Symphoricarpos oreophilus	0	2
Tetradymia canescens	0	5

TREND STUDY 12-7-95

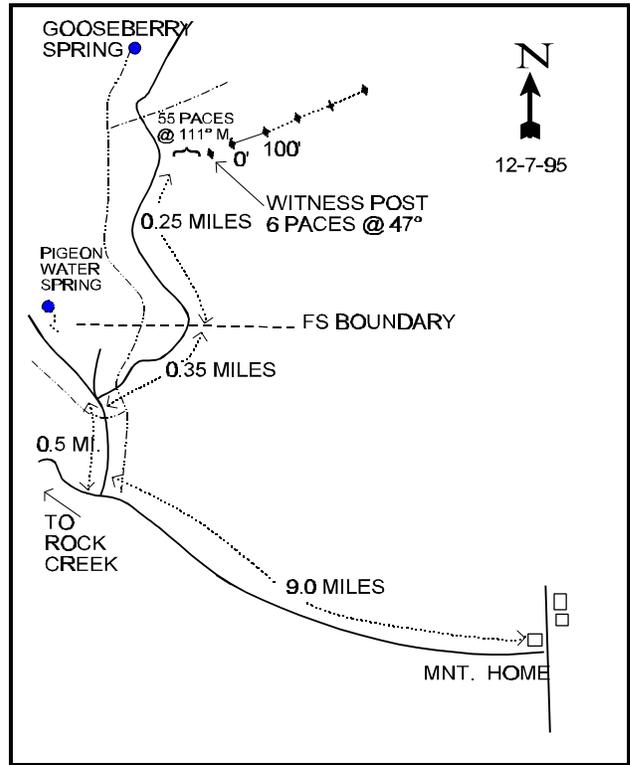
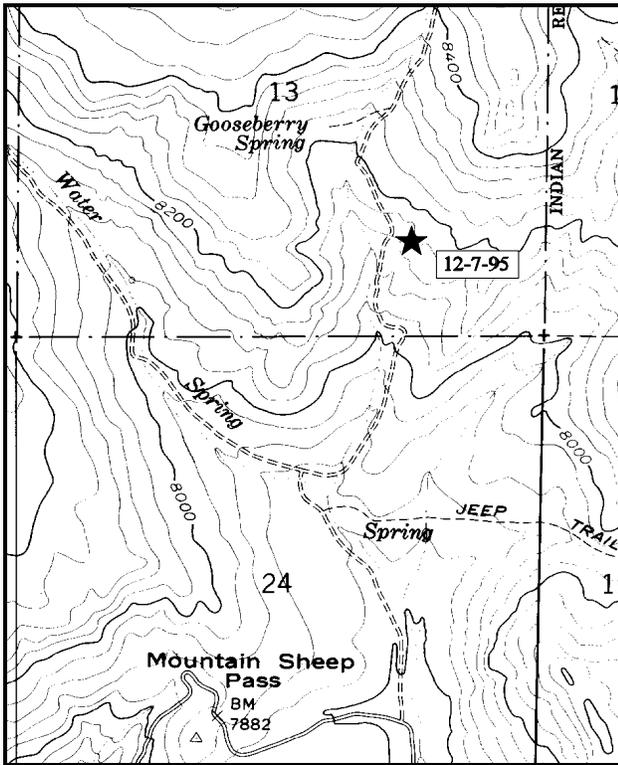
Study site name: Gooseberry Spring. Range type: Mountain Brush

Compass bearing: frequency baseline 62 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (16 & 92ft), line 2 (30ft), line 3 (47ft), line 4 (66ft).

LOCATION DESCRIPTION

From the town of Mountain Home, travel in a northwest direction towards Rock Creek. Approximately 9.0 miles from Mountain Home, you will come to a dirt road to the right (north). Before the road, there is a sign which points to Pigeon Water Spring. Take the dirt road to the north for .5 miles to a 3-way fork. Take the right-most road for .35 miles to the forest boundary. From the fence, continue .25 miles to a bend in the road in a small drainage. From the road, the 0-foot baseline stake is approximately 65 paces up the drainage. The frequency baseline stakes are marked by green, 18 inch tall fenceposts. The 0-foot baseline stake is marked with a browse tag, #7196.



Map Name: Dry Mountain

Diagrammatic Sketch

Township 1N, Range 6W, Section 13 GPS COOR. 5-41-602E 12 44-80-926N

## DISCUSSION

### Trend Study No. 12-7

This trend study is located on high winter range near Gooseberry Spring on the Ashley National Forest. Elevation is approximately 8,160 feet. The aspect is southwest with a slope of 10% to 20%. The range type is mixed mountain brush with a strong black sagebrush component. The base line runs up a small draw which contains a large number of serviceberry, snowberry, and mountain big sagebrush. The side hills are drier and dominated by nearly pure stands of black sagebrush. Intense animal use from deer, elk, cattle and possibly domestic sheep was reported in 1982. Currently pellet group frequency of elk and deer are moderately low.

Soil depth is relatively shallow, especially on the sides of the draws. The ground surface is moderately rocky (around 12% ground cover) yet erosion is minimal.

The browse composition is diverse in the shallow draws with 13 species sampled in 1995. Preferred key species include mountain big sagebrush, black sagebrush, serviceberry, bitterbrush, and snowberry. These 5 species make up 93% of the total browse cover. Serviceberry number approximately 900 "mature" plants/acre averaging 3 feet in height. Density has changed through the years primarily due to the fluctuation in the number of young plants, which has varied from 19% to 69% of the total population. Vigor is generally good with moderate to heavy use. Recruitment has declined from a high in 1988 (1,666 seedlings/acre and 2,266 young), but there appears to be sufficient numbers of seedlings and young to maintain the population. Percent decadence is low at 1%. Mountain big sagebrush shows a moderately stable population of approximately 2,000 "mature" plants/acre. These shrubs are moderately hedged with some heavily hedged individuals. Percent decadency has declined from a high of 26% in 1988 to 8% in 1995. Twenty-six percent of the population in 1982 showed poor vigor, but currently only 9% display poor vigor. Another important understory species present is bitterbrush. The entire population of approximately 333 plants/acre were classified as heavily hedged in 1982. Sixty-seven percent of the population were heavily hedged in 1988, but current use is classified as more moderate. Vigor is good and percent decadency is low at 3%. No seedlings were encountered during any of the readings and few young were found. The increased density estimated in 1995 is likely the result of the larger sample used. Still another important browse species on this site is black sagebrush which makes up 12% of the browse cover. Much of the population variation is caused by the fluctuations in the proportion of plants in the population that are classified as young. Percent decadence has gone down since 1982. Biotic potential is good with 28% of the population still being classified as young.

The herbaceous understory makes up 35% of the total vegetation cover with 12 perennial grasses and 44 perennial forbs encountered in 1995. Dominant grasses include mutton grass, thickspike wheatgrass, Kentucky bluegrass, and Sandberg bluegrass. Forbs are very diverse with many useful species present yet none are very abundant.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable. There is little evidence for any extensive soil movement. Vegetative trend, at least with respect to the browse component, is more questionable. A stable condition may currently exist, but the potential for a decline is present. The area is receiving heavy use over a large part of the year, the effect of which is unclear at present. Careful monitoring of shrub populations should provide some answers in the near future.

1988 TREND ASSESSMENT

Ground cover percentages are fairly constant. The slight increases in vegetative, litter and rock cover led to a decrease in the percentage of bare soil to about 17%. Soil movement is minimal. Browse trend is up. The age structure of snowberry and serviceberry suggest that the populations are increasing, and serviceberry did increase significantly in density since 1982. Eighty percent of the serviceberry were classified as seedlings or young shrubs, as were 71% of the snowberry. The age structure of the sagebrush population has not changed since 1982 and it has declined slightly in numbers. The most significant trend is the reduction in the number of heavily hedged shrubs; down from 21% of the total in 1982 to 3% in 1988. Vigor is apparently improving. Another indicator of a positive trend is the prevalence of young plants in the populations of the key browse species. There is not much sign of recent use by big game. Trend for the herbaceous understory is up with increased frequency grasses and forbs. A total of 40 species of forbs were encountered in the nested frequency plots, up from 20 species in 1982. Most occur only occasionally, but as a group, the forbs constitute an important source of forage at this high-elevation winter range site. Eaton fleabane, desert phlox, lupine, rock goldenrod, and looseflower milkvetch continue to top the list of the most frequent forbs. The increase in total forb frequency is very consequential, from 169 to 457 occurrences.

TREND ASSESSMENT

soil - stable

browse - up for key species

herbaceous understory - up

1995 TREND ASSESSMENT

Trend for ground cover is slightly improved. Percent bare ground declined to only 7%, down from almost 17%. Percent cover of litter declined, however litter and vegetative cover are adequate to protect the soil surface. Trend for browse is improved slightly since 1988 for key species due to reduced heavy use, improved vigor, and lower decadency rates. Trend for the herbaceous understory is down for grasses and stable for forbs. Overall, the herbaceous trend is slightly down but will likely rebound with normal precipitation patterns.

TREND ASSESSMENT

soil - up slightly

browse - improved for key species

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 12, Study no: 7

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	289	200	44	111	78	2.40
G	Agropyron spicatum	-	2		-	1	.03
G	Bouteloua gracilis	13	*-	-	7	-	-
G	Bromus anomalus	3	*-	-	2	-	-
G	Carex spp.	99	*93	18	42	41	.35
G	Koeleria cristata	19	*18	21	11	9	.15

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Poa fendleriana</i>	-	*192	-	-	66	4.03
G	<i>Poa pratensis</i>	113	*76	1	51	26	1.81
G	<i>Poa secunda</i>	264	*67	54	87	28	.92
G	<i>Sitanion hystrix</i>	-	1	1	-	1	.00
G	<i>Stipa comata</i>	2	*27	7	1	11	.29
G	<i>Stipa lettermani</i>	20	*25	2	13	9	.11
Total for Grasses		822	701	148	325	270	10.13
F	<i>Agoseris glauca</i>	3	13	-	1	6	.03
F	<i>Allium cernuum</i>	24	*17	-	14	8	.07
F	<i>Antennaria rosea</i>	1	22	-	1	10	.22
F	<i>Arabis</i> spp.	4	*2	-	3	1	.00
F	<i>Astragalus convallarius</i>	61	*34	-	30	16	.42
F	<i>Astragalus spatulatus</i>	10	*-	-	3	-	-
F	<i>Astragalus tenellus</i>	71	*29	-	38	14	.56
F	<i>Aster</i> spp.	39	*47	3	16	19	.35
F	<i>Astragalus</i> spp.	7	*-	12	3	-	-
F	<i>Balsamorhiza hookeri</i>	23	*30	6	12	12	.36
F	<i>Balsamorhiza sagittata</i>	-	-	-	-	-	.03
F	<i>Castilleja chromosa</i>	13	20	4	6	9	.26
F	<i>Castilleja linariaefolia</i>	4	22	-	3	10	.18
F	<i>Calochortus nuttallii</i>	-	*39	-	-	17	.49
F	<i>Chaenactis douglasii</i>	1	3	-	1	2	.03
F	<i>Cirsium undulatum</i>	14	*9	-	8	5	.07
F	<i>Collomia linearis</i>	-	27	-	-	13	.16
F	<i>Comandra pallida</i>	53	*50	-	23	22	.21
F	<i>Collinsia parviflora</i>	-	35	-	-	15	.29
F	<i>Crepis acuminata</i>	14	43	-	7	23	.32
F	<i>Cryptantha</i> spp.	-	-	2	-	-	-
F	<i>Cymopterus</i> spp.	-	*52	-	-	26	.15
F	<i>Cynoglossum officinale</i>	-	2	-	-	1	.00
F	<i>Eriogonum alatum</i>	7	*28	-	4	11	.10
F	<i>Eriogonum corymbosum</i>	-	2	-	-	1	.15
F	<i>Erigeron eatonii</i>	97	*55	-	41	22	.53
F	<i>Erigeron pumulus</i>	-	-	10	-	-	-
F	<i>Erigeron</i> spp.	-	-	12	-	-	-
F	<i>Eriogonum racemosum</i>	-	-	2	-	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Eriogonum umbellatum</i>	5	*14	-	3	6	.27
F	<i>Euphorbia brachycera</i>	1	-	2	1	-	-
F	<i>Geranium richardsonii</i>	-	1	-	-	1	.03
F	<i>Hymenoxys acaulis</i>	24	*4	-	9	3	.06
F	<i>Lesquerella</i> spp.	3	*-	-	1	-	-
F	<i>Linum lewisii</i>	3	*-	-	1	-	-
F	<i>Lithospermum</i> spp.	14	*8	-	8	3	.01
F	<i>Lomatium</i> spp.	2	5	-	1	2	.01
F	<i>Lupinus argenteus</i>	77	*54	22	39	26	.98
F	<i>Lychnis drummondii</i>	-	*5	-	-	2	.01
F	<i>Lygodesmia grandiflora</i>	-	1	-	-	1	.01
F	<i>Orthocarpus tolmiei</i>	11	23	2	5	11	.17
F	<i>Penstemon caespitosus</i>	10	*10	2	5	6	.10
F	<i>Penstemon dolius</i>	8	*7	-	3	4	.21
F	<i>Penstemon</i> spp.	22	*28	-	12	13	.16
F	<i>Penstemon pachyphyllus</i>	-	1	-	-	1	.01
F	<i>Petradoria pumila</i>	59	*24	26	28	9	.72
F	<i>Penstemon speciosus</i>	1	-	3	1	-	-
F	<i>Phlox austromontana</i>	93	*71	-	40	27	.94
F	<i>Phlox longifolia</i>	45	*63	8	19	25	.22
F	<i>Phlox</i> spp.	8	*-	32	2	-	-
F	<i>Physaria</i> spp.	-	3	-	-	1	.00
F	<i>Polygonum douglasii</i>	-	16	-	-	7	.03
F	<i>Potentilla gracilis</i>	18	*17	3	11	11	.13
F	<i>Schoenocrambe linifolia</i>	-	*3	-	-	1	.00
F	<i>Senecio multilobatus</i>	70	*6	7	33	2	.01
F	<i>Sphaeralcea coccinea</i>	31	*20	8	13	10	.10
F	<i>Taraxacum officinale</i>	16	16	-	7	5	.05
F	Unknown forb per.	-	-	3	-	-	-
F	<i>Viguiera multiflora</i>	3	*-	-	1	-	-
F	<i>Zigadenus</i> spp.	-	*3	-	-	1	.00
Total for Forbs		970	984	175	457	441	9.36
B	<i>Amelanchier alnifolia</i>	42	*41	15	20	18	6.88
B	<i>Artemisia nova</i>	92	*53	32	40	23	4.39
B	<i>Artemisia tridentata vaseyana</i>	33	*39	29	17	19	8.00

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
B	Chrysothamnus depressus	-	*4	-	-	2	.06
B	Chrysothamnus viscidiflorus lanceolatus	39	*47	20	20	24	2.43
B	Eriogonum microthecum	-	-	1	-	-	-
B	Echinocactus spp.	-	*3	-	-	2	.01
B	Gutierrezia sarothrae	23	*14	2	10	6	.18
B	Mahonia repens	4	*5	5	3	2	.18
B	Opuntia spp.	-	-	1	-	-	-
B	Prunus virginiana	-	-	1	-	-	-
B	Purshia tridentata	12	13	5	5	5	2.84
B	Ribes cereum cereum	-	1	-	-	1	.03
B	Symphoricarpos oreophilus	108	*122	27	43	45	11.79
B	Tetradymia canescens	4	*1	-	3	1	.03
Total for Browse		357	343	138	161	148	36.84

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

BASIC COVER --

Herd unit 12, Study no: 7

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	356	8.50	13.00	50.28
Rock	196	6.50	9.00	11.72
Pavement	130	2.25	4.50	.95
Litter	390	54.75	57.00	48.87
Cryptograms	4	1.75	0	.01
Bare Ground	186	25.50	16.50	7.05

PELLET GROUP FREQUENCY --

Herd unit 12, Study no: 7

Type	Quadrat Frequency '95
Rabbit	2
Elk	20
Deer	12
Cattle	4

BROWSE CHARACTERISTICS --  
Herd unit 12, Study no: 7

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	2	-	-	-	-	-	-	2	-	-	-	133		2	
	88	22	-	-	3	-	-	-	-	-	25	-	-	-	1666		25	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	1	3	-	-	2	-	-	-	5	1	-	-	400		6	
	88	15	8	6	2	1	-	2	-	-	27	3	3	1	2266		34	
	95	12	3	1	-	-	-	-	-	-	16	-	-	-	320		16	
M	82	3	4	9	-	5	2	-	-	-	21	2	-	-	1533	45 18	23	
	88	2	3	3	1	-	-	-	2	-	11	-	-	-	733	47 31	11	
	95	16	11	5	4	3	6	-	-	-	45	-	-	-	900	35 41	45	
D	82	-	-	2	-	-	-	1	-	-	2	-	1	-	200		3	
	88	-	3	-	1	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'82	2133	Dec:	9%				
											'88	3265		8%				
											'95	1240		1%				
<i>Artemisia nova</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	95	-	-	-	10	-	-	-	-	-	10	-	-	-	200		10	
Y	82	11	1	-	-	-	-	-	-	-	12	-	-	-	800		12	
	88	11	2	-	-	-	-	-	-	-	13	-	-	-	866		13	
	95	54	5	1	-	-	-	-	-	-	60	-	-	-	1200		60	
M	82	2	11	1	-	-	-	-	-	-	13	-	1	-	933	12 15	14	
	88	4	5	-	1	-	-	-	-	-	10	-	-	-	666	9 14	10	
	95	41	91	10	3	-	-	-	-	-	145	-	-	-	2900	10 21	145	
D	82	1	1	1	-	-	-	-	-	-	1	-	2	-	200		3	
	88	3	1	-	-	-	-	-	-	-	1	-	1	2	266		4	
	95	4	7	2	-	-	-	-	-	-	3	-	-	10	260		13	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	260		13	
Total Plants/Acre (excluding Dead & Seedlings)											'82	1933	Dec:	10%				
											'88	1798		14%				
											'95	4360		5%				

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
Y	82	5	2	-	1	-	-	-	-	-	8	-	-	-	533		8	
	88	4	1	-	1	-	-	-	-	-	6	-	-	-	400		6	
	95	2	3	-	1	1	-	-	-	-	7	-	-	-	140		7	
M	82	17	9	2	-	5	-	-	-	-	30	1	2	-	2200	18	16	33
	88	23	5	-	-	-	-	-	-	-	27	-	1	-	1866	18	14	28
	95	29	62	10	2	1	-	-	-	-	98	-	6	-	2080	21	29	104
D	82	3	4	5	-	-	-	-	-	-	-	-	11	1	800		12	
	88	6	4	1	-	-	-	1	-	-	9	-	3	-	800		12	
	95	3	6	-	1	-	-	-	-	-	5	-	-	5	200		10	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3533	Dec:	22%			
												'88	3066		26%			
												'95	2420		8%			
<i>Chrysothamnus depressus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	95	1	-	-	2	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	-	8	-	-	-	-	-	-	5	-	3	-	533	2	6	8
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	5	1
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6	12	2
Total Plants/Acre (excluding Dead & Seedlings)												'82	533	Dec:	-			
												'88	532		-			
												'95	100		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	4	1	2	-	-	-	-	-	-	6	-	1	-	466		7	
	88	69	-	-	-	-	-	1	-	-	70	-	-	-	4666		70	
	95	26	-	-	1	-	-	-	-	-	27	-	-	-	540		27	
M	82	6	9	37	1	4	-	-	-	-	41	3	13	-	3800	8	12	57
	88	29	1	-	-	-	-	1	-	-	31	-	-	-	2066	10	12	31
	95	117	1	-	15	1	-	-	-	-	134	-	-	-	2680	12	13	134
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	4266	Dec:	0%			
												'88	6798		0%			
												'95	3220		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Echinocactus</i> spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Eriogonum corymbosum</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	12	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	22	-	-	-	-	-	-	-	-	22	-	-	-	440	8	10	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	580		-			
<i>Mahonia repens</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	6	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	4	-	-	1	-	-	-	5	-	-	-	333	13	19	
	88	-	-	4	-	-	-	-	-	-	4	-	-	-	266	17	23	
	95	8	6	1	-	9	-	-	-	-	24	-	-	-	480	16	38	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	333	Dec:	0%			
												'88	399		0%			
												'95	520		3%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Ribes cereum cereum</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20	29	52	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Symphoricarpos oreophilus</i>																		
S	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	88	22	-	-	-	-	-	12	-	-	31	-	3	-	2266			34
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	82	41	6	-	12	-	-	-	-	-	51	8	-	-	3933			59
	88	128	6	-	1	-	-	4	-	-	134	-	5	-	9266			139
	95	71	5	10	6	-	-	-	-	-	92	-	-	-	1840			92
M	82	67	55	8	20	-	-	-	-	-	129	17	4	-	10000	19	23	150
	88	53	3	1	10	-	-	3	-	-	70	-	-	-	4666	18	17	70
	95	75	40	2	11	-	-	-	-	-	128	-	-	-	2560	16	28	128
D	82	-	3	-	-	-	-	-	-	-	-	-	3	-	200			3
	88	1	1	-	-	-	-	-	-	-	1	-	1	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	14133	Dec:	1%			
												'88	14065		0%			
												'95	4400		0%			
<i>Tetradymia canescens</i>																		
Y	82	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	88	6	-	-	1	-	-	-	-	-	7	-	-	-	466			7
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200	4	3	3
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	9	8	7
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	666		-			
												'95	240		-			

PERCENT BROWSE COMPOSITION--

Herd unit 12, Study no: 7

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	8	11	7
<i>Artemisia nova</i>	7	6	25
<i>Artemisia tridentata vaseyana</i>	13	10	14
<i>Chrysothamnus depressus</i>	2	2	.58
<i>Chrysothamnus viscidiflorus lanceolatus</i>	16	22	19
<i>Echinocactus spp.</i>	0	0	.23
<i>Eriogonum corymbosum</i>	0	0	.23
<i>Gutierrezia sarothrae</i>	0	0	3
<i>Mahonia repens</i>	0	0	.23
<i>Purshia tridentata</i>	1	1	3
<i>Ribes cereum cereum</i>	0	0	.11
<i>Symphoricarpos oreophilus</i>	52	46	26
<i>Tetradymia canescens</i>	.24	2	1

TREND STUDY 12-8-95

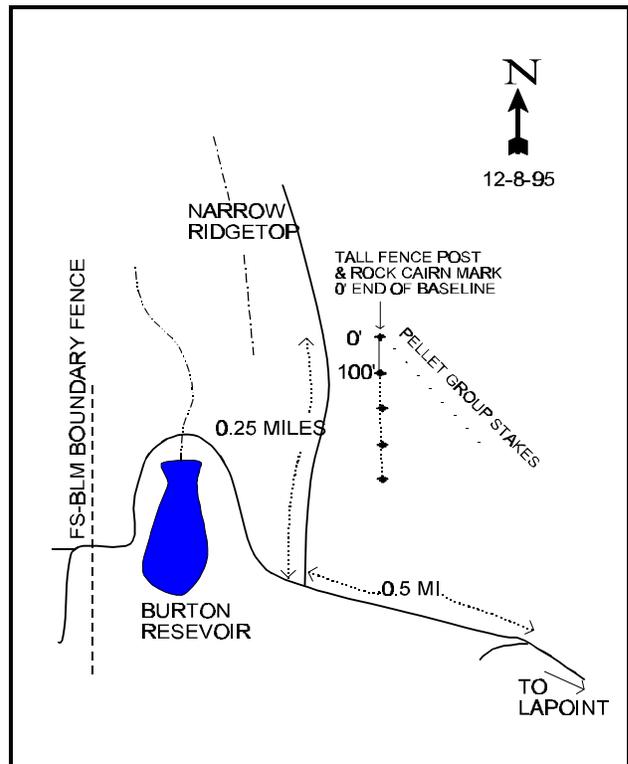
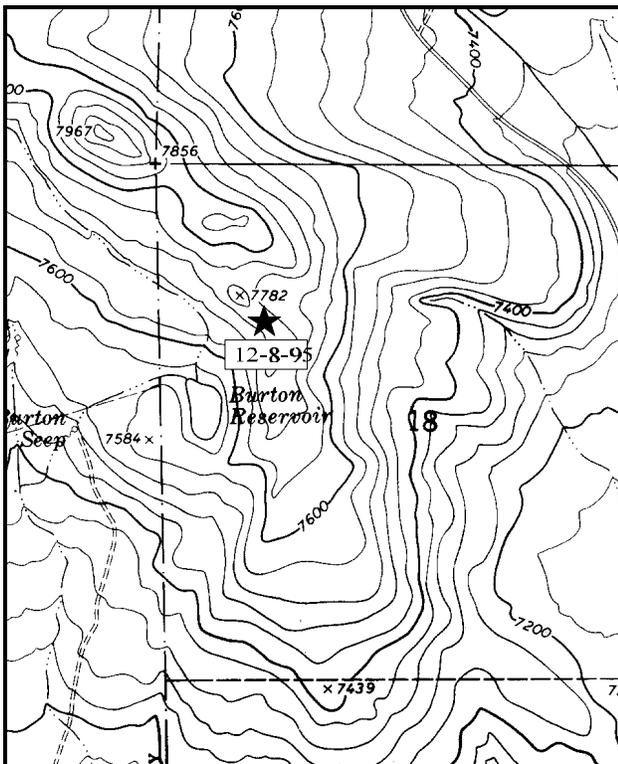
Study site name: Mosby Mountain South. Range type: Mixed Mountain Brush.

Compass bearing: frequency baseline 182 degrees.

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

LOCATION DESCRIPTION

Just east of Lapoint, turn north from highway 121. Go 6.9 miles to a fork, keep left toward Mosby Mountain. Proceed 4.8 miles to a cattleguard and turn left off the paved road. Go .15 miles to a 3-way intersection, bear left on the main road. Continue .45 miles to a fork, stay left. Go .2 miles to another fork, stay to the right. Go .5 miles to an intersection on the ridge above Burton Reservoir. Drive .25 miles north on the rocky road to the study site. A tall fencepost which marks the location of a pellet group transect is also the 0-foot baseline stake. It is marked by browse tag #7870. The frequency baseline stakes are short green fenceposts.



Map Name: Lake Mountain

Diagrammatic Sketch

Township 3S Range 19E, Section 18

GPS COOR. 5-98-209E 12 44-90-352N

## DISCUSSION

### Trend Study No. 12-8

This study was established in 1988 to sample a key area that was missed in 1982. The site is located on a narrow ridge top which drops off sharply to Burton Reservoir to the west and a sagebrush and pinyon-juniper valley to the east. The slope at the site is gentle, 2-3%, with an aspect to the southeast. Elevation is about 8,000 feet. Springs are common in the area and most have been developed for cattle. Evidence of sage grouse was observed on this site during study establishment. A large fire burned the entire area after the initial reading in 1988 and much of the sagebrush was eradicated.

The soil is moderately rocky and shallow. Rocks of all sizes are distributed throughout the soil profile and continuously over the surface. The estimate of about 17% rock cover was moderately high in 1988, but this increased after the fire to 27% by 1995. There was a considerable amount of litter cover (67%) in addition to the extensive shrub cover in 1988 providing good soil protection. Litter cover declined after the fire, but is currently moderately high at 46%. However, percent bare ground is currently low at 4% and erosion is minimal.

Mountain big sagebrush is currently the dominant shrub on this site while contributing 30% of the total browse cover. The population appeared stable in 1988 with an estimated 7,533 plants per acre. The proportion of decadent plants (33%) was offset by the high proportion of young (32%) and seedling plants (3%). Mountain big sagebrush canopy cover was estimated to average 20%. At this elevation, the sagebrush shows evidence of only light to moderate hedging. Black sagebrush was abundant and density increased where soils were more shallow. It showed only light to moderate hedging. Bitterbrush and serviceberry were scattered throughout the area at relatively lower densities, although bitterbrush was more abundant. These species were utilized to a greater extent by mule deer and the majority of the plants appeared heavily hedged. The most preferred browse species show evidence of stress from drought and insect damage, while the big sagebrush appears vigorous.

After the fire, density of all shrub species declined but none were lost. Currently the key species is mountain big sagebrush, black sagebrush, bitterbrush, and serviceberry. Mountain big sagebrush density dropped from 7,533 plants/acre to 2,100. No seedlings were encountered and young plants numbered only 140 plants/acre. Percent decadency increased to 54% but vigor is good and use is generally light to moderate. Only 240 plants/acre of black sagebrush now occupy the site. Use is heavy on 33% of the shrubs, but vigor is good and percent decadency has declined to 16%. Bitterbrush density declined slightly after the fire but the surviving plants are less heavily hedged and are in good vigor.

During the initial 1988 reading a significant amount of cheatgrass in the understory was reported. Currently cheatgrass has the highest nested frequency of any species and accounts for 21% of the grass cover. The most common perennial grasses sampled in 1988 were bottlebrush squirreltail, bluebunch wheatgrass, and Sandberg bluegrass. The available grasses had been heavily grazed by cattle. After the fire, needle-and-thread grass, crested wheatgrass, and thickspike wheatgrass are the most abundant and account for 65% of the grass cover.

Forbs are not common, but 15 perennial species were encountered in the frequency plots in 1988 and 14 species in 1995. Currently hairy goldaster and silvery lupine are the most common, these two species account for 86% of the forb cover.

1995 TREND ASSESSMENT

The soil trend is stable. Litter cover declined due to the fire but there is still adequate soil protection. Currently percent bare ground is only 4%. The browse trend is down with reduced densities of all species encountered in 1988. The key species, mountain big sagebrush, had a 72% decline in density and a high rate of decadence (54%) for it is not as tolerant of fire as the other species. Recruitment is also poor with no seedlings encountered and only 140 young plants/acre were estimated. Vigor was good on most browse, with the density expected to eventually increase in time. Trend for the preferred bitterbrush is slightly up due to a consistent mature population, low decadency, reduced heavy use, and more tolerance to fire. Trend for the herbaceous understory is up with increased sum of nested frequency for grasses and forbs.

TREND ASSESSMENT

soil - stable

browse - down due to fire, but will increase in time

herbaceous understory - up

VEGETATIVE TRENDS --

Herd unit 12, Study no: 8

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron cristatum	-	*144	-	54	3.26
G	Agropyron dasystachyum	-	*74	-	26	1.99
G	Agropyron intermedium	-	*32	-	11	.32
G	Agropyron spicatum	93	*31	41	12	.61
G	Bouteloua gracilis	27	*3	14	1	.03
G	Bromus tectorum	-	298	-	91	3.60
G	Carex spp.	7	9	4	4	.02
G	Poa fendleriana	-	*4	-	2	.03
G	Poa pratensis	25	*40	10	16	.88
G	Poa secunda	66	*2	31	1	.00
G	Sitanion hystrix	155	*40	64	18	.31
G	Sporobolus cryptandrus	-	2	-	1	.00
G	Stipa comata	20	*181	10	66	5.77
G	Stipa spp.	11	*-	4	-	-
Total for Grasses		404	860	178	303	16.86
F	Allium spp.	-	5	-	2	.01
F	Arabis spp.	7	*3	4	1	.00
F	Astragalus purshii	8	*-	3	-	-
F	Aster spp.	-	4	-	2	.01
F	Balsamorhiza hookeri	-	*3	-	3	.04
F	Chenopodium leptophyllum	-	14	-	5	.02

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	<i>Collomia linearis</i>	-	29	-	15	.07
F	<i>Comandra pallida</i>	3	-	1	-	-
F	<i>Collinsia parviflora</i>	-	8	-	3	.01
F	<i>Cryptantha</i> spp.	-	1	-	1	.00
F	<i>Descurainia pinnata</i>	-	8	-	3	.01
F	<i>Draba</i> spp.	-	1	-	1	.03
F	<i>Erigeron</i> spp	-	1	-	1	.03
F	<i>Eriogonum racemosum</i>	25	*6	10	4	.16
F	<i>Heterotheca villosa</i>	18	*142	9	59	4.69
F	<i>Hymenoxys acaulis</i>	2	1	2	1	.00
F	<i>Lappula occidentalis</i>	-	3	-	2	.01
F	<i>Lepidium</i> spp.	-	44	-	21	.15
F	<i>Lupinus argenteus</i>	13	41	5	21	1.75
F	<i>Oenothera pallida</i>	1	-	1	-	-
F	<i>Penstemon</i> spp.	5	5	2	3	.04
F	<i>Petradoria pumila</i>	8	*3	4	1	.15
F	<i>Phlox longifolia</i>	9	*-	3	-	-
F	<i>Polygonum douglasii</i>	-	29	-	14	.07
F	<i>Sedum</i> spp.	1	-	1	-	-
F	<i>Senecio multilobatus</i>	1	4	1	2	.01
F	<i>Sphaeralcea coccinea</i>	5	11	2	4	.09
F	<i>Taraxacum officinale</i>	-	3	-	2	.01
F	<i>Tragopogon dubius</i>	-	*10	-	7	.06
Total for Forbs		106	379	48	178	7.49
B	<i>Amelanchier utahensis</i>	6	*6	3	3	1.94
B	<i>Artemisia nova</i>	-	2	-	2	.18
B	<i>Artemisia tridentata</i> <i>vaseyana</i>	70	*21	32	11	2.27
B	<i>Chrysothamnus viscidiflorus</i>	-	-	-	-	.15
B	<i>Echinocactus</i> spp.	1	7	1	4	.45
B	<i>Eriogonum heracleoides</i>	-	*9	-	3	.66
B	<i>Gutierrezia sarothrae</i>	1	11	1	4	.31
B	<i>Opuntia</i> spp.	28	*18	14	9	.41
B	<i>Purshia tridentata</i>	89	*8	45	5	1.16
Total for Browse		195	82	96	41	7.55

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 12, Study no: 8

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	374	7.50	40.06
Rock	323	16.50	26.87
Pavement	90	1.00	2.96
Litter	383	67.00	46.25
Cryptograms	23	0	.12
Bare Ground	127	8.00	3.95

PELLET GROUP FREQUENCY --

Herd unit 12, Study no: 8

Type	Quadrat Frequency '95
Rabbit	3
Elk	30
Deer	19
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 12, Study no: 8

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Amelanchier utahensis																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	2	6	-	-	-	-	-	-	5	-	4	-	600			9
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	7	2	-	-	-	-	-	-	10	-	1	-	220	25	34	11
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	600		-			
												'95	220		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia nova</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	12	3	-	-	-	-	-	-	-	15	-	-	-	1000		15	
	95	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	1	3	-	-	-	-	-	-	-	4	-	-	-	266	12	20	
	95	-	4	1	-	1	2	-	-	-	8	-	-	-	160	7	18	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	8	14	2	-	-	-	-	-	-	22	-	1	1	1600		24	
	95	-	1	1	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	2866		55%			
												'95	240		16%			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	14	22	-	-	-	-	-	-	-	36	-	-	-	2400		36	
	95	5	1	1	-	-	-	-	-	-	7	-	-	-	140		7	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	23	14	1	1	-	-	-	-	-	38	1	-	-	2600	14	21	
	95	12	29	-	-	-	-	-	-	-	41	-	-	-	820	10	16	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	18	17	3	-	-	-	-	-	-	36	-	1	1	2533		38	
	95	-	20	1	-	-	-	-	-	-	20	-	-	1	420		21	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	900		45	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	7533		33%			
												'95	1380		30%			
<i>Ceanothus fendleri</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	31	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Chrysothamnus nauseosus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24	24	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	12	17	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<i>Echinocactus spp.</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	2	3	4
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	120		-			
<i>Eriogonum heracleoides</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	5	22	7
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	140		-			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	29	-	-	-	-	-	-	-	-	29	-	-	-	1933	6	6	29
	95	21	-	-	-	-	-	-	-	-	21	-	-	-	420	7	9	21
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	1999		3%			
												'95	440		0%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	25	-	-	-	-	-	-	-	-	23	-	2	-	1666		25	
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	10	
	95	22	-	-	-	-	-	-	-	-	22	-	-	-	440	3	10	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	1732		-			
												'95	580		-			
Purshia tridentata																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	1	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	5	-	-	-	-	-	-	5	-	-	-	333	12	43	
	95	2	6	5	-	-	2	-	-	-	15	-	-	-	300	7	26	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	466		-			
												'95	320		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 12, Study no: 8

Species	Percent of total '88 '95	
	Amelanchier utahensis	4
Artemisia nova	19	7
Artemisia tridentata vaseyana	50	39
Ceanothus fendleri	0	0
Chrysothamnus nauseosus	0	0
Chrysothamnus viscidiflorus	0	2
Echinocactus spp.	0	3
Eriogonum heracleoides	0	4
Gutierrezia sarothrae	13	13
Opuntia spp.	11	17
Purshia tridentata	3	9

TREND STUDY 12-9-95(23B-1)

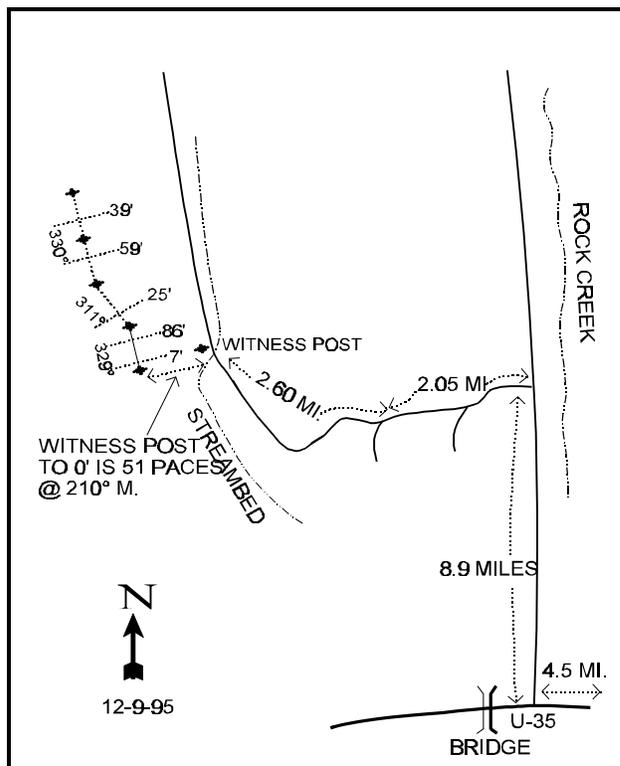
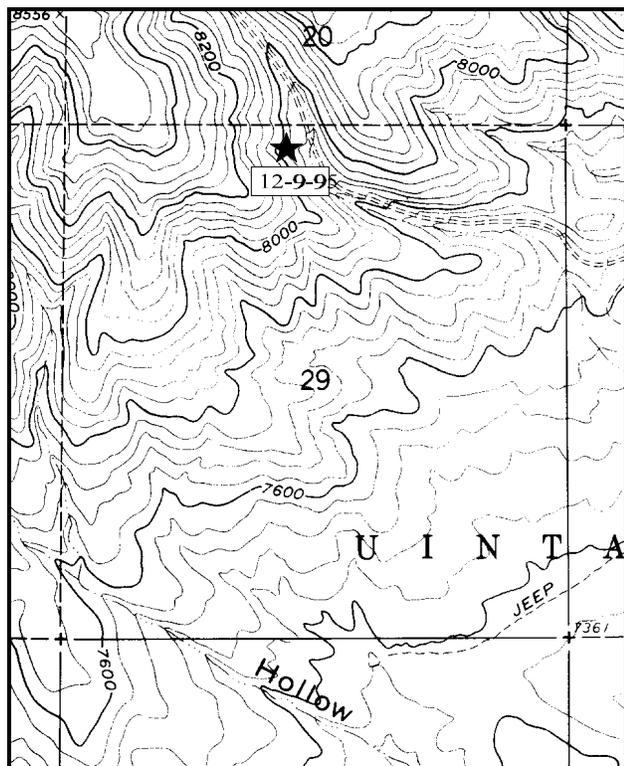
Study site name: Seep Hollow. Range type: Mountain Brush.

Compass bearing: frequency baseline 344 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (7 & 86ft), line 2 (25ft), line 3 (59ft), line 4 (39ft).

LOCATION DESCRIPTION

From highway U-87, turn onto highway U-35 and travel west to the Rock Creek Road. Turn right onto Rock Creek Road and go north for 8.95 miles to a road on the left. Turn and travel west 2.05 miles to a fork. Bear right and proceed 2.6 miles to a streambed. From the intersection of the road and the streambed, the 0-foot baseline stake is 65 paces away at the hearing of 236 degrees. The frequency baseline stakes are marked by green fenceposts 12-18 inches in height.



Map Name: Blacktail Mountain

Diagrammatic Sketch

Township 1S, Range 6W, Section 29

GPS COOR. 5-35-077E 12 44-68-868N

## DISCUSSION

### Trend Study No.12-9 (13-1)

This trend study used to be in the Current Creek deer herd unit (#13) but is now within the South Slope deer herd unit. This study is on deer and elk winter range in the Seep Hollow-Dry Mountain Hollow area. Elevation is slightly below 8,000 feet on a northeast exposure with a steep 50% to 60% slope. The site may not be accessible during severe winters. The range type is mixed mountain brush on land owned by the Ute Indian Tribe.

Soils are coarse and very rocky on the surface. Rocks range in size from a few inches to more than a foot in diameter. Excluding rock, litter and vegetative cover are excellent and considering slope steepness, erosion is minimal.

Browse dominates the site by providing 65% of the total vegetative cover. Key species include mountain big sagebrush, serviceberry, and true mountain mahogany. Serviceberry currently provides 27% of the browse cover with an estimated density of 920 plants/acre. Mature plants number approximately 640 plants/acre averaging nearly 5 feet in height. Nine percent of the mature serviceberry were classified as unavailable due to height. There were 333 mature plants/acre estimated in 1982 and 66 in 1988. The change in density is partly the result of the larger sample used in 1995 which tripled the original sample size. Utilization is currently light to moderate with good vigor.

Mountain big sagebrush density has remained fairly stable with 2,666 plants/acre estimated in 1982 and 2,440 in 1995. No seedlings were encountered during any sampling date. Young plants, with the exception of 1988 (400/acre), are scarce. It appears that this population is becoming increasingly mature with limited reproduction. Percent decadency was 15% in 1982, increasing to 31% in 1988. Currently percent decadency is 13%, but 29% of those decadent plants were classified as dying. Dead sagebrush number 560 plants/acre or 1 dead plant to every 4 live plants. This is a very high ratio. Utilization of mountain big sagebrush is light to moderate with some individuals being heavily hedged. Vigor is generally good.

True Mountain mahogany currently makes up 15% of the browse cover with an estimated density of 680 plants/acre. Mature plants average about 4 feet in height, are moderately hedged, and in good vigor. Density has remained fairly constant since 1982.

Two other browse species that are of importance would be bitterbrush and snowberry. Together they provide 18% of the browse cover. They occur in moderate numbers, respectively 540 and 2,340 plants/acre. They currently show light use and are in good vigor with none classified as decadent.

The herbaceous understory is dominated by perennial grasses which account for 61% of the herbaceous cover. Bluebunch wheatgrass, needle-and-thread, mutton grass, and a Carex are the most common grass. All of these species have increased in sum of nested frequency since 1988. Forbs are diverse with 24 perennial species counted in 1995. Common perennial species include biscuitroot, littleleaf alumroot, spring parsley, and arrowleaf balsamroot.

### 1982 APPARENT TREND ASSESSMENT

Soil and vegetative trend both appear stable. Although the site is on a steep slope, a good vegetative and litter cover limit soil loss. The browse component is in generally good condition and does not suffer from heavy use. A reasonable management objective might be to encourage expansion of true mountain mahogany and antelope bitterbrush. Hopefully, this could be achieved at the expense of

low rabbitbrush and pricklypear.

1988 TREND ASSESSMENT

On this steep slope, ground cover is especially important as soil protection. Ground cover percentages are almost unchanged from 1982 and currently soil erosion is not a problem. The community is basically stable, but data comparisons between readings in 1982 and 1988 do indicate a few significant changes. There was a rather large decrease in the number of snowberry encountered on the density plots, but the other large browse species have maintained stable populations. Mountain big sagebrush appears to be more moderately hedged in recent years, in contrast to the lightly hedged growth form reported in 1982. Still, the key browse species have good vigor and adequate recruitment. In the understory, there has been an increase in the frequency and density of western wheatgrass. A decrease in forb density was noted, along with an increase in the number of several small shrubs such as slenderbush eriogonum, Oregon grape, low rabbitbrush, and pricklypear cactus.

TREND ASSESSMENT

soil - stable

browse - stable for key species

herbaceous understory - stable

1995 TREND ASSESSMENT

Trend for soil is improved with a decline in percent bare ground from about 14% to almost 4%. Nested frequency of grasses and forbs also increased providing additional soil protection. Trend for key browse species is improving slightly for serviceberry, true mountain mahogany, bitterbrush, and snowberry; but stable for the most abundant shrub, mountain big sagebrush which provides 27% of the browse cover. The population of sagebrush is becoming increasingly mature with no seedlings and few young observed. Density of the less desirable shrubs like mountain low rabbitbrush and wyeth eriogonum appear stable. Trend for the herbaceous understory is up with increased sum of nested frequency for perennial grasses and forbs. The four most abundant grasses all increased in nested frequency since 1988.

TREND ASSESSMENT

soil - up

browse - stable for sagebrush and slightly up for serviceberry, mountain mahogany, bitterbrush, and snowberry

herbaceous understory - up

VEGETATIVE TRENDS --

Herd unit 12, Study no: 9

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	82	*66	2	33	25	.93
G	Agropyron spicatum	157	*160	52	64	55	2.94
G	Bromus tectorum	-	14	-	-	6	.08
G	Carex spp.	21	58	17	12	25	1.12
G	Koeleria cristata	9	*2	2	4	2	.04
G	Oryzopsis hymenoides	13	1	2	5	1	.03

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Poa fendleriana</i>	122	*124	35	50	47	2.27
G	<i>Poa secunda</i>	15	23	33	8	9	.48
G	<i>Sitanion hystrix</i>	-	11	2	-	4	.08
G	<i>Stipa comata</i>	68	*119	41	29	50	4.09
Total for Grasses		487	578	186	205	224	12.09
F	<i>Allium</i> spp.	-	3	-	-	1	.00
F	<i>Antennaria rosea</i>	-	*11	-	-	4	.07
F	<i>Arabis</i> spp.	2	-	7	1	-	-
F	<i>Artemisia ludoviciana</i>	-	*4	-	-	2	.18
F	<i>Astragalus</i> spp.	-	*5	1	-	2	.01
F	<i>Balsamorhiza sagittata</i>	-	1	2	-	1	.15
F	<i>Castilleja linariaefolia</i>	17	*5	-	8	2	.06
F	<i>Calochortus nuttallii</i>	-	*13	-	-	7	.04
F	<i>Chenopodium leptophyllum</i>	-	2	-	-	2	.01
F	<i>Cirsium</i> spp.	7	7	-	4	4	.21
F	<i>Collomia linearis</i>	-	119	-	-	55	.62
F	<i>Comandra pallida</i>	34	*29	13	16	12	.21
F	<i>Collinsia parviflora</i>	-	244	-	-	82	1.53
F	<i>Crepis acuminata</i>	-	*19	-	-	11	.21
F	<i>Cryptantha</i> spp.	7	*-	4	3	-	-
F	<i>Cymopterus</i> spp.	-	*32	-	-	16	.57
F	<i>Descurainia</i> spp.	-	11	-	-	5	.05
F	<i>Draba</i> spp.	-	67	-	-	20	.20
F	<i>Erigeron eatonii</i>	-	1	-	-	1	.00
F	<i>Erigeron flagellaris</i>	4	4	-	2	2	.04
F	<i>Eriogonum racemosum</i>	-	*7	-	-	4	.04
F	<i>Eriogonum umbellatum</i>	-	-	9	-	-	-
F	<i>Gayophytum ramosissimum</i>	-	5	-	-	2	.01
F	<i>Heuchera parvifolia</i>	-	*41	23	-	18	.93
F	<i>Lappula occidentalis</i>	-	3	-	-	2	.01
F	<i>Lithospermum ruderales</i>	-	*5	-	-	3	.21
F	<i>Lomatium</i> spp.	20	51	22	9	24	.98
F	<i>Penstemon</i> spp.	11	3	4	4	1	.15
F	<i>Penstemon procerus</i>	-	*11	-	-	5	.12
F	<i>Petradoria pumila</i>	-	3	-	-	1	.03
F	<i>Polygonum douglasii</i>	-	20	-	-	11	.05

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Senecio integerrimus</i>	13	*12	3	6	6	.05
F	<i>Sedum lanceolatum</i>	-	4	-	-	2	.01
F	<i>Sphaeralcea coccinea</i>	-	2	-	-	1	.03
F	<i>Stellaria jamesiana</i>	-	4	-	-	2	.01
Total for Forbs		115	748	88	53	311	6.84
B	<i>Amelanchier alnifolia</i>	41	*31	16	20	14	9.44
B	<i>Artemisia tridentata</i> <i>vaseyana</i>	49	*22	23	20	12	8.63
B	<i>Cercocarpus montanus</i>	-	*15	-	-	8	5.23
B	<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	20	*14	16	9	7	.88
B	<i>Echinocactus</i> spp.	-	2	-	-	1	.03
B	<i>Eriogonum heracleoides</i>	62	*65	20	28	26	2.42
B	<i>Mahonia repens</i>	-	3	-	-	1	.00
B	<i>Opuntia</i> spp.	28	*37	9	12	15	.37
B	<i>Pinus edulis</i>	4	7	2	2	3	1.04
B	<i>Prunus virginiana</i>	-	-	-	-	-	.03
B	<i>Purshia tridentata</i>	23	17	13	10	7	2.42
B	<i>Symphoricarpos oreophilus</i>	51	53	26	21	24	3.95
Total for Browse		278	266	125	122	118	34.46

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 12, Study no: 9

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	360	8.50	7.50	43.34
Rock	242	10.50	14.00	14.42
Pavement	8	0	0	.07
Litter	394	64.25	64.25	60.95
Cryptograms	42	1.25	0	.33
Bare Ground	123	15.50	14.25	4.36

PELLET GROUP FREQUENCY --  
Herd unit 12, Study no: 9

Type	Quadrat Frequency '95
Rabbit	5
Elk	9
Deer	27

BROWSE CHARACTERISTICS --  
Herd unit 12, Study no: 9

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
Y	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	88	5	1	-	-	-	-	-	-	-	5	1	-	-	400		6	
	95	8	1	-	3	2	-	-	-	-	14	-	-	-	280		14	
M	82	3	2	-	-	-	-	-	-	-	5	-	-	-	333	16	14	5
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	56	32	1
	95	15	11	1	-	2	-	-	3	-	32	-	-	-	640	58	75	32
Total Plants/Acre (excluding Dead & Seedlings)												'82	799	Dec:	-			
												'88	466		-			
												'95	920		-			
<i>Artemisia tridentata vaseyana</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	31	3	-	-	-	-	-	-	-	31	2	1	-	2266	19	24	34
	88	6	16	-	-	-	-	-	-	-	22	-	-	-	1466	17	22	22
	95	49	45	3	4	3	-	-	-	-	102	-	-	2	2080	21	31	104
D	82	-	4	2	-	-	-	-	-	-	-	2	3	1	400		6	
	88	8	4	1	-	-	-	-	-	-	11	-	1	1	866		13	
	95	4	13	-	-	-	-	-	-	-	12	-	-	5	340		17	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	560		28	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2666	Dec:	15%			
												'88	2732		31%			
												'95	2440		13%			

A G E	YR	Form Class (No. of 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>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	6	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	82	5	3	-	-	-	-	-	-	-	6	-	2	-	533	33 21	8	
	88	-	5	-	-	-	-	-	-	-	5	-	-	-	333	28 39	5	
	95	5	11	3	4	3	-	-	-	-	26	-	-	-	520	44 47	26	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	533	Dec:	-			
												'88	466		-			
												'95	680		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
M	82	10	-	-	-	-	-	-	-	-	11	-	-	-	666	11 9	10	
	88	10	2	-	-	-	-	-	-	-	12	-	-	-	800	11 11	12	
	95	45	-	-	7	-	-	-	-	-	52	-	-	-	1040	15 16	52	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	2	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	666	Dec:	0%			
												'88	1332		19%			
												'95	1060		0%			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	2 4	3	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<i>Eriogonum heracleoides</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	27	-	-	-	-	-	-	-	-	21	-	6	-	1800		27	
	95	19	-	-	-	-	-	-	-	-	19	-	-	-	380		19	
M	82	29	-	-	-	-	-	-	-	-	29	-	-	-	1933	13 10	29	
	88	19	-	-	-	-	-	-	-	-	11	-	8	-	1266	5 7	19	
	95	109	-	-	8	-	-	-	-	-	117	-	-	-	2340	8 15	117	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1933	Dec:	-			
												'88	3066		-			
												'95	2720		-			

A G E	YR	Form Class (No. of 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>Mahonia repens</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	38	-	-	-	-	-	-	-	-	38	-	-	-	2533		38	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	16	-	-	-	-	-	-	-	-	16	-	-	-	1066	4	6	16
	88	5	-	-	-	-	-	-	-	-	2	-	3	-	333	3	5	5
	95	14	-	-	-	-	-	-	-	-	14	-	-	-	280	5	7	14
Total Plants/Acre (excluding Dead & Seedlings)												'82	1066	Dec:	-			
												'88	2866		-			
												'95	280		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	88	22	-	-	-	-	-	-	-	-	19	-	3	-	1466		22	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	13	-	-	-	-	-	-	-	-	13	-	-	-	866	4	8	13
	88	15	-	-	-	-	-	-	-	-	13	-	2	-	1000	4	9	15
	95	44	-	-	-	-	-	-	-	-	44	-	-	-	880	3	8	44
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1332	Dec:	0%			
												'88	2466		0%			
												'95	960		4%			
<i>Pinus edulis</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	69	59	1
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	83	47	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Purshia tridentata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	2	-	-	-	-	-	3	-	-	-	60		3	
M	82	1	4	-	-	-	-	-	-	-	5	-	-	-	333	12	16	5
	88	2	3	-	-	-	-	-	-	-	5	-	-	-	333	24	21	5
	95	9	11	-	3	1	-	-	-	-	24	-	-	-	480	16	37	24
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	333	Dec:	0%			
												'88	465		14%			
												'95	540		0%			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
Y	82	1	-	-	2	-	-	-	-	-	3	-	-	-	200		3	
	88	8	2	-	-	-	-	-	-	-	10	-	-	-	666		10	
	95	14	-	-	6	-	-	-	-	-	20	-	-	-	400		20	
M	82	9	1	-	9	-	-	-	-	-	19	-	-	-	1266	16	27	19
	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133	28	22	2
	95	72	-	-	25	-	-	-	-	-	97	-	-	-	1940	16	30	97
D	82	2	-	-	-	-	-	-	-	-	-	-	2	-	133		2	
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1599	Dec:	8%			
												'88	932		14%			
												'95	2340		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 12, Study no: 9

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	7	3	8
<i>Artemisia tridentata</i> <i>vaseyana</i>	24	18	20
<i>Cercocarpus montanus</i>	5	3	6
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	6	9	9
<i>Echinocactus</i> spp.	0	0	.50
<i>Eriogonum heracleoides</i>	18	21	23
<i>Mahonia repens</i>	10	19	2
<i>Opuntia</i> spp.	12	17	8
<i>Pinus edulis</i>	.60	.44	0
<i>Purshia tridentata</i>	3	3	5
<i>Symphoricarpos oreophilus</i>	15	6	20

TREND STUDY 12-10-95

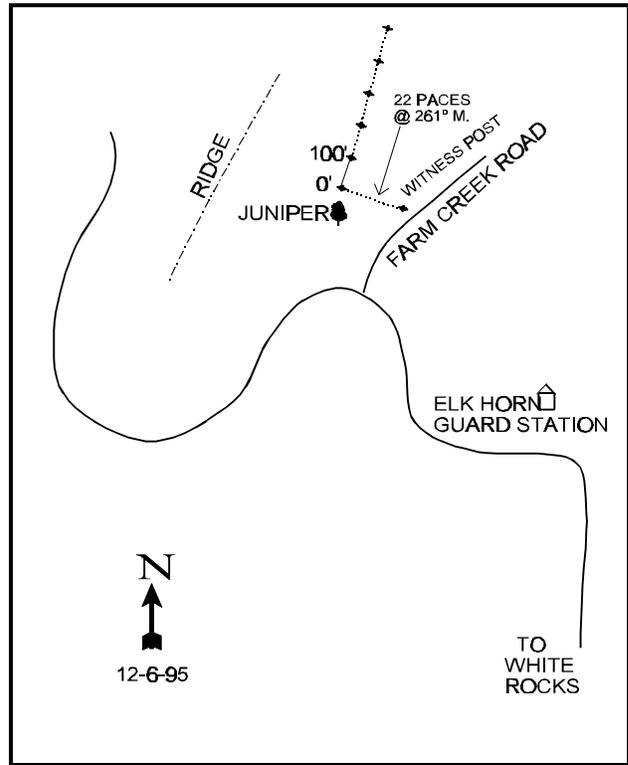
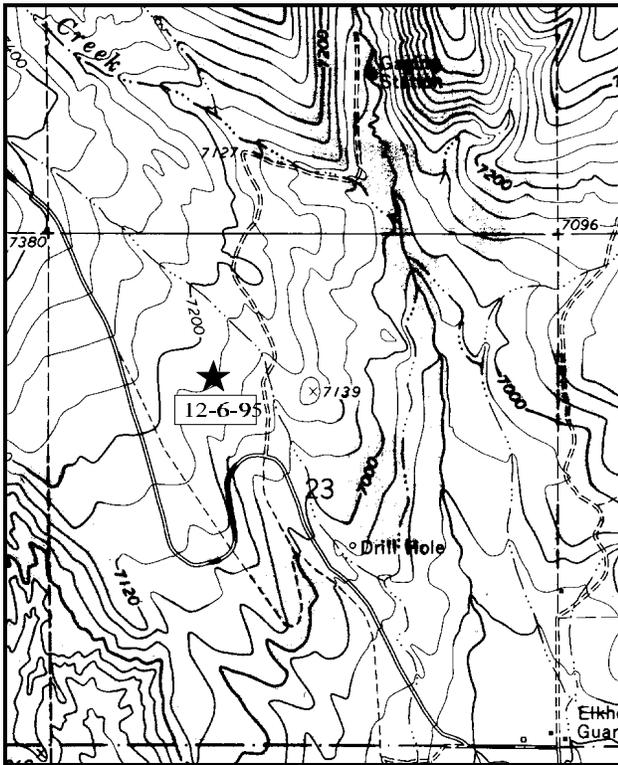
Study site name: Farm Creek. Range type: Sagebrush / Grass

Compass bearing: frequency baseline 322M degrees.

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

LOCATION DESCRIPTION

From the Elk Horn Guard Station located North of White Rocks, continue on USFS road #117 to the Farm Creek Road for 1 mile. At the first switchback turn right (north) and travel 0.1 miles to the witness located on the left (west) side of the road. From the witness walk 22 paces at 261°M to the 0 foot baseline stake.



Map Name: Ice cave Peak

Diagrammatic Sketch

Township 2N, Range 1W, Section 23

GPS COOR. 5-87-557E 12 44-90-273N

DISCUSSION

Trend Study No.12-10

This is a new study site established in 1995 to replace Cart Hollow #22-6 which is now inaccessible. This site monitors a sagebrush grass type on Forest Service land just east of Farm creek. Elevation at the site is approximately 7,100 feet with a southern exposure and slope of 6% to 8%. Elk and deer use as determined by the pellet group counts indicated light use, while that of cattle would be considered moderate use.

Soil is very rocky in the profile yet rooting depth does not appear restricted. Bare ground was estimated at only 7% and no noticeable erosion is occurring due to the abundant vegetation and litter cover.

The dominant browse is mountain big sagebrush which has an estimated density of 2,860 plants/acre and accounts for 64% of the browse cover. It appears to be a healthy population with few decadent plants, good vigor and adequate numbers of seedlings and young. Use of sagebrush is generally light to moderate. The more preferred antelope bitterbrush has an estimated population of 2,100 plants/acre, which provide 33% of the browse cover. These shrubs have a prostrate growth form averaging only 13 inches in height. Vigor is good and percent decadence is low at 13%. No seedlings were encountered but 16% of the population are classified as young plants. Use is moderate to heavy with 41% of the shrubs displaying heavy use. Other browse found on the site consist of prickly pear cactus, mountain low rabbitbrush, and broom snakeweed.

Grasses dominate the understory and provide 48% of the total vegetative cover. Crested wheatgrass is the most common and accounts for 86% of the grass cover. The only other common species is bulbouse bluegrass. Forbs are diverse but not abundant. Twenty-six species of annual and perennial forbs were encountered on the site but total cover of forbs was less than 2%. Common species include poison timber vetch and hairy goldaster.

1995 APPARENT TREND ASSESSMENT

The soil trend appears stable as long as vegetation and litter cover remain high. No erosion is currently occurring. The browse trend appears stable for mountain big sagebrush due to low decadency rates, the lack of dead plants and adequate numbers of seedlings and young. Trend for bitterbrush is also stable. Use is mostly moderate and decadency rates low (13%). The herbaceous understory is in good condition but the species composition is poor. The seeded, crested wheatgrass is abundant but the other perennial grasses are rare. Forbs are diverse but also scarce.

VEGETATIVE TRENDS --

Herd unit 12, Study no: 10

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron cristatum	387	94	17.89
G	Agropyron dasystachyum	3	1	.00
G	Bromus tectorum	17	5	.05
G	Poa bulbosa	85	28	2.67
G	Poa fendleriana	5	2	.06

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	<i>Poa pratensis</i>	5	1	.03
G	<i>Poa secunda</i>	2	1	.00
Total for Grasses		504	132	20.72
F	<i>Allium</i> spp.	20	13	.06
F	<i>Arabis</i> spp.	14	8	.06
F	<i>Artemisia ludoviciana</i>	27	11	.18
F	<i>Astragalus convallarius</i>	7	4	.21
F	<i>Balsamorhiza hookeri</i>	4	2	.01
F	<i>Castilleja</i> spp.	1	1	.00
F	<i>Conyza canadensis</i>	6	2	.01
F	<i>Collomia linearis</i>	48	22	.16
F	<i>Cryptantha</i> spp.	5	2	.01
F	<i>Draba reptans</i>	64	22	.11
F	<i>Erigeron</i> spp	4	1	.00
F	<i>Eriogonum racemosum</i>	10	6	.14
F	<i>Heterotheca villosa</i>	12	4	.33
F	<i>Lappula occidentalis</i>	9	4	.02
F	<i>Lactuca serriola</i>	2	1	.00
F	<i>Lepidium</i> spp.	55	24	.17
F	<i>Lithospermum ruderales</i>	-	-	.03
F	<i>Lomatium</i> spp.	3	2	.01
F	<i>Microsteris gracilis</i>	1	1	.00
F	<i>Orobanche</i> spp.	2	1	.00
F	<i>Phlox longifolia</i>	14	4	.02
F	<i>Polygonum douglasii</i>	49	20	.12
F	<i>Schoenocrambe linifolia</i>	9	3	.01
F	<i>Sphaeralcea coccinea</i>	21	7	.10
F	<i>Tragopogon dubius</i>	1	1	.00
F	<i>Trifolium gymnocarpon</i>	9	5	.05
F	<i>Zigadenus paniculatus</i>	1	1	.00
Total for Forbs		398	172	1.90
B	<i>Artemisia tridentata vaseyana</i>	56	24	13.01
B	<i>Gutierrezia sarothrae</i>	9	3	.04
B	<i>Opuntia</i> spp.	34	11	.39
B	<i>Pinus edulis</i>	3	1	.00
B	<i>Purshia tridentata</i>	53	21	6.77
Total for Browse		155	60	20.23

BASIC COVER --

Herd unit 12, Study no: 10

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	445	45.22
Rock	268	10.75
Pavement	135	.50
Litter	490	56.27
Cryptograms	36	.39
Bare Ground	225	7.24

PELLET GROUP FREQUENCY --

Herd unit 12, Study no: 10

Type	Quadrat Frequency '95
Rabbit	10
Elk	4
Deer	9
Cattle	22

BROWSE CHARACTERISTICS --

Herd unit 12, Study no: 10

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.		
<i>Amelanchier alnifolia</i>																			
M	95	-	-	1	-	-	-	-	-	-	-	-	-	1	-	20	8	22	1
Total Plants/Acre (excluding Dead & Seedlings)												'95	20	Dec:		-			
<i>Artemisia tridentata vaseyana</i>																			
S	95	3	-	-	-	-	-	-	-	-	-	-	3	-	-	60			3
Y	95	9	-	-	3	-	-	-	-	-	-	-	12	-	-	240			12
M	95	95	33	-	2	-	-	-	-	-	-	-	130	-	-	2600	24	41	130
D	95	-	-	1	-	-	-	-	-	-	-	-	1	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'95	2860	Dec:		0%			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																			
Y	95	1	-	-	-	-	-	-	-	-	-	-	1	-	-	20			1
M	95	5	-	-	1	-	-	-	-	-	-	-	6	-	-	120	14	23	6
Total Plants/Acre (excluding Dead & Seedlings)												'95	140	Dec:		-			
<i>Echinocactus spp.</i>																			
M	95	2	-	-	-	-	-	-	-	-	-	-	2	-	-	40	2	3	2
Total Plants/Acre (excluding Dead & Seedlings)												'95	40	Dec:		-			
<i>Gutierrezia sarothrae</i>																			
S	95	1	-	-	-	-	-	-	-	-	-	-	1	-	-	20			1
M	95	25	-	-	-	-	-	-	-	-	-	-	25	-	-	500	9	12	25
Total Plants/Acre (excluding Dead & Seedlings)												'95	500	Dec:		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	95	52	-	-	1	-	-	-	-	-	53	-	-	-	1060	5	9	53
Total Plants/Acre (excluding Dead & Seedlings)														'95	1060	Dec:	-	
Purshia tridentata																		
Y	95	10	7	-	-	-	-	-	-	-	17	-	-	-	340		17	
M	95	3	31	33	4	2	1	-	-	-	74	-	-	-	1480	13	37	74
D	95	-	3	9	-	2	-	-	-	-	13	-	-	1	280		14	
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	280		14	
Total Plants/Acre (excluding Dead & Seedlings)														'95	2100	Dec:	13%	

PERCENT BROWSE COMPOSITION--  
Herd unit 12, Study no: 10

Species	Percent of Total '95
Amelanchier alnifolia	.29
Artemisia tridentata vaseyana	43
Chrysothamnus viscidiflorus lanceolatus	2
Echinocactus spp.	.59
Gutierrezia sarothrae	7
Opuntia spp.	16
Purshia tridentata	31

## SUMMARY

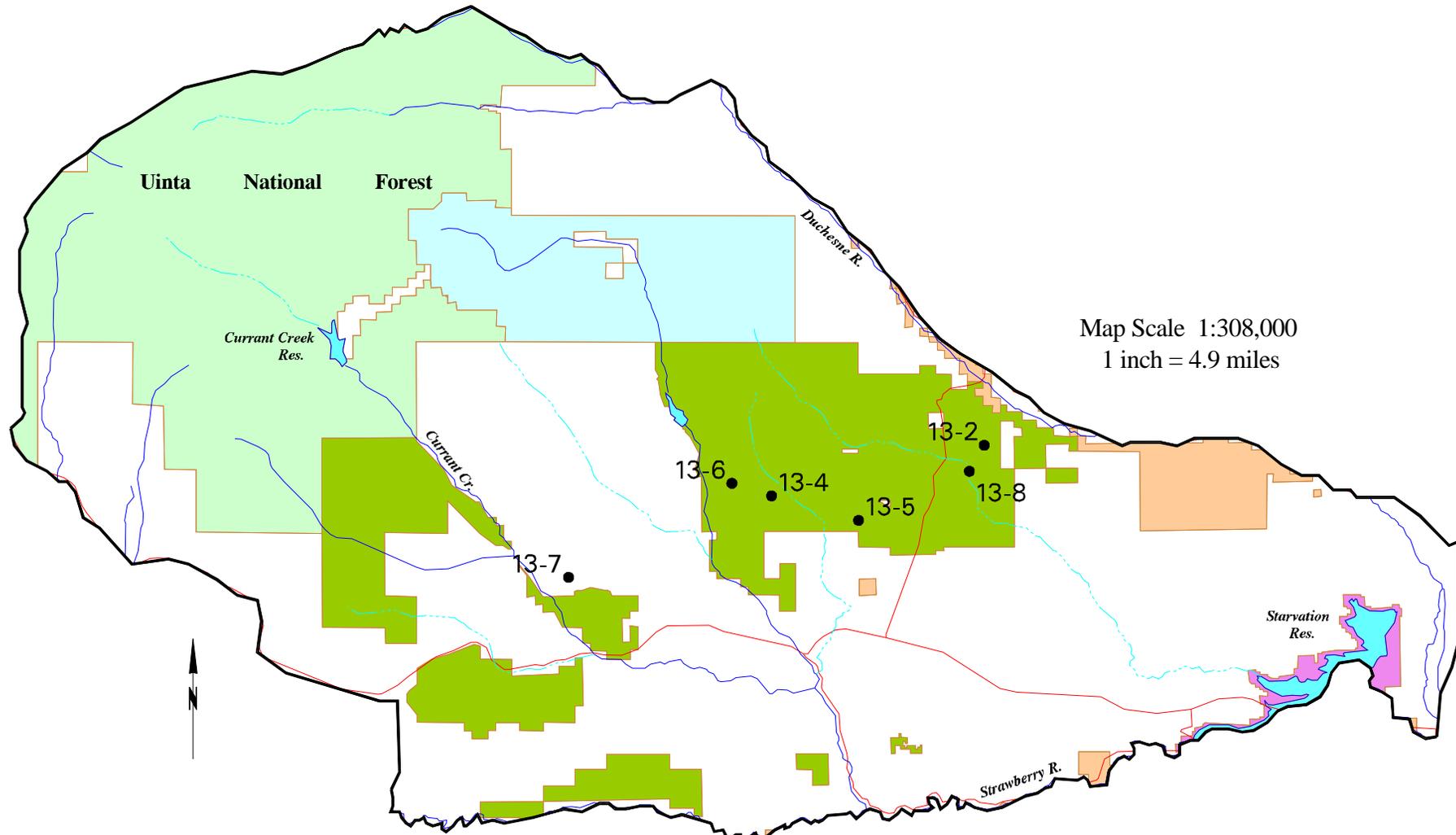
### DEER HERD UNIT - 12 - SOUTH SLOPE

All the studies on this unit, except Mosby Mountain (12-5) and Farm Creek (12-10), are located in the mountain brush type and sample deer winter range. Some sites sample higher elevation winter range which are likely used in the spring and summer as well. The study areas at Mosby Mountain and the new site at Farm Creek sample mountain big sagebrush-grass vegetation types on winter range. A wildfire burned the Mosby Mountain site after the 1988 reading. The fire was spotty as some of the shrubs survived. As a result, density of the key mountain big sagebrush is lower, but the remaining stand is more vigorous. Trends for soil and browse appear stable while the herbaceous trend is slightly down. The new site at Farm Creek shows stable soil conditions and stable key browse populations. The herbaceous understory is abundant but composition is less than desirable.

The mountain brush sites on John Star Flat (12-1), Mud Springs Draw (12-4) and Gooseberry Spring (12-7) show improving browse trends. Gooseberry seems to be recovering well from past heavy use reported in 1982. Soil trends for these sites are stable to improving while herbaceous trends are slightly down on John Star Flat and Gooseberry Spring.

The site at Mosby Spring (12-8) displays a downward browse trend due to the loss of browse to wildfire. Soil conditions are stable and trend for herbaceous understory is up. Trends at Red Pine Canyon (12-3) show stable soil and browse trends with a downward herbaceous trend due in part to the dominance of cheatgrass in the understory. The site at Seep Hollow (12-9) have upward soil and herbaceous trends and a slightly upward browse trend.

# Deer Management Unit 13 – 1995 Transect Locations



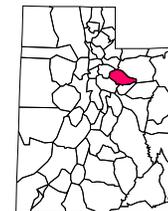
Map Scale 1:308,000  
1 inch = 4.9 miles



## LEGEND

- |                                                                                                                   |                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  Forest Service                 |  Water Body          |
|  State of Utah                  |  Transect Location   |
|  Native American                |  Road                |
|  Private Land                   |  Perennial Stream    |
|  State Wildlife Res./Mgmt. Area |  Intermittent Stream |
|  State Park/Rec. Area           |                                                                                                         |

## MAP LOCATION



## DEER HERD UNIT 13 - CURRANT CREEK

### Boundary Description

Duchesne and Wasatch counties - Boundary begins at Duchesne; then north on Highway SR-87 to Highway SR-35; northwesterly on SR-35 to Wolf Creek Pass and the Provo River-Duchesne River drainage divide; south along this drainage divide to Heber Mountain and the Strawberry River-Daniels Canyon drainage divide; south along this divide to Highway US-40; east on US-40 to the Soldier creek Dam road; south on this road to the Strawberry River; east along this river to Duchesne and the beginning point.

### Herd Unit Description

Deer herd unit 13 currently encompasses an area of almost 320,000 acres. Winter range is estimated to be 117,500 acres, with the majority (84%) being divided almost equally between state and private lands. The summer range is a little over 200,000 acres, with 62% of it being on U.S. Forest Service lands. The remainder of the summer range is divided between State (25%) and private lands (13%).

Winter range is the critical habitat factor on this unit. All eight trend studies sample winter range sites. The winter range extends in a virtually solid block north from the Strawberry River to a maximum elevation of about 8,000 to 8,700 feet in the Duchesne River, Red Creek, and Currant Creek drainages. At the lower elevation, vegetation is primarily pinyon-juniper. At higher elevation, sagebrush-grass and mountain brush are more prevalent. See Huff and Coles (1966) and Olsen (1975) for a more complete description.

### Grazing Summary

All study sites on deer herd unit 13 occur on land owned by the Division of Wildlife Resources. The study site at Blacktail Ridge (#13-2) is in the Two-Bar East unit of the Red Creek Wildlife management area. Currently no grazing occurs on the site. The site at Wolf Mountain (#13-4) was allotted to 200 AUMs with a season of use from April 15 to May 15. This site was disced during the fall of 1993 to enhance watershed conditions. It has been rested from grazing since treatment but trespass grazing is a problem. The nearby site at Santaquin's Cabin (#13-6) was disced in the fall of 1995 and is currently being rested from grazing. Lower Santaquin Draw (#13-5) is assigned to 100 AUMs from April 15 to May 15. This area was rested in 1993 and 1994. The site at Cutoff (#13-7) has no grazing assigned, but is utilized by trespass cattle. Two Bar Ranch (#13-8) is grazed for one month in the spring by 125 AUMs since 1994.

### Big Game Trends

The Currant Creek herd unit has always been very popular with deer hunters. The 10 years from 1983 to 1992 had an average of 9,862 hunters afield/year. Buck harvest fluctuates, as exemplified by the especially low harvests after the severe winters of 1983-84 and 1992-93. A regression trend of the buck harvest from 1975 through 1995 shows an overall moderately downward trend.

Winter mortality is a management concern on this unit. However, since the severe winter of 1983-84, spring deer classifications have shown good fawn survival with a fairly steady average of 64 fawns/100 adults. To assess deer mortality, transects were established on two critical areas of DWR land at Grey Wolf and Two-Bar. There are range trend studies in the vicinity of both of these pellet group/mortality transects.

When established in 1982, the range trend studies were not located in conjunction with the existing pellet group transects. Pellet group transects in the general vicinity of key areas sampled by range trend studies are NE Rabbit Gulch, Blacktail Mountain, Dry Mountain, and Cutoff. The pellet group counts from these areas, along with the herd unit average, tend to show increasing deer days use. This is especially true when comparing five-year averages. These pellet group transects do not always show the highest use on the unit. They tend to show moderate to heavy use ranging up to 100 deer days use/hectare.

The six range trend studies on unit 13 sample three different types of winter range. Sites 13-4, 13-5, and 13-8 sample the important Wyoming big sagebrush-grass type. Sites 13-2 and 13-7 sample the mountain type. The last site (13-6) samples an old pinyon-juniper chaining.

TREND STUDY 13-2-95

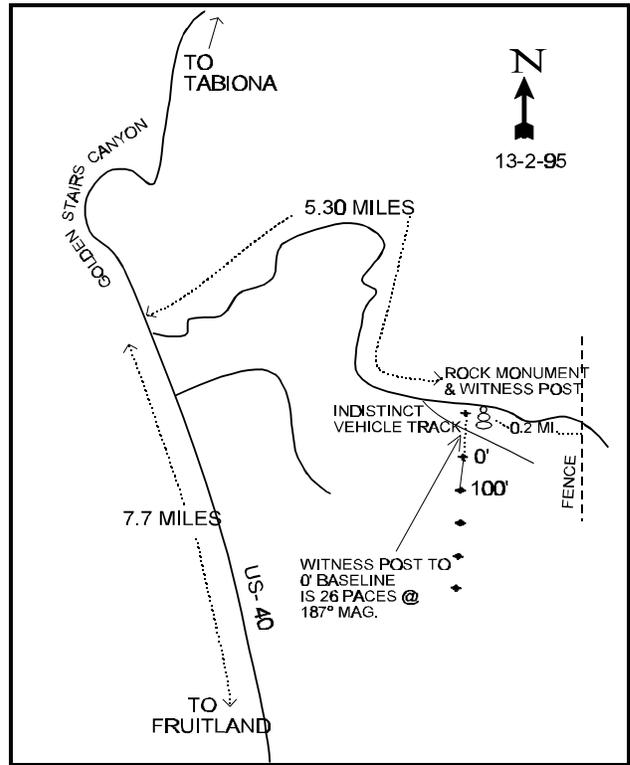
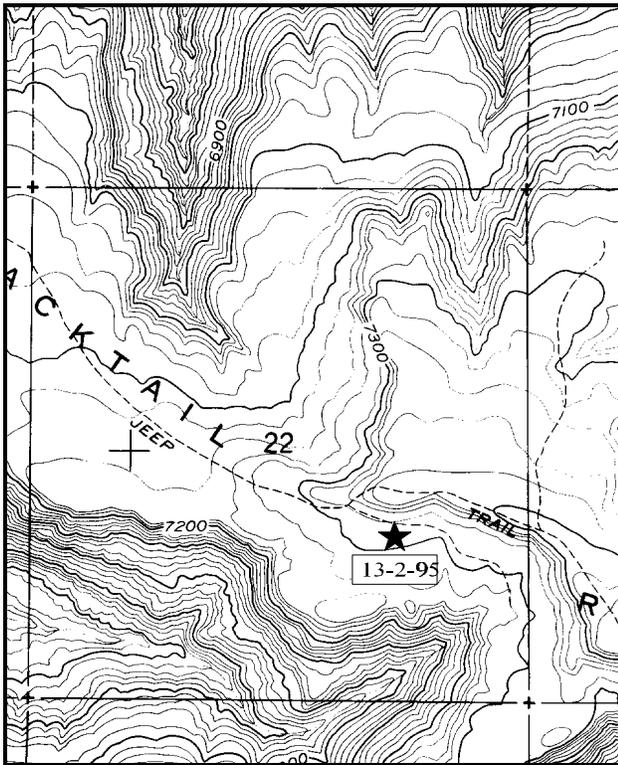
Study site name: Blacktail Ridge. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 196 degrees.

First frame placement on frequency belts 5 feet. Frequency line placement; line 1 (6 & 91ft), line 2 (32ft), line 3 (53ft), line 4 (71ft).

LOCATION DESCRIPTION

From Highway U.S. 40. take Highway U-208 towards Tabiona, at which point there will be a steep downgrade sign for Golden Stairs Canyon. Just before Golden Stairs Canyon, turn right through a gate. Proceed along this road for 5.3 miles, up a steep rocky 4 WD road to the top of the bench and on to a sagebrush opening. If you go too far, there is a fenceline .2 miles past the study area. The study area is marked by a rock cairn along the south side of the road. From the cairn, the 0-foot baseline stake is 36 paces away at a bearing of 262 degrees.



Map Name: Tabiona

Diagrammatic Sketch

Township 2S, Range 7W, Section 22

GPS COOR. 5-28-005E 12 44-60-582N

## DISCUSSION

### Trend Study No.13-2

This trend study is located on the winter range of Blacktail Ridge. The study site is within a small sagebrush-grass park surrounded by dense pinyon-juniper woodland. Deer use of the area is moderately heavy. There is no sign of livestock grazing on this portion of the Two-Bar East Unit of the Red Creek Wildlife Management Area in 1988 or 1995. Terrain is essentially flat and the elevation is 7,300 feet. The land is owned by the Utah Division of Wildlife Resources.

Soil is light-colored and rather sandy in texture. Rooting depth is variable and obviously restricted in some areas where black sagebrush occurs. Little to no rock and pavement cover occurs on the surface. Ground cover from vegetation (basal cover) and litter was moderately good at 71% in 1982 declining to 64% in 1988. Percent bare ground declined in 1988 due to a significant increase in cryptogamic cover (2% to 14%). Aerial vegetative cover was estimated at 35% in 1995 with litter declining slightly to 46%. Percent bare ground continued to decline and currently is estimated at almost 18%. Erosion does not currently appear to be a problem on the site due to the lack of significant slope. Some erosion is occurring on disturbed areas, such as vehicle tracks.

Key browse on this site consist of mountain big sagebrush intermixed with black sagebrush. Some hybridizing is occurring between these two species. Density of mature mountain big sagebrush has remained fairly constant at around 3,000 plants/acre since 1982. The large reduction in the number of mature plants noted in 1988 is the result of increased decadence from 6% in 1982 to 59% in 1988. It also appears that they misidentified many of the mature plants as young plants and without any sign of reproduction (seedlings) in 1982 or 1988 this would have to be the only logical explanation for this disproportionate statistic for mature plants in 1988. Currently, 31% of the stand is classified as decadent. Dead plants number only 940 plants/acre or 1 dead plant for every 6 live plants. It appears that many of the decadent plants sampled in 1988 recovered by 1995. Data indicated that 57% of the mountain big sagebrush were heavily hedged in 1988. Vigor was also reduced on 20% of the population. During the 1995 reading the proportion of heavily hedged sagebrush declined to only 12% with 18% displaying poor vigor. Some of the decadence in 1995 could have been the result of winter injury which was reported in field notes. Currently recruitment is low with only 7% of the population consisting of young plants and no seedlings were found.

Black sagebrush occurs in patches where soil depth is somewhat restricted. Percent decadency trends were similar to those observed in mountain big sagebrush. The 1988 reading found dramatically increased decadence (0% to 46%) and poor vigor on 13% of the population. However, utilization was light indicating the possibility of increased decadence caused by prolonged drought coupled with winter injury. Percent decadence has now (1995) gone down to only 3% with mostly light use.

The herbaceous understory is well developed and accounts for nearly one half of the total vegetative cover. Eight perennial grass species were encountered in 1995 with needle-and-thread, mutton grass, and Sandberg bluegrass providing 86% of the grass cover. Forbs are fairly diverse with 16 perennial species encountered in 1995. However, none of these species are abundant.

### 1982 APPARENT TREND ASSESSMENT

Although the soil is highly erodible, the level terrain limits soil loss. Nonetheless, there is 28% exposed ground which, if on a slope, would readily erode. Current trend is stable. Vegetative composition and trend appear stable.

There is little evidence of any profound vegetative change. Mountain big sagebrush may slowly be increasing, with black sagebrush slowly decreasing in numbers. Future readings of the study should provide a more clear picture.

1988 TREND ASSESSMENT

Trend for soil is up with an increase in basal vegetative cover from 6% to 16%. Litter cover declined but cryptogamic cover was more prevalent, increasing from 2% to 14%. Trend for the key browse species, mountain big sagebrush, is down. Big game heavily utilized the big sagebrush this year with 56% of the plants classified as all available and heavily hedged. Young plants now make up 28% of the population (refer to introductory discussion), while the majority of the mature sagebrush have shifted to a more decadent population. Decadence has increased from 7% to 58% of the population. This is clearly supported by photographic comparisons, which show more decadent and severely clubbed sagebrush. Currently, vigor is poor. Sagebrush cover is still moderately high at 22%, but declining. Grass frequency is high, and has increased 39% since 1982. All but one of the grass species increased in quadrat frequency since 1982. Species composition is similar between years, with needle-and-thread the dominant species.

TREND ASSESSMENT

soil - up

browse - down with dramatically increased decadence and very heavy use

herbaceous understory - up

1995 TREND ASSESSMENT

Soil trend is stable. Litter cover continued to decline, but percent bare ground declined from 22% to 18%. Cryptogamic cover also declined significantly. Trend for the key browse species, mountain big sagebrush, has improved. Percent decadency has declined from 59% to 31% and the proportion of shrubs heavily utilized has declined from 57% to 12%. However, vigor is poor on 52% of the decadent sagebrush indicating a possible further die off of decadent individuals which would further reduce the rate of decadency. If all of the individuals with poor vigor should die, the total population will be reduced but the surviving plants will be healthier with less intraspecific competition. No seedlings were encountered in 1995, yet 7% of the population consists of young plants. Trend for the herbaceous understory is down slightly with the sum of nested frequency for two of the three dominate grasses declining significantly. Nested frequency of perennial forbs remained at similar levels to those reported in 1988.

TREND ASSESSMENT

soil - stable

browse - slightly up with improving conditions for mountain big sagebrush

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 13, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	184	*132	46	65	53	.59
G	Bromus tectorum	-	25	-	-	11	.08
G	Carex spp.	106	*65	27	43	27	.21

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Elymus salina</i>	-	*31	-	-	13	.26
G	<i>Oryzopsis hymenoides</i>	-	*3	3	-	1	.03
G	<i>Poa fendleriana</i>	116	*124	9	52	47	2.26
G	<i>Poa secunda</i>	192	*162	56	77	60	2.07
G	<i>Sitanion hystrix</i>	12	39	8	7	18	.33
G	<i>Stipa comata</i>	285	*192	58	95	71	5.15
Total for Grasses		895	773	207	339	301	11.00
F	<i>Allium</i> spp.	-	*3	-	-	1	.00
F	<i>Antennaria rosea</i>	-	*5	-	-	2	.03
F	<i>Arabis</i> spp.	6	*-	-	3	-	-
F	<i>Astragalus convallarius</i>	41	*26	18	20	14	.49
F	<i>Astragalus mollissimus</i>	4	4	3	2	2	.03
F	<i>Castilleja</i> spp.	-	*14	-	-	8	.26
F	<i>Chaenactis douglasii</i>	2	-	-	1	-	-
F	<i>Chenopodium leptophyllum</i>	-	38	-	-	15	.07
F	<i>Comandra pallida</i>	-	*6	-	-	2	.06
F	<i>Cryptantha</i> spp.	5	7	-	2	2	.06
F	<i>Delphinium bicolor</i>	-	*31	-	-	15	.07
F	<i>Descurainia pinnata</i>	-	1	-	-	1	.00
F	<i>Draba</i> spp.	-	107	-	-	39	.24
F	<i>Erigeron eatonii</i>	22	*-	-	12	-	-
F	<i>Erigeron flagellaris</i>	-	-	19	-	-	-
F	<i>Erigeron</i> spp.	-	-	4	-	-	-
F	<i>Eriogonum</i> spp.	6	*-	-	2	-	-
F	<i>Fritillaria atropurpurea</i>	-	2	-	-	2	.01
F	<i>Ipomopsis aggregata</i>	-	-	-	-	-	.00
F	<i>Lappula occidentalis</i>	-	35	-	-	17	.11
F	<i>Lepidium</i> spp.	-	11	-	-	6	.05
F	<i>Lomatium</i> spp.	-	*19	1	-	10	.05
F	<i>Machaeranthera canescens</i>	-	*5	4	-	2	.03
F	<i>Orobanche</i> spp.	-	5	-	-	2	.03
F	<i>Penstemon</i> spp.	-	*3	3	-	2	.01
F	<i>Phlox hoodii</i>	73	*24	17	29	14	.25
F	<i>Phlox longifolia</i>	3	*-	7	1	-	-
F	<i>Polygonum douglasii</i>	-	254	13	-	90	1.13

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Schoenocrambe linifolia	28	*1	-	15	1	.00
F	Senecio multilobatus	5	*-	-	4	-	-
F	Sphaeralcea coccinea	17	*10	4	7	6	.22
F	Trifolium spp.	2	21	-	1	9	.17
Total for Forbs		214	632	93	99	262	3.46
B	Artemisia nova	12	12	-	7	6	1.67
B	Artemisia tridentata vaseyana	97	*82	45	43	40	13.38
B	Chrysothamnus nauseosus albicaulis	2	2	-	2	1	.15
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	2	-	-	-
B	Echinocactus spp.	4	2	1	2	1	.00
B	Leptodactylon pungens	37	*33	-	21	15	1.27
B	Opuntia spp.	10	*10	1	4	6	.05
B	Pinus edulis	2	-	1	1	-	-
Total for Browse		164	141	50	80	69	16.54

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

BASIC COVER --

Herd unit 13, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	360	6.0	15.75	35.18
Rock	5	0	0	.01
Pavement	-	0	0	0
Litter	395	84.8	48.00	45.55
Cryptograms	179	1.3	14.00	3.48
Bare Ground	245	27.50	22.25	17.54

PELLET GROUP FREQUENCY --

Herd unit 13, Study no: 2

Type	Quadrat Frequency '95
Rabbit	2
Elk	12
Deer	35

BROWSE CHARACTERISTICS --  
Herd unit 13, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia nova</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	9	1	-	-	-	-	-	-	-	10	-	-	-	666	13	22	10
	88	6	1	-	-	-	-	-	-	-	7	-	-	-	466	13	15	7
	95	21	8	-	-	-	-	-	-	-	29	-	-	-	580	10	22	29
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	6	1	-	-	-	-	-	-	-	5	-	1	1	466		7	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	666	Dec:	0%			
												'88	998		46%			
												'95	620		3%			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	88	20	4	1	-	-	-	-	-	-	21	-	3	1	1666		25	
	95	15	2	-	-	-	-	-	-	-	17	-	-	-	340		17	
M	82	39	6	-	-	-	-	-	-	-	43	2	-	-	3000	19	29	45
	88	1	2	8	-	-	-	-	-	-	11	-	-	-	733	16	14	11
	95	9	136	15	-	1	-	-	-	-	158	-	-	3	3220	18	30	161
D	82	3	1	-	-	-	-	-	-	-	3	1	-	-	266		4	
	88	5	6	41	-	-	-	-	-	-	38	-	3	11	3466		52	
	95	-	54	9	-	13	6	-	-	-	39	-	-	43	1640		82	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	940		47	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3866	Dec:	6%			
												'88	5865		59%			
												'95	5200		31%			
<i>Chrysothamnus nauseosus albicaulis</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	15	23	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	18	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Echinocactus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	2	3	5
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	100		-			
<i>Leptodactylon pungens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	30	-	-	-	-	-	-	-	-	30	-	-	-	2000	5	4	30
	95	79	-	-	6	-	-	-	-	-	85	-	-	-	1700	6	10	85
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	2266		-			
												'95	1940		-			
<i>Opuntia spp.</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	1	6	2
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	2	2	2
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	6	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	0%			
												'88	332		19%			
												'95	100		0%			
<i>Pinus edulis</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 13, Study no: 2

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia nova</i>	14	10	8
<i>Artemisia tridentata</i> <i>vaseyana</i>	83	62	65
<i>Chrysothamnus</i> <i>nauseosus albicaulis</i>	0	0	.25
<i>Chrysothamnus</i> <i>viscidiflorus</i>	0	0	0
<i>Echinocactus</i> spp.	0	0	1
<i>Leptodactylon pungens</i>	0	24	24
<i>Opuntia</i> spp.	3	3	1
<i>Pinus edulis</i>	0	.69	0

TREND STUDY 13-4-95

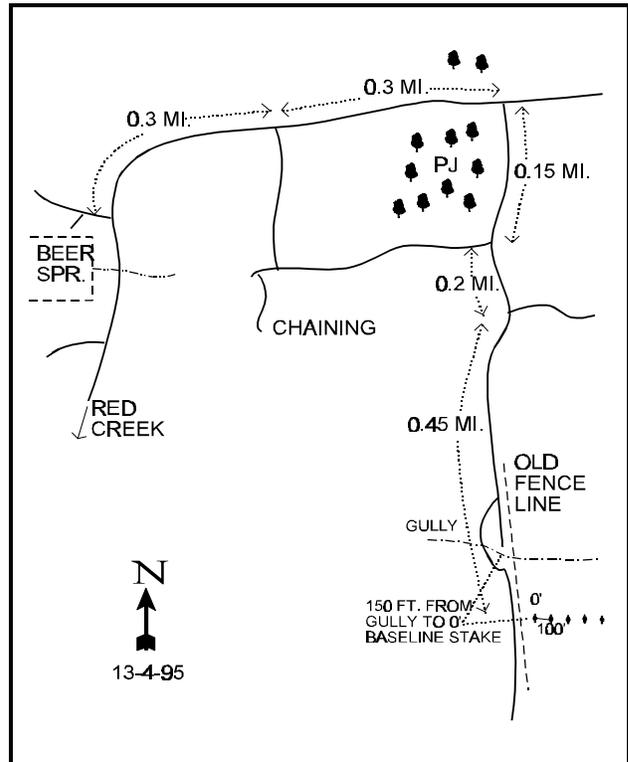
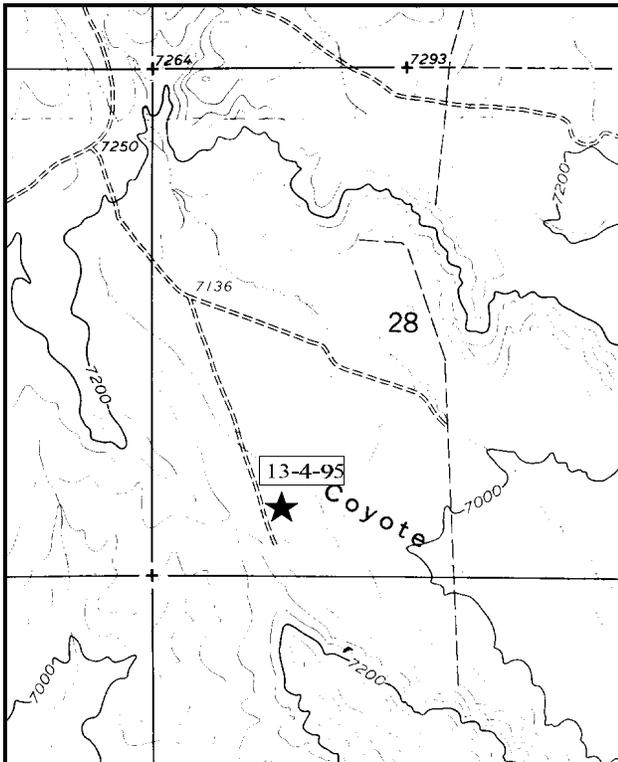
Study site name: Grey Wolf Mountain . Range type: Sagebrush-Grass .

Compass bearing: frequency baseline 112 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (15 & 96ft), line 2 (39ft), line 3 (52ft), line 4 (66ft).

LOCATION DESCRIPTION

From U.S. 40 in Fruitland, travel north up the Red Creek Road 1.8 miles to a 3-way fork. Take the middle fork and go 2.6 miles. After crossing Red Creek, turn right onto a dirt road. Proceed northeast on this road for 1.95 miles to Beer Spring, and the fork to Study #23A-6. Continue past the fenced spring and stay on the main road going northeast for .85 miles to an intersection. Turn right and go .4 miles to a fork by an old fenceline. Keep right and follow the road south along the old fence for .45 miles to the study site. It may not be possible to drive across the deep gully. The start of the baseline is approximately 150 feet south of the gully. The 0-foot baseline Stake, a green, short fencepost, is marked by browse tag #7090.



Map Name: Tabby Mountain

Diagrammatic Sketch

Township 2S , Range 8W , Section 28

GPS COOR. 5-17-202E 12 44-58-014N

## DISCUSSION

### Trend Study No. 13-4

This trend study is located at an elevation of approximately 7,080 feet on the north end of Grey Wolf Mountain near the head of Coyote Draw. Slope is less than 5% with an east aspect. The current trend study replaces a line-intercept study established in 1981. The area is owned by the Utah Division of Wildlife Resources and is utilized as winter range by both deer and elk. The area was disked and seeded in the fall of 1990 as a habitat and watershed improvement project. Livestock grazing was removed after the treatment. Cattle and horses grazed the area in the past and use was reported heavy in 1988. Numerous trespass cattle have been observed in the area since grazing was removed.

Soils are alluvial and of considerable depth. Texture is a silt loam with minimal rock. Protective ground cover has been poor in the past consisting mostly of old mature sagebrush canopies. Currently (1995) there is still a high proportion of bare ground (54%), but herbaceous cover is now more abundant and better distributed. This combined with the gentle terrain, helps limit serious erosion from occurring.

The key browse species on the site is Wyoming big sagebrush. It displays characteristics of both Wyoming big sagebrush and mountain big sagebrush, but the majority is Wyoming big sagebrush. For this report to help alleviate any confusion, all the sagebrush encountered on the study was classified as Wyoming big sagebrush. These shrubs vary considerably in color, size, growth form, and degree of hedging. Typically, Wyoming big sagebrush occurs more in the flat integrating into the basin big sagebrush type which occurs more along the gullies. Wyoming big sagebrush had an estimated density of 1,265 mostly mature plants/acre in 1982. By 1988, population density had increased to 6,466 plants/acre due to a dramatic increase in the number of young shrubs (4,733 plants/acre). Utilization was light to moderate with heavy use reported on 11% of the population. After the disking treatment (thinning), the number of mature sagebrush remained similar (1,040 plants/acre) with the number of seedlings and young declining dramatically. The percentage of seedlings and young still remain in adequate numbers to maintain the population. The percentage of decadent plants remained fairly low through 1988, but now have increased to 9% in 1995 with 55% percent of those decadent sagebrush classified as dying. Use is light to moderate and vigor good on all but the decadent individuals.

A small population of winterfat provides additional forage for wintering big game. Density and height/crown measurements have increased since the thinning treatment. Several undesirable increaser shrubs occupy the site. These include narrowleaf low rabbitbrush, broom snakeweed, prickly phlox, and pricklypear. Since treatment, density of all but narrowleaf low rabbit brush have declined. Rabbitbrush density is similar to that of 1988. Decadency and vigor have improved but the proportion of seedlings and young indicates a stable population.

Before treatment, the herbaceous understory consisted of crested wheatgrass and a few forbs. Crested wheatgrass was reported to be heavily utilized in both 1982 and 1988. As a result of use and competition, vigor was reduced. After the disking treatment, crested wheatgrass declined significantly in nested frequency but is still the most abundant grass accounting for 93% of the grass cover. Seven other grasses were encountered on the site yet all occur in small numbers. Forbs are also more abundant after treatment with 19 perennial species sampled in 1995. Total forb cover is currently at a little over 8%. Useful species include Lewis flax, yellow sweet clover, low penstemon, and scarlet globemallow which account for 53% of the forb cover.

#### 1982 APPARENT TREND ASSESSMENT

Trend is difficult to evaluate. Based on soil loss, the percentage of bare ground and the trampling effect of livestock, soil trend is probably slightly downward. However, from a management standpoint, this may be an acceptable trade-off if shrub density and composition can be improved. A rather speculative estimate of vegetative trend is stable to slowly improving. The apparent increase in the key species is encouraging, especially if increases of low rabbitbrush can be limited or avoided.

#### 1988 TREND ASSESSMENT

Trend for soil is stable yet poor condition. A large amount of bare soil remains exposed, 50% of the ground surface. Litter cover is poor and severe gullying continues in adjacent Coyote Draw. With reduced grass vigor and litter buildup, there is accelerated soil loss from the flat. Trend for the key browse species is up. Sagebrush density has gone from 1,265 plants/acre to 6,466 plants/acre. The density of mature plants is similar between years, with a moderate density of 1,533 sagebrush/acre. The large increase occurred in the number of seedlings and young plants. Sagebrush has proliferated from 18% to 44% of the browse composition. Overall use remains moderate, and vigor is fair. Annual growth and seed production were low this year. Density of undesirable browse species increased since 1982. Trend for the herbaceous understory is up with an increase in quadrat frequency of grasses and forbs.

##### TREND ASSESSMENT

soil - stable but poor condition

browse - up

herbaceous understory - up

#### 1995 TREND ASSESSMENT

Since the contoured thinning treatment of sagebrush, percent bare ground has increased from 50% to 54%. Litter cover also declined from 36% to 22% but the litter is more evenly distributed. Even with these negative changes, sum of nested frequency of grasses and forbs increased significantly providing much better soil protection. No erosion was reported in 1995 and trend for soil is considered slightly improved. The browse trend is stable. Even though total density of Wyoming big sagebrush declined significantly, the number of mature plants remained similar to previous years. The disking treatment thinned the population and eliminated most of the older plants. The remaining stand has better vigor and is less heavily hedged. Percent decadence is still low at 9%. Trend for the herbaceous understory is up. Sum of nested frequency of grasses increased slightly, but more importantly composition is improved with 7 new perennial grass species being sampled. Sum of nested frequency of forbs increased with significant increases in 15 of the 20 perennial species sampled in 1995.

##### TREND ASSESSMENT

soil - slightly improved since treatment

browse - stable with better composition characteristics

herbaceous understory - up with more species diversity

VEGETATIVE TRENDS --  
Herd unit 13, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron cristatum	316	*260	43	99	80	9.44
G	Agropyron dasystachyum	6	21	2	3	9	.28
G	Agropyron intermedium	-	*30	-	-	13	.12
G	Bromus inermis	-	4	-	-	2	.01
G	Carex spp.	-	*10	-	-	4	.04
G	Dactylis glomerata	-	*8	-	-	4	.04
G	Oryzopsis hymenoides	-	6	1	-	2	.06
G	Poa secunda	-	2	-	-	1	.03
G	Secale cereale	-	*7	-	-	3	.06
Total for Grasses		322	348	46	102	118	10.10
F	Agoseris glauca	-	*61	-	-	18	1.92
F	Allium spp.	-	*6	-	-	4	.02
F	Arabis spp.	-	-	1	-	-	-
F	Astragalus convallarius	17	23	6	8	11	.21
F	Astragalus spp.	1	5	-	1	2	.01
F	Calochortus nuttallii	-	*7	-	-	6	.03
F	Chenopodium fremontii	-	7	-	-	3	.01
F	Chenopodium leptophyllum	-	10	-	-	5	.02
F	Cirsium spp.	-	-	-	-	-	.15
F	Descurainia pinnata	-	5	-	-	2	.01
F	Erigeron spp	-	3	-	-	1	.00
F	Haplopappus spp.	-	-	2	-	-	-
F	Hedysarum boreale	-	*7	-	-	3	.08
F	Lactuca serriola	-	1	-	-	1	.01
F	Linum lewisii	-	*69	-	-	34	1.16
F	Lygodesmia grandiflora	-	3	-	-	1	.00
F	Machaeranthera canescens	21	*4	4	12	1	.03
F	Machaeranthera grindelioides	4	-	-	2	-	.00
F	Melilotus officinalis	-	*16	-	-	9	.32
F	Orthocarpus tolmiei	-	*11	-	-	6	.08
F	Penstemon humilis	10	*11	-	6	5	.65
F	Penstemon spp.	-	-	2	-	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Phlox hoodii	101	*35	-	42	16	.43
F	Phlox longifolia	70	*76	9	25	28	.29
F	Sanguisorba minor	-	*28	-	-	15	.21
F	Sphaeralcea coccinea	183	*166	44	77	70	2.40
F	Tragopogon dubius	4	8	-	2	5	.18
F	Trifolium gymnocarpon	8	46	3	5	22	.19
F	Unknown forb per.	-	-	2	-	-	-
Total for Forbs		419	608	73	180	268	8.47
B	Artemisia tridentata wyomingensis	69	*24	27	33	13	2.61
B	Ceratoides lanata	5	3	6	4	1	.03
B	Chrysothamnus depressus	-	6	-	-	2	.01
B	Chrysothamnus nauseosus albicaulis	2	2	-	1	1	.03
B	Chrysothamnus viscidiflorus stenophyllus	31	*41	13	19	21	1.96
B	Eriogonum corymbosum	58	*41	35	30	20	1.45
B	Opuntia spp.	17	*4	5	8	2	.01
B	Leptodactylon spp.	-	-	10	-	-	-
B	Pinus edulis	1	-	1	1	-	-
Total for Browse		183	121	97	96	60	6.11

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 13, Study no: 4

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	344	6.25	8.00	23.68
Rock	-	0	0	0
Pavement	-	0	0	0
Litter	377	40.25	36.00	21.52
Cryptograms	16	0	6.25	.23
Bare Ground	376	53.50	49.75	54.37

PELLET GROUP FREQUENCY --  
 Herd unit 13, Study no: 4

Type	Quadrat Frequency '95
Rabbit	2
Elk	7
Deer	11
Cattle	1

BROWSE CHARACTERISTICS --  
 Herd unit 13, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	82	17	-	-	-	-	-	-	-	-	17	-	-	-	1133		17	
	88	79	3	-	2	-	-	-	-	-	76	-	7	1	5600		84	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	88	58	10	1	2	-	-	-	-	-	64	1	6	-	4733		71	
	95	52	-	-	-	-	-	-	-	-	52	-	-	-	1040		52	
M	82	8	7	1	-	-	-	-	-	-	16	-	-	-	1066	23	27	16
	88	10	4	9	-	-	-	-	-	-	18	2	3	-	1533	20	17	23
	95	41	9	2	-	-	-	-	-	-	52	-	-	-	1040	15	20	52
D	82	-	1	-	-	-	-	-	-	-	-	-	1	-	66		1	
	88	2	-	1	-	-	-	-	-	-	2	-	1	-	200		3	
	95	3	7	1	-	-	-	-	-	-	5	-	-	6	220		11	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	780		39	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1265	Dec:	5%			
												'88	6466		3%			
												'95	2300		9%			
<i>Ceratoides lanata</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	2	2	-	-	-	-	-	-	-	3	1	-	-	266	8	8	4
	88	-	-	2	-	-	-	-	-	-	2	-	-	-	133	7	7	2
	95	13	4	-	-	-	-	-	-	-	17	-	-	-	340	10	12	17
Total Plants/Acre (excluding Dead & Seedlings)												'82	332	Dec:	-			
												'88	199		-			
												'95	360		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<b>Chrysothamnus depressus</b>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	8	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<b>Chrysothamnus nauseosus albicaulis</b>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	14	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<b>Chrysothamnus viscidiflorus stenophyllus</b>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	6	-	-	-	-	-	-	-	-	4	-	2	-	400		6	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	11	-	-	3	-	-	-	-	-	14	-	-	-	933		14	
	95	28	-	-	-	-	-	-	-	-	28	-	-	-	560		28	
M	82	28	-	-	-	-	-	-	-	-	29	-	-	-	1866	10	12	
	88	13	3	2	-	-	-	-	-	-	17	1	-	-	1200	7	5	
	95	130	2	-	-	-	-	-	-	-	132	-	-	-	2640	11	14	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	13	8	-	-	-	-	-	-	-	16	-	5	-	1400		21	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1866	Dec:	0%			
												'88	3533		39%			
												'95	3200		0%			

A G E	YR	Form Class (No. of 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>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	2	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	28	-	-	-	-	-	-	-	-	28	-	-	-	560		28	
M	82	21	14	-	3	-	-	-	-	-	27	5	6	-	2533	13	15	38
	88	12	10	4	2	-	-	-	-	-	28	-	-	-	1866	14	13	28
	95	117	-	-	3	-	-	-	-	-	120	-	-	-	2400	14	16	120
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	9	5	3	1	-	-	-	-	-	18	-	-	-	1200		18	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2533	Dec:	0%			
												'88	3466		34%			
												'95	2960		0%			
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	8	8	4
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	1	-	-	1	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	399		33%			
												'95	20		0%			
<i>Leptodactylon pungens</i>																		
M	82	6	-	-	-	-	-	-	-	-	6	-	-	-	399	2	7	6
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	399	Dec:	-			
												'88	0		-			
												'95	0		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	8	-	-	1	-	-	-	-	-	9	-	-	-	600		9	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	8	-	-	-	-	-	-	-	-	8	-	-	-	533	3	7	8
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	4	10	4
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320	4	6	16
4	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	599	Dec:	-			
												'88	732		-			
												'95	360		-			

PERCENT BROWSE COMPOSITION--

Herd unit 13, Study no: 4

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata wyomingensis	18	44	25
Ceratoides lanata	5	1	4
Chrysothamnus depressus	0	0	.43
Chrysothamnus nauseosus albicaulis	0	0	.64
Chrysothamnus viscidiflorus stenophyllus	27	24	34
Eriogonum corymbosum	36	23	32
Gutierrezia sarothrae	0	3	.21
Leptodactylon spp.	.95	0	0
Leptodactylon pungens	5	0	0
Opuntia spp.	9	5	4

TREND STUDY 13-5-95

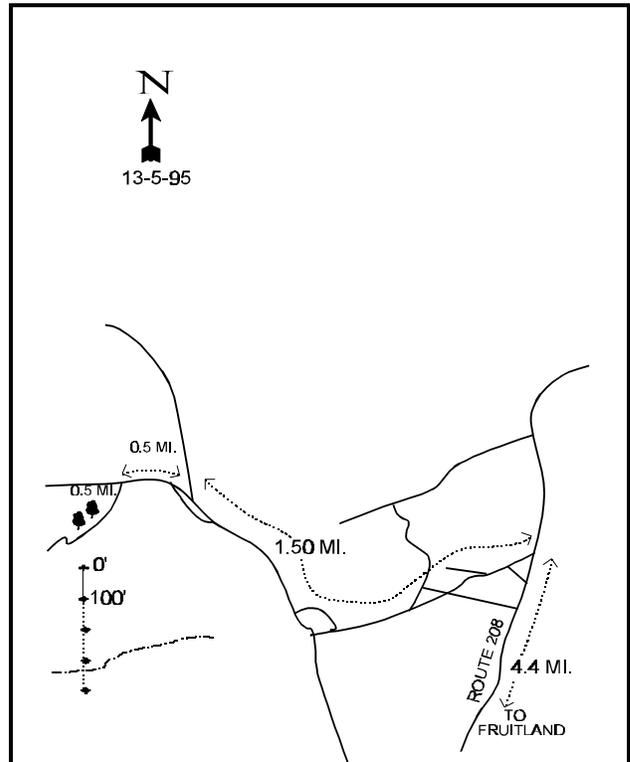
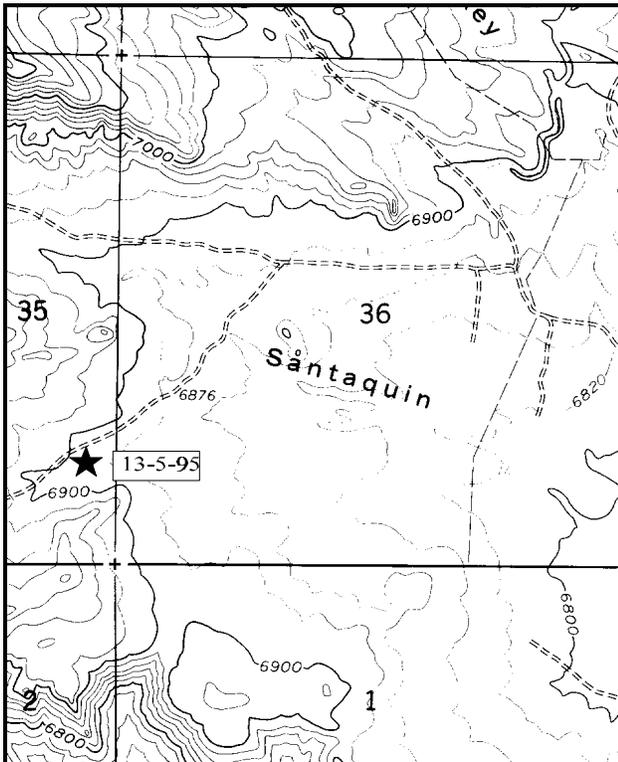
Study site name: Lower Santaquin Draw. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 83ft), line 2 (38ft), line 3 (54ft), line 4 (79ft).

LOCATION DESCRIPTION

From Highway U.S. 40, take Route 208 towards Tabiona for 4.4 miles, at which point there will be a road to the left (i.e. west). Turn left and go .5 miles on the main road, keeping to the left. Proceed an additional one mile towards Santaquin Draw, to a fork towards Cockey Hollow. Take the road to the left for .5 miles to the next intersection. Turn left and go .5 miles to a group of junipers. From the southwestern juniper, the 0-foot baseline stake is 7 paces south (180°).



Map Name: Tabiona

Diagrammatic Sketch

Township 2S, Range 8W, Section 35 GPS COOR. 5-21-620E 12 44-56-770N

## DISCUSSION

### Trend Study No. 13-5

This trend study monitors a sagebrush-grass site on deer and elk winter range in lower Santaquin Draw. The area is obviously critical range as many antler sheds, winter-killed deer and pellet groups were observed. Numerous jackrabbit pellets and cattle pats were observed during study establishment in 1982. Terrain is nearly level and elevation is approximately 6,880 feet. Low pinyon-juniper covered ridges in the immediate proximity of the study provide needed escape and thermal cover.

Soils are alluvially deposited and deep but generally undifferentiated. Texture is rather fine with few rocks. Ground cover is fair for this type with percent bare ground ranging from 33% to 38% since 1982. Currently percent bare ground is at 33%. There is no extensive litter cover and moderate amounts of bare soil. Sheet erosion is a factor but it is greatly reduced by the levelness of the terrain. However, stream courses in the area tend to be rather deep, steep-sided gullies, effectively lowering the water table.

The key browse species consists of a moderately dense stand of Wyoming big sagebrush. This site, like the previous one, contains sagebrush with characteristics of both mountain and Wyoming big sagebrush. All sagebrush in this report are considered Wyoming big sagebrush. Total density has remained similar since 1982 at approximately 5,000 plants/acre. During the 1982 reading, 28% of the sagebrush was heavily hedged with 34% of the population displaying poor vigor. Percent decadence was reported at 24%. By 1988, percent decadence increased to 44% with more moderate use, yet improved vigor. Percent decadence declined to 8% in 1995 with heavy use reported on 17% of the population. The number of seedlings and young plants have declined since 1988, but numbers are adequate to maintain the population. The only other palatable browse species includes a small population of winterfat. Population density has ranged from 866 plants/acre in 1982 to 1,040 in 1995. Heavy utilization has declined since 1982 as has percent decadency. Other less desirable browse occur in low numbers and consists of narrowleaf low rabbitbrush, broom snakeweed, and pricklypear cactus. It appears that the increased density of prickly phlox in 1982 and 1988 was due an identification problem with the abundant hoods phlox.

The herbaceous understory provides 59% of the vegetation cover. Five grass species were found on the site in 1995 with crested wheatgrass making up 95% of the grass cover. Forbs combine to produce 4% total cover with timber poisonvetch, hoods phlox, and scarlet globemallow providing 88% of the forb cover.

### 1982 APPARENT TREND ASSESSMENT

Overall, this area is relatively stable. Soil trend may be down slightly due to continuous low level erosion and soil deposition but the level terrain minimizes the effect. Vegetatively, Wyoming big sagebrush may be slowly expanding. Grasses are being heavily impacted by livestock, which presumably will favor the shrub component. Forbs are insignificant forage sources and are generally undesirable species. Undesirable shrubs include pricklypear and narrowleaf low rabbitbrush, neither of which should be allowed to increase much beyond their present level.

### 1988 TREND ASSESSMENT

Due to a slight decrease in litter cover, there was a slight increase in the percentage of bare soil in 1988. However the level terrain limits erosion and trend for soil is considered stable. The density of the key browse species, big

sagebrush remained similar to that of 1982. Vigor has improved since 1982, and most mature plants were rated in form class 2, moderately hedged, rather than form class 3 (heavily hedged). However, a higher percentage (44%) of the sagebrush population was classified as decadent. There is still a substantial population of seedling and young mountain big sagebrush. Average sagebrush cover is 21% on the study site. Trend for grasses and forbs are up due to a significant increase in quadrat frequency. Crested wheatgrass, the most abundant grass, tripled its quadrat frequency since 1982. Scarlet globemallow also greatly increased in quadrat frequency (23 to 66).

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up

1995 TREND ASSESSMENT

Soil trend is up slightly. Percent bare ground declined from 38% to 33% and photos indicate a dramatic increase in herbaceous cover. Nested frequency of grasses and forbs have increased. Trend for sagebrush is improved. Percent decadence has declined from 44% to 8%. It appears that many of the decadent plants surveyed in 1988 are now classified as healthy mature plants. The number of seedlings and young have declined but there is adequate numbers to maintain the population. The secondary browse, winterfat, also shows an improving trend. Heavy use is reduced, vigor is improved and percent decadency has decreased significantly from 15% to 1%. Trend for grasses is slightly up with a significant increase in the nested frequency of crested wheatgrass. Nested frequency of forbs increased by 39% with 11 perennial species counted. Overall trend is up.

TREND ASSESSMENT

soil - slightly up

browse - up

herbaceous understory - up

VEGETATIVE TRENDS --

Herd unit 13, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron cristatum	307	*331	32	99	98	12.21
G	Agropyron dasystachyum	-	*13	1	-	5	.02
G	Carex spp.	37	*9	8	16	4	.07
G	Oryzopsis hymenoides	15	*9	1	8	5	.22
G	Stipa comata	-	*13	-	-	7	.30
Total for Grasses		359	375	42	123	119	12.84
F	Allium spp.	-	2	-	-	1	.00
F	Arabis spp.	-	-	2	-	-	-
F	Astragalus convallarius	4	*20	4	2	14	.78
F	Astragalus tenellus	-	*6	-	-	5	.19
F	Calochortus nuttallii	-	*3	-	-	2	.01

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Descurainia spp.	-	1	-	-	1	.00
F	Draba spp.	-	5	-	-	2	.01
F	Erigeron spp.	-	-	2	-	-	-
F	Machaeranthera canescens	2	10	12	2	5	.02
F	Orthocarpus tolmiei	-	1	-	-	1	.01
F	Phlox hoodii	-	*77	-	-	33	2.02
F	Phlox longifolia	20	25	1	8	11	.06
F	Schoenocrambe linifolia	2	3	1	1	2	.01
F	Senecio multilobatus	1	-	-	1	-	-
F	Sphaeralcea coccinea	143	*121	23	66	55	.98
F	Trifolium spp.	6	20	7	3	9	.17
Total for Forbs		178	294	52	83	141	4.29
B	Artemisia tridentata wyomingensis	67	*89	38	36	41	10.30
B	Ceratoides lanata	10	13	5	6	8	.62
B	Chrysothamnus nauseosus albicaulis	-	*7	-	-	3	.33
B	Chrysothamnus viscidiflorus stenophyllus	-	*7	-	-	4	.31
B	Gutierrezia sarothrae	-	6	-	-	2	.06
B	Leptodactylon pungens	79	*8	18	36	3	.01
B	Opuntia spp.	31	*18	13	17	9	.44
Total for Browse		187	148	0	95	70	12.09

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

BASIC COVER --

Herd unit 13, Study no: 5

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	345	6.50	7.00	32.09
Rock	5	0	0	.15
Pavement	8	0	0	.01
Litter	387	58.50	53.00	39.47
Cryptograms	112	0	1.75	1.44
Bare Ground	316	35.00	38.25	32.60

PELLET GROUP FREQUENCY --  
 Herd unit 13, Study no: 5

Type	Quadrat Frequency '95
Rabbit	4
Elk	17
Deer	29

BROWSE CHARACTERISTICS --  
 Herd unit 13, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	82	28	-	-	-	-	-	-	-	-	7	21	-	-	1866		28	
	88	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	82	17	2	-	-	-	-	-	-	-	16	3	-	-	1266		19	
	88	18	1	1	-	-	-	-	-	-	20	-	-	-	1333		20	
	95	32	12	-	-	-	-	-	-	-	39	-	5	-	880		44	
M	82	7	17	14	-	-	-	-	-	-	18	13	7	-	2533	20 23	38	
	88	5	14	3	-	-	-	-	-	-	21	1	-	-	1466	19 23	22	
	95	10	148	40	3	4	-	-	-	-	205	-	-	-	4100	18 30	205	
D	82	-	12	7	-	-	-	-	-	-	-	-	14	5	1266		19	
	88	8	19	6	-	-	-	-	-	-	30	1	-	2	2200		33	
	95	2	15	5	-	-	-	-	-	-	11	-	-	11	440		22	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	500		25	
Total Plants/Acre (excluding Dead & Seedlings)												'82	5065	Dec:	24%			
												'88	4999		44%			
												'95	5420		8%			
<i>Ceratoides lanata</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	3	1	-	-	-	-	-	-	8	-	1	-	600		9	
	95	3	1	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	82	3	6	1	-	-	-	-	-	-	9	-	1	-	666	10 8	10	
	88	3	1	3	1	-	-	-	-	-	8	-	-	-	533	6 8	8	
	95	43	3	1	-	-	-	-	-	-	46	-	-	1	940	11 13	47	
D	82	-	-	3	-	-	-	-	-	-	3	-	-	-	200		3	
	88	2	-	1	-	-	-	-	-	-	2	-	1	-	200		3	
	95	1	-	-	-	-	-	-	-	-	-	-	1	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	866	Dec:	23%			
												'88	1333		15%			
												'95	1040		1%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus nauseosus albicaulis</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160	20	21	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	200		10%			
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	1	-	-	1	-	-	-	-	-	1	1	-	-	133	14	9	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	24	15	
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300	13	17	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	-	1	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	0%			
												'88	332		19%			
												'95	300		0%			
<i>Gutierrezia sarothrae</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	6	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	80		-			
<i>Leptodactylon pungens</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	88	48	-	-	-	-	-	-	-	-	-	-	48	-	3200		48	
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60		3	
M	82	21	-	-	-	-	-	-	-	-	21	-	-	-	1400	1	7	
	88	34	-	-	-	-	-	-	-	-	-	-	34	-	2266	2	5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	3	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	25	-	-	-	-	-	-	-	-	-	-	16	9	1666		25	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2000	Dec:	0%			
												'88	7132		23%			
												'95	60		0%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	1	-	-	-	-	-	-	-	-	-	3	-	200		3	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	82	8	-	-	-	-	-	-	-	-	8	-	-	-	533	3	7	8
	88	5	-	-	-	-	-	-	-	-	3	-	2	-	333	3	8	5
	95	40	-	-	-	-	-	-	-	-	40	-	-	-	800	5	11	40
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	1	-	4	-	333		5	
	95	2	-	-	-	-	-	-	-	-	-	1	-	1	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	533	Dec:	0%			
												'88	866		38%			
												'95	940		4%			

PERCENT BROWSE COMPOSITION--

Herd unit 13, Study no: 5

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata wyomingensis	59	34	67
Ceratoides lanata	10	9	13
Chrysothamnus nauseosus albicaulis	0	0	2
Chrysothamnus viscidiflorus stenophyllus	2	2	4
Gutierrezia sarothrae	0	0	.99
Leptodactylon pungens	23	49	.74
Opuntia spp.	6	6	12

TREND STUDY 13-6-95

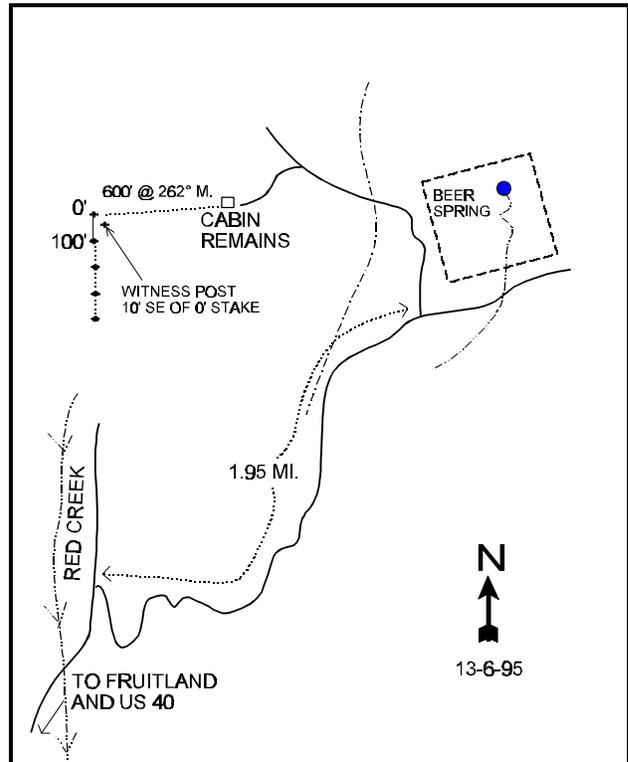
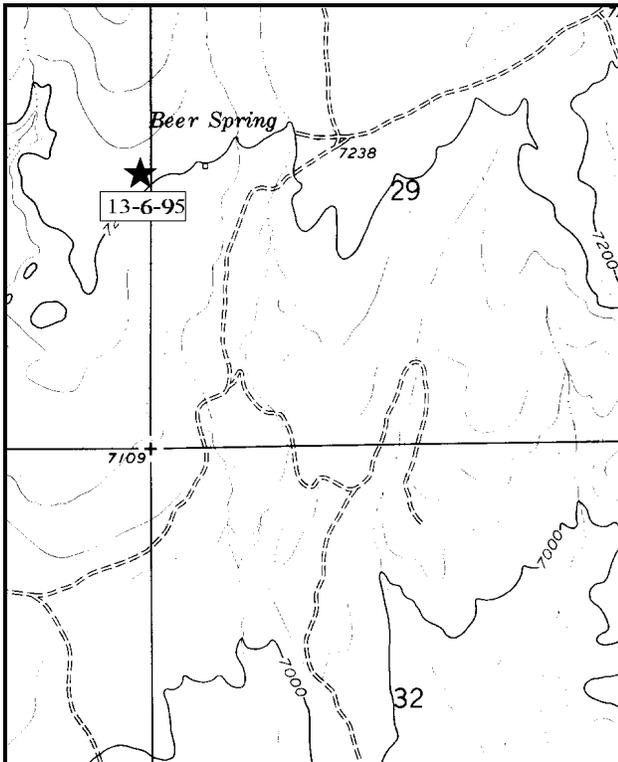
Study site name: Santaquins Cabin. Range type: Chained, Reseeded PJ.

Compass bearing: frequency baseline 174 degrees.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (19 & 94ft), line 2 (29ft), line 3 (57ft), line 4 (71ft).

LOCATION DESCRIPTION

From US 40 in Fruitland, travel north up the Red Creek Road 1.8 miles to a 3-way fork. Take the middle fork and go 2.6 miles. After crossing Red Creek, turn right onto a dirt road. Go northeast up this road for 1.95 miles, keeping left at two major forks. At Beer Spring, turn left and go along the west side of the fenced spring to a wide, shallow wash. Cross the wash, then bear left onto a faint road. Follow it for about 100 yards to the end by the remains of Santaquins cabin. From the cabin walk due west 600 feet, following the old line intercept study, to the 4th stake. From the 4th line-intercept stake, walk 11 paces south to the start of the baseline. The 0-foot baseline stake is marked with red browse tag #7022. The frequency baseline runs at a bearing of 174 degrees true.



Map Name: Tabby Mountain

Diagrammatic Sketch

Township 2S, Range 8W, Section 29

GPS COOR. 5-15-184E 12 44-58-652N

## DISCUSSION

### Trend Study No. 13-6

This trend study is on winter range located near Santaquin's Cabin. The study site is placed on a chained and seeded pinyon-juniper area west of Beer Spring. Elevation is 7,200 feet and the terrain is essentially flat with a slight southerly aspect. The area is owned by the Utah Division of Wildlife Resources.

Soils are fairly deep and fine textured. There is very little surface rock. Erosion is under control as a result of the treatment, which has developed a good cover of grasses, forbs, shrubs and litter. A number of small, south flowing gullies traverse the area but these have stabilized.

The key browse species on the chaining is Wyoming big sagebrush. A small population of white stemmed rubber rabbitbrush produces some additional forage. Density of sagebrush has declined since 1982 but the decline is due to the reduction of young plants which numbered 2,866 plants/acre in 1982 and only 520 in 1995. The number of mature plants and decadent plants combined have remained similar through the years. Percent decadence has remained low and is currently 7%. Utilization has been moderate with 23% of the population classified as heavily hedged in 1988 and 16% in 1995. Vigor was considered poor in 11% of the population in 1988 but by 1995 it was only at 2%. Rubber rabbitbrush has increased in density and currently numbers 2,380 plants/acre. All plants appeared unutilized in 1995.

The herbaceous understory is diverse with 11 perennial grass species and 20 forb species sampled in 1995. Crested, thickspike, and intermediate wheatgrass and a sedge dominate the grass composition by providing 83% of the total grass cover. Nested frequency of grasses increased slightly between 1982 and 1988. By 1995 the two dominate grasses, crested and thickspike wheatgrass, declined significantly in sum of nested frequency since 1988. Frequency of alfalfa also declined significantly.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable to improving. The shrub component, especially Wyoming big sagebrush, is on the increase. Browse diversity, however, could be better. This seems to be another of those seedings where direct seeding of desirable shrubs has largely failed. Interseeding may be a viable option. Grasses and forbs are providing needed watershed protection as well as livestock forage. The highly palatable alfalfa appears to be on the way out. Vegetative trend is stable to improving.

### 1988 TREND ASSESSMENT

Vegetative cover hits were rare in 1988. Basal vegetative cover decreased from 8.5% to 2.37 of the total. Since litter cover was constant, the percentage of bare soil exposed increased. Trend for soil is considered slightly down. The permanent photo-plots associated with the study on DWR land at Santaquins Cabin will help to document the continued succession of this chaining. From the photos, there is an obvious increase in the size and prominence of woody species although cover is still very limited in the area. For some reason, the frequency baseline was established in an area with less sagebrush than is typical over the area as a whole. Along the baseline, sagebrush cover is 1%. On the density plots, sagebrush cover averages 17%. In 1982, a large number of seedling and young big sagebrush were counted. Total sagebrush density was 5,666 plants/acre. For the 1988 rereading, no seedlings were found, but there were still a substantial number of young plants. However, the total sagebrush population was only 4,399 plants/acre, and there was a decrease in the number of mature plants

counted. Correlating with the data, photograph comparisons illustrate the increased size and degree of hedging on the sagebrush. Seven percent of the mature sagebrush were classified as heavily hedged in 1982. In 1988, 21% were in form class 3. The populations of increaser species; broom snakeweed, pricklypear, juniper and pinyon have only slightly increased. Browse trend is considered slightly down.

Quadrat frequency of grasses increased slightly since 1982 while frequency of forbs declined. Overall, trend is stable for the herbaceous understory.

TREND ASSESSMENT

soil - slightly down

browse - slightly down

herbaceous understory - stable

1995 TREND ASSESSMENT

Soil conditions have improved since 1988. Cover of bare ground declined from 42% to 28%, while litter cover continues to decline as churning litter decomposes. Trend is up for soil. The key browse species, Wyoming big sagebrush, has declined in overall density due to a reduction in the number of young plants in the population caused by drought conditions over the past several years. The number of shrubs displaying heavy use declined slightly, vigor improved, and the number of decadent plants declined slightly from 9% to 7% of the population. Trend is considered stable at this time. Trend for the herbaceous understory is up due to an increase in the sum of nested frequency of grasses which makes up 74% of the herbaceous cover. Frequency of forbs remained similar to 1988.

TREND ASSESSMENT

soil - up

browse - stable

herbaceous understory - up for grasses and stable for forbs

VEGETATIVE TRENDS --

Herd unit 13, Study no: 6

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron cristatum	172	*165	44	65	53	3.85
G	Agropyron dasystachyum	152	*113	27	57	36	3.99
G	Agropyron intermedium	-	*86	-	-	31	1.69
G	Bromus inermis	75	*43	29	32	18	.78
G	Carex spp.	-	*60	1	-	19	1.27
G	Elymus junceus	-	*6	-	-	2	.06
G	Festuca ovina	32	*3	9	15	2	.03
G	Oryzopsis hymenoides	46	67	29	24	36	.86
G	Poa secunda	-	*4	-	-	2	.03
G	Sitanion hystrix	11	*16	-	6	9	.13
G	Stipa comata	-	*22	-	-	10	.22
Total for Grasses		488	585	139	199	218	12.94
F	Arabis spp.	-	-	3	-	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Astragalus convallarius</i>	-	*6	1	-	3	.06
F	<i>Astragalus tenellus</i>	91	*23	40	38	10	.28
F	<i>Calochortus nuttallii</i>	-	*8	-	-	5	.03
F	<i>Chenopodium fremontii</i>	-	13	-	-	6	.05
F	<i>Chenopodium leptophyllum</i>	-	3	-	-	1	.00
F	<i>Cirsium</i> spp.	1	2	1	1	2	.01
F	Cruciferae	3	-	-	1	-	-
F	<i>Cryptantha</i>	-	-	11	-	-	-
F	<i>Cymopterus</i> spp.	-	4	-	-	2	.01
F	<i>Descurainia pinnata</i>	-	2	-	-	2	.01
F	<i>Erigeron</i> spp	3	7	-	1	4	.04
F	<i>Hackelia patens</i>	-	-	1	-	-	-
F	<i>Haplopappus nuttallii</i>	-	-	4	-	-	-
F	<i>Lappula occidentalis</i>	-	18	-	-	7	.08
F	<i>Machaeranthera canescens</i>	21	*7	47	10	3	.06
F	<i>Machaeranthera grindelioides</i>	8	*-	-	5	-	.00
F	<i>Medicago sativa</i>	58	*28	18	25	13	1.70
F	<i>Orthocarpus tolmiei</i>	-	*25	-	-	13	.28
F	<i>Pedicularis</i> spp.	-	-	1	-	-	-
F	<i>Penstemon humilis</i>	-	*8	-	-	5	.07
F	<i>Penstemon</i> spp.	-	4	8	-	1	.00
F	<i>Phlox hoodii</i>	8	14	4	4	8	.61
F	<i>Phlox longifolia</i>	-	1	-	-	1	.00
F	<i>Polygonum douglasii</i>	-	*10	-	-	7	.03
F	<i>Potentilla</i> spp.	-	-	1	-	-	-
F	<i>Schoenocrambe linifolia</i>	4	3	4	4	1	.00
F	<i>Senecio multilobatus</i>	3	-	-	1	-	-
F	<i>Sisymbrium altissimum</i>	-	2	-	-	1	.00
F	<i>Sphaeralcea coccinea</i>	24	73	13	13	31	.85
F	<i>Taraxacum officinale</i>	-	*4	-	-	2	.01
F	<i>Tragopogon dubius</i>	1	-	-	1	-	-
F	<i>Trifolium gymnocarpon</i>	-	*12	1	-	5	.22
F	<i>Viola</i> spp.	-	-	4	-	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
Total for Forbs		225	277	162	104	133	4.48
B	Artemisia tridentata wyomingensis	17	58	5	8	26	9.66
B	Atriplex canescens	-	-	1	-	-	-
B	Chrysothamnus greenei	17	*2	2	8	2	.16
B	Chrysothamnus nauseosus albicaulis	3	*26	7	2	11	1.16
B	Chrysothamnus viscidiflorus viscidiflorus	41	*-	11	18	-	-
B	Echinocactus spp.	-	3	-	-	1	.00
B	Eriogonum corymbosum	-	1	-	-	1	.15
B	Gutierrezia sarothrae	16	*8	2	6	4	.24
B	Juniperus osteosperma	-	-	1	-	-	-
B	Leptodactylon pungens	3	*4	5	3	2	.15
B	Opuntia spp.	8	*1	2	5	1	.00
Total for Browse		105	103	36	50	48	11.54

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

BASIC COVER --

Herd unit 13, Study no: 6

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	347	8.50	2.25	29.18
Rock	19	0	.25	.04
Pavement	61	0	0	.14
Litter	393	56.00	55.75	44.87
Cryptograms	60	0	0	1.22
Bare Ground	280	35.50	41.75	27.60

PELLET GROUP FREQUENCY --

Herd unit 13, Study no: 6

Type	Quadrat Frequency
Rabbit	18
Elk	6
Deer	47

BROWSE CHARACTERISTICS --  
Herd unit 13, Study no: 6

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	82	83	-	-	-	-	-	-	-	-	83	-	-	-	5533		83	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	43	-	-	-	-	-	-	-	-	43	-	-	-	2866		43	
	88	9	17	6	-	-	-	-	-	-	32	-	-	-	2133		32	
	95	24	2	-	-	-	-	-	-	-	26	-	-	-	520		26	
M	82	28	11	3	-	-	-	-	-	-	37	5	-	-	2800	20	20	42
	88	5	17	6	-	-	-	-	-	-	24	-	4	-	1866	22	23	28
	95	39	57	18	1	-	-	-	-	-	115	-	-	-	2300	33	38	115
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	2	3	-	-	-	-	-	-	3	-	3	-	400		6	
	95	-	5	6	-	-	-	-	-	-	8	-	-	3	220		11	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16	
Total Plants/Acre (excluding Dead & Seedlings)											'82	5666	Dec:	0%				
											'88	4399		9%				
											'95	3040		7%				
<i>Chrysothamnus greenei</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300	6	15	15
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	0		-				
											'95	300		-				
<i>Chrysothamnus nauseosus albicaulis</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	1	-	-	-	-	-	-	2	-	1	-	200		3	
	95	11	-	-	-	-	-	-	-	-	9	-	-	-	220		11	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	108	-	-	-	-	-	-	-	-	108	-	-	-	2160	14	14	108
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	200		-				
											'95	2380		-				
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	10	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	11	15	3
Total Plants/Acre (excluding Dead & Seedlings)											'82	66	Dec:	-				
											'88	0		-				
											'95	80		-				

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Echinocactus</i> spp.																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	2	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Eriogonum corymbosum</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	15	13	1
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	16	30	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	80		-			
<i>Eriogonum microthecum</i>																		
M	82	1	-	-	-	-	-	-	-	-	-	1	-	-	66	15	16	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200	6	9	3
	95	32	-	-	-	-	-	-	-	-	32	-	-	-	640	9	11	32
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	200		-			
												'95	680		-			
<i>Juniperus osteosperma</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Leptodactylon pungens</i>																		
M	82	8	-	-	-	-	-	-	-	-	8	-	-	-	533	2	7	8
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160	6	7	8
Total Plants/Acre (excluding Dead & Seedlings)												'82	533	Dec:	-			
												'88	0		-			
												'95	160		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Opuntia spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	14	-	-	-	-	-	-	-	-	14	-	-	-	933	3	13	14
	88	21	-	-	-	-	-	-	-	-	21	-	-	-	1400	3	4	21
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	6	14	6
Total Plants/Acre (excluding Dead & Seedlings)												'82	933	Dec:	-			
												'88	1533		-			
												'95	120		-			
Pinus edulis																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	0		-			
Tetradymia canescens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	12	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 13, Study no: 6

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata wyomingensis	78	67	44
Chrysothamnus greenei	0	0	4
Chrysothamnus nauseosus albicaulis	0	3	35
Chrysothamnus viscidiflorus viscidiflorus	.91	0	1
Echinocactus spp.	0	0	.29
Eriogonum corymbosum	0	1	1
Eriogonum microthecum	.91	0	0
Gutierrezia sarothrae	0	3	10
Juniperus osteosperma	0	1	0
Leptodactylon pungens	7	0	2
Opuntia spp.	13	23	2
Pinus edulis	0	1	0
Tetradymia canescens	0	0	0

TREND STUDY 13-7-95

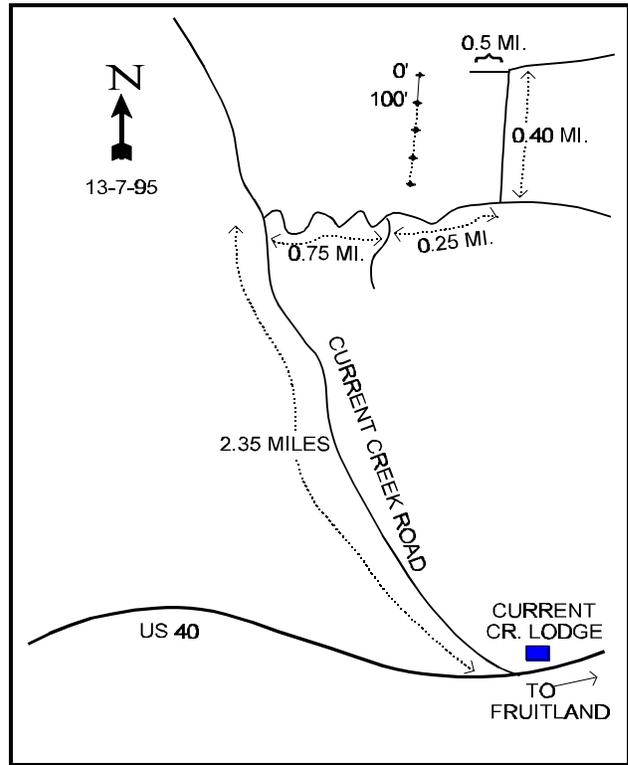
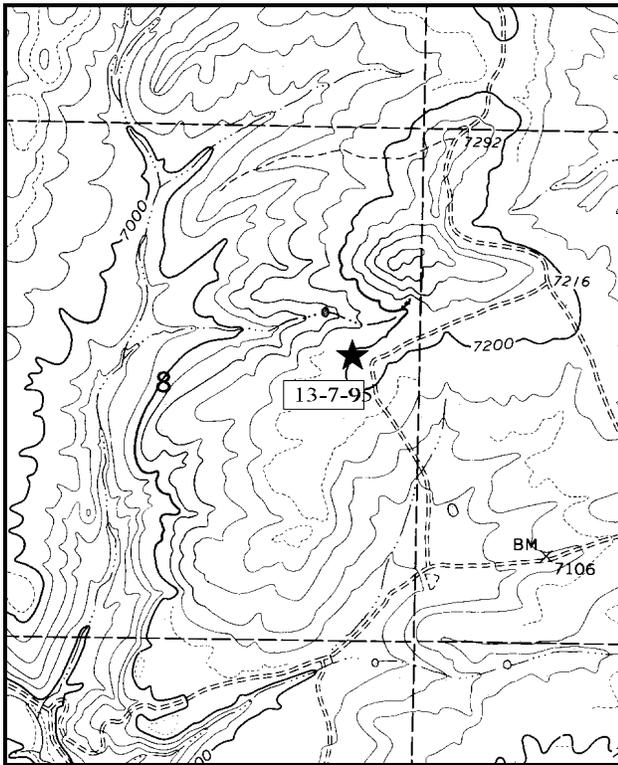
Study site name: Cutoff. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 194 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (6 & 90ft), line 2 (26ft), line 3 (57ft), line 4 (69ft).

LOCATION DESCRIPTION

From the intersection of Currant Creek Road and Highway U.S. 40, drive north on the Currant Creek Road for 2.35 miles. Turn right and go east for one mile to an intersection. Turn left and drive north for .40 miles to a "T". At the "T", turn left (west) and go 0.05 miles to the roads end. From the end of the road, the 0-foot baseline stake is approximately 150 feet west.



Map Name: Deep Creek Canyon

Diagrammatic Sketch

Township 3S, Range 9W, Section 8

GPS COOR. 5-06-881E 12 44-53-877N

## DISCUSSION

### Trend Study No. 13-7

This trend study is on Division of Wildlife Resource lands which are classified as winter range in the "Cutoff" area immediately north of Currant Creek Lodge. The range type is sagebrush-grass, with a slope of 10% to 20% west aspect. Elevation is approximately 7,200 feet. Pellet group frequency data indicates the area is used heavily by deer.

Soils are fairly deep and moderately fine textured with little surface rock. Percent bare ground has quite variable ranging from 34% to 46%. It is currently at 34% with some pedestaling and gully formation apparent. On nearby steeper slopes, erosion is more serious and widespread than on the study site.

The key browse species is mountain big sagebrush, although a variety of other browse plants are also present including, serviceberry, true mountain mahogany, mountain low rabbitbrush, and bitterbrush. Population density for mountain big sagebrush was estimated at 1,866 plants/acre in 1982. Use was mostly light, vigor was good, and percent decadency was 21%. By 1988, density increased to 2,199 plants/acre, but percent decadency rose to 69%. Use was light to moderate. This increase in decadency is the result of an over mature population, interspecific competition, combined with drought. During the 1995 reading, population density was estimated at 3,000 plants/acre. Use was heavy on 56% of the mature and decadent shrubs and vigor reduced on 25% of the population. Percent decadency has declined to 39% and will likely decline further in the future as 54% of the decadent shrubs appear to be dying. Dead sagebrush, first counted in 1995, number 920 plants/acre. Seedlings are rare, but 16% of the population consist of young plants. Other preferred browse occur in small numbers and do not appear to be heavily utilized.

Grasses and forbs combine to produce 60% of the vegetation cover. Nine perennial grass species were encountered in 1997 with thickspike wheatgrass, needle-and-thread, bluebunch wheatgrass, Indian Ricegrass, and mutton grass being the most abundant. Forbs are abundant, yet do not contain many useful species. Timber poisonvetch, Tolmie owlclover, and hoods phlox produce 63% of the forb cover.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable to declining. Soil movement, while not rapid, is still a long-term problem. Vegetation trend also shows a slight decline, which could be reversed in a relatively short time. The most obvious problems involve browse composition and age structure and vigor of the key species. Prior to Division of Wildlife Resources acquisition in 1981, the area had been grazed by livestock during the summer and fall. A spring grazing program designed to enhance the browse component might prove beneficial if the increaser shrubs currently present can be held static or even reduced.

### 1988 TREND ASSESSMENT

There was an increase in percent bare ground from 39% to 46%. Litter cover also declined but basal vegetative cover increased slightly and frequency of herbaceous vegetation increased. There is continued gully erosion evident on the site, but other soil trend indicators are stable. Trend for soil is considered stable but in poor condition. A variety of browse is available, but mountain big sagebrush is the key species. Frequency of big sagebrush, along with all the browse species including the small increasers, has increased slightly. For the sagebrush however, the most important change is in the age class composition. The mostly mature sagebrush population found in 1982 is now 69% decadent. There are few young plants. The sagebrush is lightly to moderately hedged. Sagebrush cover averages 12%. The more palatable, but less common, shrubs such as true

mountain mahogany, serviceberry, and bitterbrush are also only lightly to moderately hedged. Although poorly sampled due to low numbers, more individuals of these species were counted in 1988 and all are vigorous. Young shrubs are common. Trend for browse is down. In the understory, frequency of grasses and forbs has increased. Trend for grasses and forbs is up.

TREND ASSESSMENT

soil - stable but in poor condition.

browse - down due to increased decadency and reduced vigor

herbaceous understory - up

1995 TREND ASSESSMENT

The soil trend is up. The amount of exposed bare soil is down from 46% to 34%. Litter cover continued to decline slightly, but cover of cryptogamic plants increased to over 5%. There are currently no active gullies on the site, but signs of past soil movement such as pedestaling are evident. Trend for browse is mixed for the key browse species, mountain big sagebrush. The number of mature plants is similar to that found in 1982 (1,400 to 1,340 plants/acre) and the number of decadent plants declined from 69% to 39%. On the negative side, heavy use increased. No heavy use was reported on sagebrush in 1982 or 1988. During the 1995 reading, 56% of the mature and decadent shrubs displayed heavy hedging. Those plants classified with poor vigor equaled 21%. In addition, 54% of the decadent plants (640 plants/acre) were classified as dying. Dead plants numbered 920 plants/acre indicating a recent die off. Few seedlings were found, yet young plants were moderately abundant. It appears that the population may decline in the future but the resulting population will be younger showing better health as long as use is not too extreme. Trend for browse is considered slightly down. Trend for the herbaceous understory is up with an increase in the sum of nested frequency of perennial grasses and forbs. Nested frequency of thickspike wheatgrass increased significantly while frequency of Indian ricegrass and muttongrass declined significantly. Overall, nested frequency of grasses increased by 18%. Nested frequency of forbs increased by 20%.

TREND ASSESSMENT

soil - up

browse - slightly down due to high decadence poor vigor and heavy use

herbaceous understory - up

VEGETATIVE TRENDS --

Herd unit 13, Study no: 7

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	181	*203	54	67	70	2.23
G	Agropyron spicatum	-	*32	-	-	11	1.14
G	Bromus tectorum	-	3	-	-	1	.00
G	Carex spp.	3	46	-	1	20	.27
G	Elymus salina	39	67	-	13	27	.99
G	Oryzopsis hymenoides	145	*79	48	58	33	1.20
G	Poa fendleriana	148	*118	15	59	49	1.35
G	Poa secunda	-	*7	5	-	3	.01
G	Sitanion hystrix	-	1	-	-	1	.00

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Stipa comata</i>	-	*74	14	-	29	2.25
Total for Grasses		516	630	136	198	244	9.48
F	<i>Agoseris glauca</i>	-	3	-	-	2	.01
F	<i>Allium</i> spp.	-	*104	-	-	45	.45
F	<i>Antennaria rosea</i>	68	*48	18	30	21	.52
F	<i>Androsace septentrionalis</i>	-	35	-	-	13	.14
F	<i>Arabis</i> spp.	6	5	3	4	5	.02
F	<i>Astragalus convallarius</i>	83	139	43	35	59	3.79
F	<i>Astragalus tenellus</i>	4	3	2	2	2	.62
F	<i>Castilleja chromosa</i>	4	4	-	2	3	.07
F	<i>Calochortus nuttallii</i>	-	3	-	-	1	.01
F	<i>Chaenactis douglasii</i>	25	*9	15	12	5	.02
F	<i>Chenopodium fremontii</i>	-	6	-	-	3	.01
F	<i>Chenopodium leptophyllum</i>	-	11	-	-	6	.03
F	<i>Cirsium</i> spp.	2	-	-	1	-	-
F	<i>Collinsia parviflora</i>	-	62	-	-	25	.22
F	<i>Crepis acuminata</i>	-	*9	-	-	5	.19
F	<i>Cryptantha</i> spp.	3	-	-	3	-	-
F	<i>Cymopterus</i> spp.	-	*3	-	-	1	.00
F	<i>Descurainia</i> spp.	-	10	-	-	4	.07
F	<i>Eriogonum cernuum</i>	-	3	-	-	1	.01
F	<i>Erigeron pumilus</i>	36	*27	19	18	14	.07
F	<i>Gayophytum ramosissimum</i>	-	7	-	-	3	.06
F	<i>Hedysarum boreale</i>	-	*30	-	-	12	.61
F	<i>Lappula occidentalis</i>	-	19	-	-	10	.05
F	<i>Lithospermum ruderale</i>	1	3	-	1	2	.03
F	<i>Lomatium</i> spp.	-	*21	-	-	12	.06
F	<i>Machaeranthera canescens</i>	151	*19	51	66	11	.08
F	<i>Mammillaria</i> spp.	1	-	-	1	-	-
F	<i>Orthocarpus tolmiei</i>	-	*81	20	-	39	2.25
F	<i>Penstemon</i> spp.	-	2	9	-	1	.00
F	<i>Phlox hoodii</i>	142	*108	45	64	48	1.58
F	<i>Phlox longifolia</i>	-	*30	-	-	14	.12
F	<i>Polygonum douglasii</i>	-	53	-	-	22	.13

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Schoenocrambe linifolia	-	5	-	-	2	.01
F	Sphaeralcea coccinea	55	*31	21	24	14	.45
F	Tragopogon spp.	-	-	2	-	-	-
F	Trifolium gymnocarpon	5	50	-	2	22	.24
Total for Forbs		586	943	248	265	427	12.01
B	Amelanchier alnifolia	3	*7	3	3	2	.82
B	Artemisia tridentata vaseyana	41	*59	15	20	25	10.52
B	Cercocarpus montanus	18	*3	4	9	1	.56
B	Chrysothamnus depressus	58	*32	20	32	14	1.13
B	Chrysothamnus viscidiflorus lanceolatus	46	*8	8	24	5	.31
B	Eriogonum corymbosum	37	*11	10	20	5	.30
B	Opuntia spp.	2	17	3	2	8	.14
B	Tetradymia canescens	12	3	6	5	2	.33
Total for Browse		217	140	69	115	62	14.14

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

BASIC COVER --

Herd unit 13, Study no: 7

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	353	11.50	13.00	32.34
Rock	14	.75	1.25	.20
Pavement	91	.75	.25	.26
Litter	389	45.00	38.50	35.52
Cryptograms	149	2.75	1.00	5.24
Bare Ground	326	39.25	46.00	34.07

PELLET GROUP FREQUENCY --

Herd unit 13, Study no: 7

Type	Quadrat Frequency '95
Rabbit	25
Elk	3
Deer	44

BROWSE CHARACTERISTICS --  
Herd unit 13, Study no: 7

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	1	-	-	-	-	-	6	-	-	-	400		6	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	2	-	-	-	-	-	-	-	-	2	-	-	133	16	22	2
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	6	-	2	-	-	-	-	-	13	-	-	-	260	22	26	13
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	200		-			
												'95	320		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	21	3	-	-	-	-	-	-	-	24	-	-	-	480		24	
M	82	14	7	-	-	-	-	-	-	-	15	6	-	-	1400	18	26	21
	88	3	5	-	-	-	-	-	-	-	8	-	-	-	533	18	23	8
	95	10	25	31	1	-	-	-	-	-	67	-	-	-	1340	20	34	67
D	82	-	6	-	-	-	-	-	-	-	5	1	-	-	400		6	
	88	15	8	-	-	-	-	-	-	-	15	-	-	8	1533		23	
	95	4	13	40	1	1	-	-	-	-	27	-	-	32	1180		59	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	920		46	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1866	Dec:	21%			
												'88	2199		69%			
												'95	3000		39%			
<i>Ceratoides lanata</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	14	9	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	8	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	6	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	3	-	-	-	-	-	-	-	-	3	-	-	200	20	19	3
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	7	5	-	-	-	-	-	-	-	12	-	-	-	240	22	31	12
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	-			
												'88	400		-			
												'95	260		-			
<i>Chrysothamnus depressus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	8	-	-	1	-	-	-	-	-	9	-	-	-	600	3	6	9
	95	123	-	-	-	-	-	-	-	-	123	-	-	-	2460	6	11	123
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	666		-			
												'95	2520		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	23	-	-	-	-	-	-	-	-	23	-	-	-	1533	12	15	23
	88	36	-	-	1	-	-	-	-	-	37	-	-	-	2466	8	8	37
	95	62	-	-	6	-	-	-	-	-	68	-	-	-	1360	11	14	68
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	2	-	-	-	-	-	3	-	-	2	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1533	Dec:	0%			
												'88	3132		10%			
												'95	1480		0%			
<i>Eriogonum corymbosum</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	13	11	2
	95	32	-	-	-	-	-	-	-	-	32	-	-	-	640	13	18	32
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	732		36%			
												'95	800		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Eriogonum microthecum</i>																		
M	82	11	-	-	-	-	-	-	-	-	11	-	-	-	733	17	15	11
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	733	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Opuntia spp.</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533			8
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200	3	5	3
	88	4	-	-	-	-	-	3	-	-	7	-	-	-	466	1	2	7
	95	13	-	-	-	-	-	-	-	-	13	-	-	-	260	4	11	13
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	95	1	-	-	-	-	-	-	-	-	-	-	1	20			1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	999		20%			
												'95	340		5%			
<i>Purshia tridentata</i>																		
M	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66	14	30	1
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133	19	39	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	133		-			
												'95	0		-			
<i>Tetradymia canescens</i>																		
M	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200	8	15	3
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	6	1
	95	6	1	-	-	-	-	-	-	-	7	-	-	-	140	11	17	7
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	-			
												'88	66		-			
												'95	140		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 13, Study no: 7

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	3	2	4
<i>Artemisia tridentata</i> <i>vaseyana</i>	37	26	34
<i>Ceratoides lanata</i>	1	0	0
<i>Cercocarpus montanus</i>	4	5	3
<i>Chrysothamnus depressus</i>	0	8	28
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	31	37	17
<i>Eriogonum corymbosum</i>	0	9	9
<i>Eriogonum microthecum</i>	15	0	0
<i>Opuntia</i> spp.	4	12	4
<i>Purshia tridentata</i>	1	2	0
<i>Tetradymia canescens</i>	4	.78	2

TREND STUDY 13-8-95

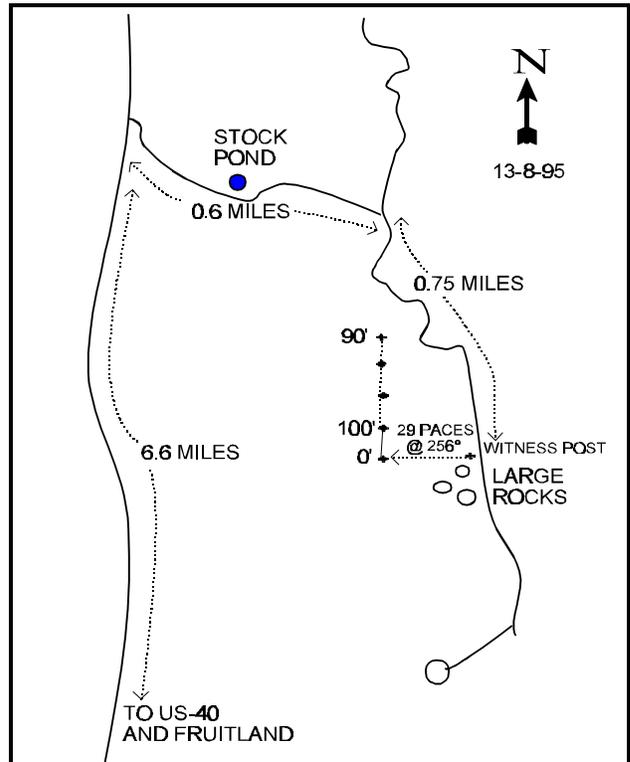
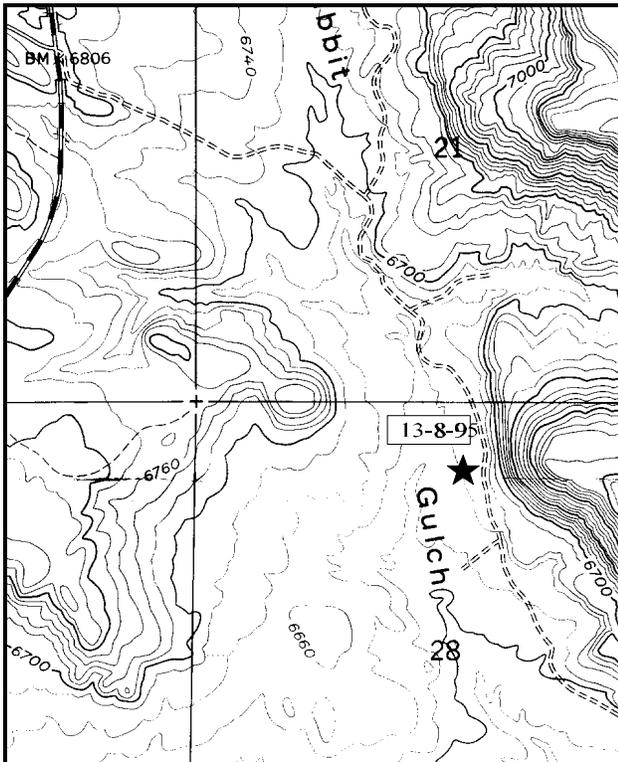
Study site name: Two Bar Ranch. Range type: Saaebrush - Grass.

Compass bearing: frequency baseline 2 degree.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (9 & 85ft), line 2 (26ft), line 3 (45ft), line 4 (60ft).

LOCATION DESCRIPTION

From U.S. 40 five miles east of Fruitland, take Rt. 208 north towards Tabiona for 6.6 miles. Just after a small road cut, there is a road on the right. Turn right towards Rabbit Gulch and go .75 miles to an intersection. Turn right (south) and go another .75 miles down a gully-riden road to two large rocks on the west side of the road. From the highest point of the first rock, the 0-foot baseline stake is 25 paces away bearing 269°.



Map Name: Tabiona

Diagrammatic Sketch

Township 2S, Range 7W, Section 28

GPS COOR. 5-27-251E 12 44-59-263N

## DISCUSSION

### Trend Study No. 13-8

This study is in the upper part of Rabbit Gulch near the base of Blacktail Ridge. The study site is a large sagebrush flat with a gentle (5%) slope and a west exposure at an elevation of 6,580 feet. This is the lowest elevation trend study on the herd unit. Protective big-game cover is limited in the sagebrush flat, but good thermal protection is available in the pinyon-juniper woodland along the ridge. This entire area is critical deer winter range and is grazed by cattle during the spring and fall periods. There is evidence of substantial deer use on the study site. Pellet group frequency data from 1995 indicated moderate numbers of deer and elk use this area.

Soils are alluvially deposited, deep and somewhat sandy in texture. Exposed bare ground (47%) was extensive and erosion was occurring at an accelerated rate, as evidenced by many small rills and gullies in 1982. Vegetation was sparse and generally inadequate to prevent soil movement. Conditions have improved since then but still are only poor to fair. The major changes are that percent bare ground has declined to only about 34% and there has been large improvements in protective herbaceous ground cover.

The key browse species consist of Wyoming big sagebrush with shadscale, which is of secondary importance. Density of sagebrush has fluctuated considerably since 1982 when 2,533 sagebrush plants/acre were estimated. In 1988 that number increased by 74% to 9,865 plants/acre. However, the number of mature plants has remained about the same in 1982 and 1988 (2,000 to 2,066 plants/acre) with a 32% increase by 1995 to 3,020 plants/acre. The large increase reported in 1988 was primarily the result of a significant increase in young plants which rose from 333 plants/acre in 1982 to 6,466 by 1988. The number of decadent plants also increased from 200 to 1,333 plants/acre but due to the large number of young plants, percent decadency remained low at 13%. During the 1995 reading, population density declined to 5,080 plants/acre due to a decline in the young age class and number of decadent plants. Percent decadency remained similar at 14%, but 45% of the decadent plants are now classified as dying. This could mean that with the continued drought there could be a larger number of dead plants when it is sampled next time. In 1995, there was one dead plant for every four plants in the population, or 20% were dead (1,320 plants/acre). Use was also heavier in 1995 with 42% of the mature and decadent plants displaying heavy use compared to 3% in 1988. There still appears to be adequate numbers of seedling and young plants to maintain the current population.

Shadscale are moderately abundant with a current population density of 3,080 plants/acre. Use is mostly light and vigor generally good. The population appears stable.

The herbaceous understory is deficient. Four perennial grass species, thickspike wheatgrass, Indian ricegrass, squirreltail, and needle-and-thread make up the bulk of the herbaceous cover (81%). Perennial forbs are scarce with hoary aster, longleaf phlox, and scarlet globemallow combining to produce 69% of the meager forb cover. Total forb cover is just barely over 1%.

### 1982 APPARENT TREND ASSESSMENT

Currently, this area is rather poor quality winter range. Significant improvements are possible but will be difficult to achieve. Soil trend is declining and must be reversed if any vegetative change is to occur. Vegetatively, the area is stable but at a low level of plant species variety. A principle management goal should be to improve species diversity among all vegetative components.

1988 TREND ASSESSMENT

There appears to have been a significant decrease in vegetative basal cover and litter cover. Although there was an increase in cryptogamic cover from 2.51 to 12%, there was an overall decrease in total protective ground cover in 1988. There is a large amount of bare soil (53%). Small gullies have expanded since the 1982 study, with accelerated soil loss continuing. Soil trend is down. Although the total number of sagebrush has increased by 2½ times on the density plots, the density of mature plants and mean sagebrush occurrence are unchanged. There is a moderately dense stand of mature sagebrush, 2,066 plants/acre, and consistent canopy cover of 8%. More decadent, but also many more young plants were found in 1988. The degree of hedging has increased since 1982. Hedging on 55% of the available sage is moderate, whereas most (93%) were rated as lightly hedged in 1982. Trend appears up due to the large numbers of seedling and young plants and a stable mature population. Trend for the herbaceous understory is stable but in poor condition. Quadrat frequency of grasses increased slightly while frequency of forbs declined.

TREND ASSESSMENT

soil - down

browse - up

herbaceous understory - stable but in poor condition

1995 TREND ASSESSMENT

Soil conditions have improved but are still poor. Percent bare ground declined from 53% in 1988 to 34%. Litter cover remained similar and cryptogamic cover increased to 16%. In addition, sum of nested frequency of grasses increased providing improved soil protection. Trend for soil is up but still only fair condition. The browse trend is stable. Past data suggest wide fluctuations in population density of Wyoming big sagebrush. However, percent decadency has remained similar to 1988 estimates (13% vs 14%) and there are adequate numbers of seedlings and young plants to maintain the population. The proportion of plants displaying heavy use has increased from 3% to 35%. This could cause an increase in decadence in the future as heavy use increases or if use is consistently high for several years. Trend for the herbaceous understory is up for grasses and forbs but still deficient.

TREND ASSESSMENT

soil - up

browse - stable

herbaceous understory - up but still deficient

VEGETATIVE TRENDS --

Herd unit 13, Study no: 8

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	132	*173	11	45	59	2.55
G	Bromus tectorum	-	1	-	-	1	.00
G	Carex spp.	73	*38	14	28	16	.23
G	Oryzopsis hymenoides	40	65	57	19	28	1.10
G	Sitanion hystrix	29	*29	-	12	11	1.33

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Sporobolus cryptandrus	-	2	-	-	1	.00
G	Stipa comata	29	51	8	12	19	1.82
Total for Grasses		303	359	90	116	135	7.07
F	Arabis spp.	-	*7	-	-	3	.04
F	Chenopodium fremontii	-	3	-	-	2	.01
F	Chenopodium leptophyllum	-	6	-	-	5	.02
F	Descurainia spp.	-	1	-	-	1	.00
F	Draba spp.	-	3	-	-	1	.00
F	Eriogonum cernuum	-	2	-	-	2	.01
F	Lappula occidentalis	-	16	-	-	7	.03
F	Lepidium spp.	-	24	-	-	9	.12
F	Lychnis drummondii	1	-	22	1	-	-
F	Machaeranthera canescens	6	*32	10	2	15	.22
F	Phlox longifolia	3	*81	-	2	34	.21
F	Plantago patagonica	-	9	-	-	4	.07
F	Schoenocrambe linifolia	2	*10	-	1	6	.03
F	Sphaeralcea coccinea	52	65	20	22	27	.45
F	Townsendia incana	-	1	-	-	1	.03
Total for Forbs		64	260	52	28	117	1.28
B	Artemisia tridentata vaseyana	66	*73	29	32	35	11.23
B	Atriplex confertifolia	34	*39	21	19	20	2.59
B	Ceratoides lanata	-	-	1	-	-	-
B	Opuntia spp.	23	*24	6	13	9	1.10
B	Pinus edulis	2	-	-	1	-	.15
B	Sarcobatus vermiculatus	7	*9	5	3	5	1.28
B	Tetradymia spinosa	-	1	-	-	1	.00
Total for Browse		132	146	62	68	70	16.36

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 13, Study no: 8

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	323	5.50	2.00	26.45
Rock	21	0	1.00	.06
Pavement	39	0	.50	.12
Litter	393	45.25	31.50	29.09
Cryptograms	289	2.50	12.25	15.82
Bare Ground	339	46.75	52.75	33.79

PELLET GROUP FREQUENCY --

Herd unit 13, Study no: 8

Type	Quadrat Frequency '95
Rabbit	2
Elk	17
Deer	28

BROWSE CHARACTERISTICS --

Herd unit 13, Study no: 8

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia nova																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	23	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:		-		
												'88	0			-		
												'95	0			-		

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	30	-	-	-	-	-	-	-	-	30	-	-	-	2000		30	
	88	8	14	-	-	-	-	6	-	-	23	5	-	-	1866		28	
	95	13	-	-	4	-	-	-	-	-	17	-	-	-	340		17	
Y	82	5	-	-	-	-	-	-	-	5	-	-	-	333		5		
	88	24	35	1	-	-	-	37	-	96	-	1	-	6466		97		
	95	33	15	11	3	3	-	-	-	65	-	-	-	1300		65		
M	82	27	3	-	-	-	-	-	-	27	3	-	-	2000	25	29	30	
	88	18	12	1	-	-	-	-	-	30	1	-	-	2066	22	21	31	
	95	4	84	62	-	1	-	-	-	150	-	1	-	3020	21	30	151	
D	82	1	2	-	-	-	-	-	-	1	2	-	-	200		3		
	88	5	11	3	-	-	-	1	-	19	1	-	-	1333		20		
	95	3	15	17	-	3	-	-	-	21	-	-	17	760		38		
X	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	-	-	-	-	-	-	-	-	-	-	-	1320		66		
Total Plants/Acre (excluding Dead & Seedlings)												'82	2533	Dec:	7%			
												'88	9865		13%			
												'95	5080		14%			
<i>Atriplex confertifolia</i>																		
S	82	17	-	-	-	-	-	-	-	17	-	-	-	1133		17		
	88	5	-	-	-	-	-	-	-	5	-	-	-	333		5		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	82	19	-	-	-	-	-	-	-	19	-	-	-	1266		19		
	88	12	1	-	-	-	-	2	-	15	-	-	-	1000		15		
	95	30	-	-	1	-	-	-	-	31	-	-	-	620		31		
M	82	13	7	-	-	-	-	-	-	16	4	-	-	1333	12	20	20	
	88	24	2	1	-	-	-	1	-	28	-	-	-	1866	10	10	28	
	95	106	11	4	-	-	-	-	-	121	-	-	-	2420	12	19	121	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	5	3	-	-	-	-	-	-	8	-	-	-	533		8		
	95	2	-	-	-	-	-	-	-	-	-	-	2	40		2		
Total Plants/Acre (excluding Dead & Seedlings)												'82	2599	Dec:	0%			
												'88	3399		15%			
												'95	3080		1%			
<i>Ceratoides lanata</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	6	7	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Chrysothamnus viscidiflorus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	1	-	-	-	-	-	-	-	1	-	-	-	20	10	4	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	29	-	-	-	-	-	-	-	-	29	-	-	-	1933	4	3	
	95	53	-	-	1	-	-	-	-	-	53	-	-	1	1080	5	15	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	8	-	-	-	-	-	-	-	-	4	-	-	4	160		8	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	2066		0%			
												'95	1260		12%			
Pinus edulis																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	1	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	0		-			
Sarcobatus vermiculatus																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	95	19	-	-	-	-	-	-	-	-	19	-	-	-	380		19	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	39	27	
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320	47	38	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	1399		9%			
												'95	700		0%			

PERCENT BROWSE COMPOSITION--  
Herd unit 13, Study no: 8

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia nova</i>	0	0	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	49	59	50
<i>Atriplex confertifolia</i>	51	20	30
<i>Ceratoides lanata</i>	0	0	0
<i>Chrysothamnus viscidiflorus</i>	0	0	.19
<i>Opuntia</i> spp.	0	12	12
<i>Pinus edulis</i>	0	.39	0
<i>Sarcobatus vermiculatus</i>	0	8	7

## SUMMARY

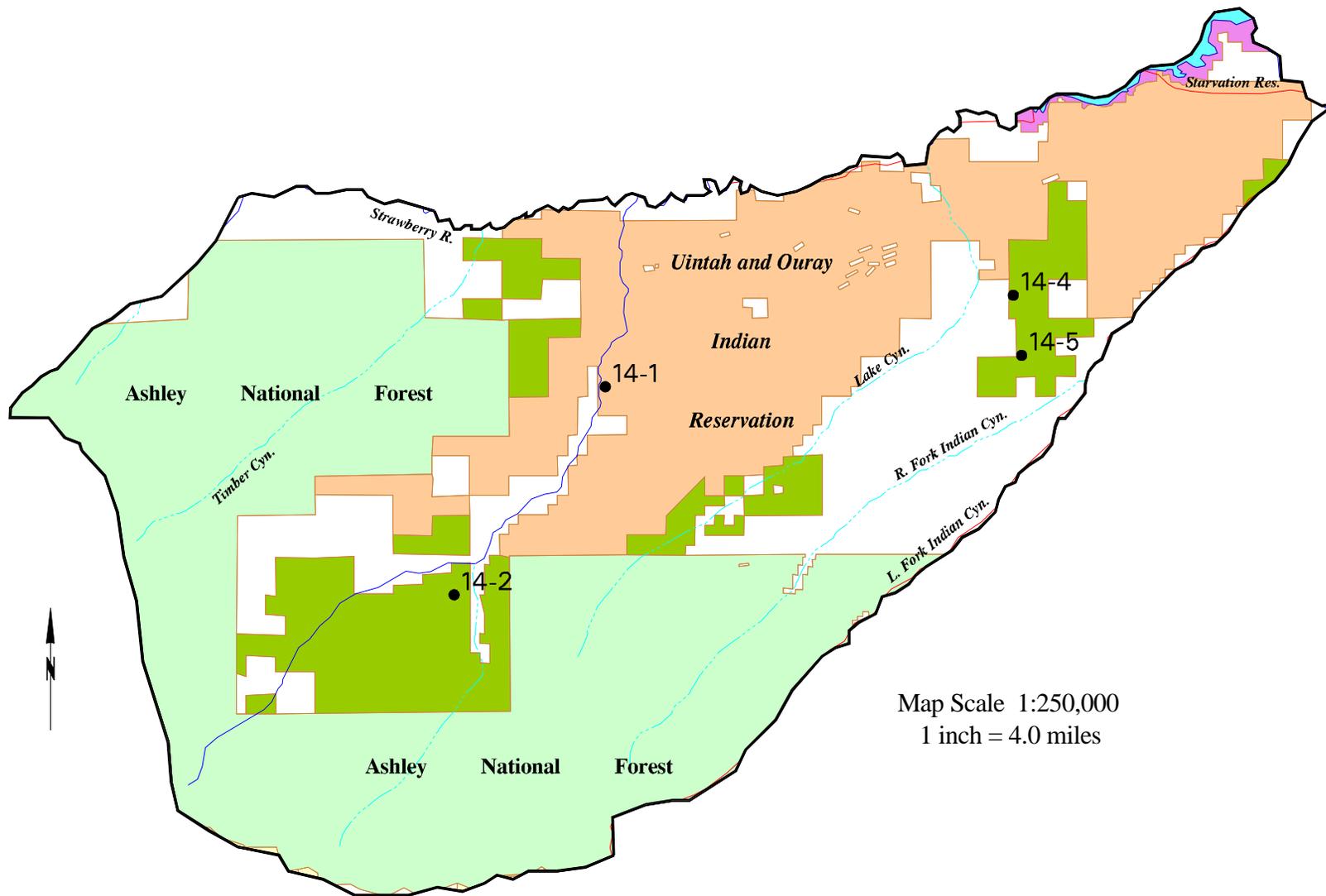
### DEER HERD UNIT - 13 - CURRANT CREEK

Overall, trends for soil and herbaceous plants on unit 13 are upward compared to 1982 data. Browse trends are down on three of the six sites. Soil trends on the three Wyoming big sagebrush sites, Grey Wolf Mountain (#13-4), Lower Santaquin Draw (#13-5) and Two Bar Ranch (#13-8), are all improving due to reduced bare ground and improving herbaceous understories. The herbaceous component at Two Bar Ranch is still deficient however. The sites at Grey Wolf Mountain and Two Bar Ranch show stable browse trends compared to 1988 data and slightly upward browse trends overall. Lower Santaquin Draw displays an upward trend when compared to 1982 or 1988 data.

The mountain big sagebrush site at Blacktail Ridge (#13-2) shows a stable soil trend compared to 1988 data and an overall upward trend since 1982. The herbaceous trend is currently slightly down but upward overall. The browse trend is currently up but down overall. The trend study at Cut Off (#13-7) displays the same overall trends as Blacktail Ridge, but currently has an upward soil and herbaceous trend and a slightly downward browse trend.

The study at Santaquin's Cabin (#13-6) samples a pinyon-juniper chaining. Trend for soil and the herbaceous understory is up and slightly up respectively. The browse trend is currently stable but slightly down overall.

# Deer Management Unit 14 –1995 Transect Locations

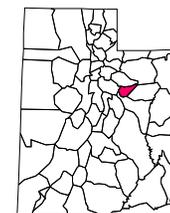


Map Scale 1:250,000  
1 inch = 4.0 miles

## LEGEND

 Forest Service	 State Wildlife Res./Mgmt. Area	 Road
 BLM	 State Park/Rec. Area	 Perennial Stream
 Native American	 Water Body	 Intermittent Stream
 Private Land	 Transect Location	

## MAP LOCATION



## DEER HERD UNIT - 14 - AVINTAQUIN

### Boundary Description

Duchesne, Utah, and Wasatch counties - Boundary begins at Duchesne and Highway US-191; then southerly on US-191 to the Reservation Ridge road; westerly and northerly on this road to Big Beaver Springs road; northerly on this road to Big Beaver Springs and Beaver Canyon; northeasterly along this canyon to the Strawberry River; easterly along this river to Duchesne and beginning point (excluding all Ute Tribal lands within this boundary).

### Herd Unit Description

The Avintaquin deer herd unit has approximately 97,361 acres of summer range, 96% of which is administered by the Forest Service (Evans 1995). The other 4% is privately owned. Winter range acreage totals about 141,513 acres, where 47% is on Ute Tribal lands and 26% is on private lands. The State of Utah administers an additional 18%.

The principal limiting factor on the unit is most likely the condition and productivity of the winter range. Winter range extends as high as 8,500 feet in elevation during severe winters. The canyon bottoms of the Strawberry River and its tributaries are very important. The dominant vegetative type on the winter range is pinyon-juniper woodland. There are other areas, smaller in size, that also play an important role for usefulness as winter range. Most notably they are pinyon-juniper chainings and sagebrush-grass areas. See Coles and Pederson (1967) and Giunta (1979) for a more detailed description of habitat.

### Big Game Trends

The unit has always been popular for deer hunting. However, the trends for buck harvest have been down since 1,176 bucks were harvested in 1983. The average over the five year period 1983-1987 was 745 bucks/year, with 2,171 hunters and a 34% success rate. These are similar to the previous five-year averages, although between years the harvest statistics have always been highly variable. Between 1988 and 1994, harvests averaged only 354 bucks per year. After the severe winter of 1992-93, harvests were less than 100 bucks per year. The fawn/doe ratio averaged only 50 fawns/100 does between 1990-91 and 1994-95. The 1997 herd management plan objectives is to have a modeled target winter herd size of 3,000 with an annual harvest objective of 350 bucks. Once the objective is met or range conditions warrant stabilizing or reducing the population, antlerless permits can be utilized to accomplish this management objective.

### Trend Study Description

On the Avintaquin deer herd unit #14, three range trend studies were established on DWR land, one on private land and one on the Uintah and Ouray Indian Reservation (#14-3). There is little Federally-owned winter range, the majority remains under private ownership or on the Indian Reservation. All study sites sample deer winter range. Two sites sample pinyon-juniper chainings, one samples an open pinyon-juniper woodland, and two sites are placed on higher elevation mountain brush winter range. This herd unit is not ranked as a priority for winter range acquisition. All sites were originally established in 1982 and reread in 1988 and 1995.

TREND STUDY 14-1-95

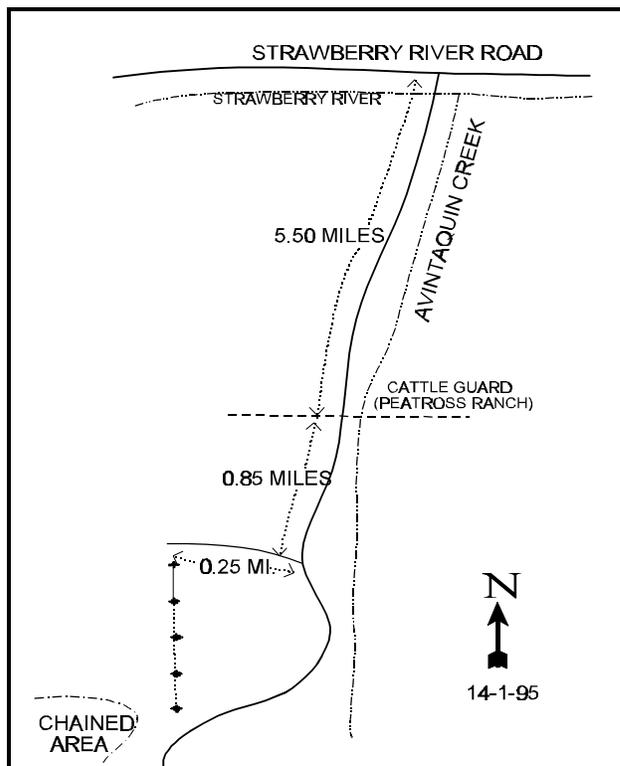
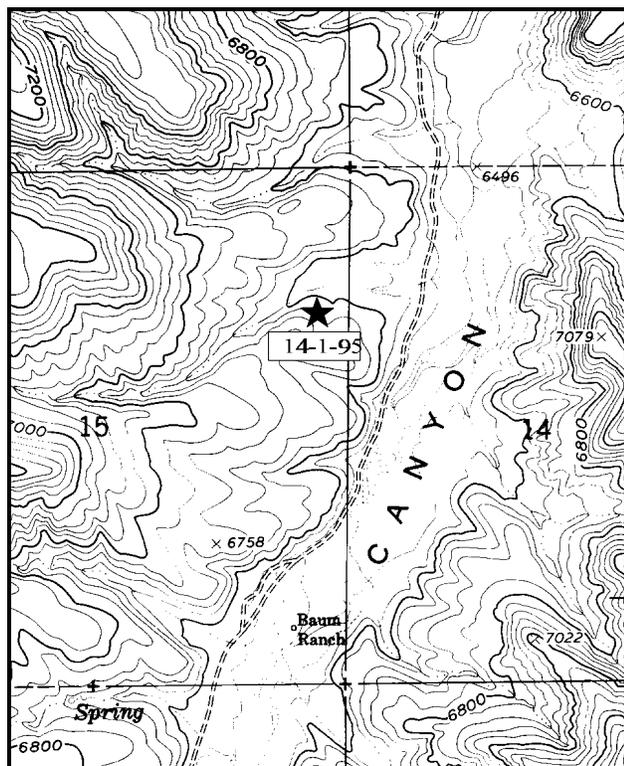
Study site name: Peatross Ranch. Range type: Pinyon - Juniner.

Compass bearing: frequency baseline 182 degrees.

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 Strawberry Pinnacles, turn south off the Strawberry River Road. Cross Red Creek then bear left at the fork towards Avintaquin Canyon. Go south up Avintaquin canyon for about 5.3 miles to a fence and cattleguard. Proceed an additional .85 miles to a small canyon to the west. Turn right and go up the faint road .25 miles. Stop and walk 28 pack up the trail to the southeast. From this point, the 0-foot baseline stake is located 4 paces to the south. The frequency baseline is marked by green steel fenceposts approximately 12-18 inches in height.



Map Name: Avintaquin Canyon

Diagrammatic Sketch

Township 5S, Range 8W, Section 15

Salt Lake Meridian - T9S, R10E

## DISCUSSION

### Trend Study No. 14-1

This trend study is located approximately one-half mile north of the Peatross Ranch headquarters on private land in Avintaquin Canyon. The area is deer winter range with an elevation of 6,680 feet. The range type is juniper-pinyon woodland with a grass-mixed browse understory. Slope is approximately 30% and exposure is northerly. Grazing from both livestock and deer is moderately heavy. The site is crisscrossed by cattle trails yet use by livestock appears heavier on top of the hill in a nearby chained area. Deer pellet group frequency was estimated at 35% in 1995.

Soils are loose and fairly shallow. Limestone is the principal parent material. The soil is moderately rocky and soil movement is evident on the steeper terrain. Vegetative cover is evenly divided between grasses, forbs and browse. Over head canopy cover of pinyon and juniper was estimated at 31% in 1995. Pinyon density was estimated at 160 plants/acre with an average diameter of almost 5 inches. Juniper density was approximately 38 plants/acre, averaging 6.7 inches in diameter.

Browse composition and density is poor. Of the ten browse species encountered, only mahogany and snowberry are palatable and in sufficient densities to provide useful forage. The key browse species, true mountain mahogany, has a stunted, very heavily hedged appearance and showed no evidence of seed production in 1988. During the 1995 reading only a few larger plants were producing seed. Most plants are less than 2 feet in height. Density was low in 1982 when only 200 mature plants/acre were estimated. Of these, 33% were heavily hedged. During the 1988 reading, 1,666 young plants/acre were estimated. It is likely that some of these young plants were actually, small mature shrubs. Utilization was reported heavy on 76% of the mahogany in 1988 with poor vigor found in 4% of the population. A more balanced population was found in 1995 when 20 seedling, 60 young, 840 mature and 20 decadent plants/acre were estimated. A larger, more representative sample was used in 1995. Dead plants, first counted in 1995, totaled only 40 plants/acre. This would indicate a fairly stable population. Utilization continues to be heavy with 63% of the mahogany displaying heavy use.

Snowberry has an estimated density of 1,160 plants/acre, but appears to be not utilized. Other, less desirable browse encountered on the site include, mountain low rabbitbrush, corymbed eriogonum, broom snakeweed, and gray horsebrush.

The herbaceous understory accounts for 69% of the vegetative cover. Nine perennial grass species were encountered in 1995. Dominant species include slender wheatgrass, Carex, Salina wildrye, and needle-and-thread grass which makes up 86% of the grass cover. The forb composition is diverse but dominated by less desirable species including stemless hymenoxys, mat penstemon, and desert phlox.

### 1982 APPARENT TREND ASSESSMENT

Range trend appears to be declining in all categories. Loss of soil is unacceptably high, the browse species are in a state of decline, undesirable shrubs are probably increasing and forb composition is unsatisfactory. Only the grass component seems fairly stable. Even it could be threatened by an increased presence of Salina wildrye. This plant dominates many similar sites in the Avintaquin Canyon area.

1988 TREND ASSESSMENT

Ground cover characteristics have declined slightly. Basal vegetative cover declined from 12% to 10% and percent bare ground increased from 11.5% to 16%. Trend for browse is slightly improved, but density and composition are still poor. The key browse species, true mountain mahogany, has increased in density but is more heavily hedged. There were some shifts in the grass composition. Slender wheatgrass and Salina wildrye are more prevalent. However, frequency of grass is unchanged since 1982. Frequency of forbs increased slightly although the increase can be attributed mainly to low value species such as stemless hymenoxys, desert phlox, and rose pussytoes.

TREND ASSESSMENT

soil - down slightly

browse - slightly improved but composition and density are still poor

herbaceous understory - slightly improved but dominated by low value increasers

1995 TREND ASSESSMENT

Ground cover characteristics have improved since 1988. Percent litter cover increased from 37% to 44% and percent bare ground declined from 16% to 14%. Trend for soil is slightly up. Browse trend for the key species, true mountain mahogany, is stable to slightly improving with only 2% decadency and heavy use reported on 63%, down from 76% in 1988. One would not expect a much higher density for mahogany with pinyon-juniper canopy cover exceeding 30%. Trend for the herbaceous understory is significantly down for both grasses and forbs. Sum nested frequency of grasses declined by 28% since 1988. Six of the 7 grasses encountered in 1988 declined significantly in 1995. The only grass which did not decline was Salina wildrye. Sum nested frequency of perennial forbs also declined. Much of the herbaceous understory decline could be attributed to the prolonged drought.

TREND ASSESSMENT

soil - improved slightly

browse - stable to slightly improving for true mountain mahogany, few other species are present on this site with p-j cover >30%

herbaceous understory - down for grasses and forbs with continuing drought

VEGETATIVE TRENDS --

Herd unit 14, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	62	*6	38	25	2	.03
G	Agropyron trachycaulum	191	*119	38	69	44	2.46
G	Carex spp.	99	*75	31	48	32	1.95
G	Elymus salina	53	81	-	19	30	1.48
G	Koeleria cristata	55	*28	44	23	9	.44
G	Oryzopsis hymenoides	92	*64	52	38	30	.58
G	Poa fendleriana	1	-	-	1	-	-
G	Sitanion hystrix	-	2	-	-	2	.01

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Stipa comata</i>	88	*86	57	37	37	1.00
Total for Grasses		641	461	260	260	186	7.97
F	<i>Antennaria rosea</i>	78	*4	11	37	3	.01
F	<i>Androsace septentrionalis</i>	-	10	-	-	5	.02
F	<i>Arabis</i> spp.	-	1	-	-	1	.00
F	<i>Astragalus convallarius</i>	1	4	3	1	1	.01
F	<i>Astragalus purshii</i>	13	7	9	6	4	.04
F	<i>Aster</i> spp.	-	5	-	-	2	.03
F	<i>Castilleja chromosa</i>	19	*24	-	11	12	.18
F	<i>Caulanthus crassicaulis</i>	12	-	-	5	-	-
F	<i>Calochortus nuttallii</i>	-	*8	-	-	4	.02
F	<i>Chenopodium fremontii</i>	-	15	-	-	7	.25
F	<i>Chenopodium leptophyllum</i>	-	2	-	-	2	.01
F	<i>Cryptantha</i> spp.	60	*45	-	30	25	.30
F	<i>Descurainia pinnata</i>	-	15	-	-	6	.72
F	<i>Erigeron flagellaris</i>	-	-	1	-	-	-
F	<i>Erigeron</i> spp.	-	-	19	-	-	-
F	<i>Eriogonum alatum</i>	-	3	-	-	1	.00
F	<i>Eriogonum umbellatum</i>	20	*13	-	13	6	.08
F	<i>Heterotheca villosa</i>	-	-	4	-	-	-
F	<i>Hymenoxys acaulis</i>	100	*50	42	41	21	2.42
F	<i>Linum lewisii</i>	26	*27	13	12	13	.14
F	<i>Machaeranthera canescens</i>	4	-	-	3	-	-
F	<i>Machaeranthera grindelioides</i>	18	31	8	10	17	.27
F	<i>Penstemon caespitosus</i>	-	*77	-	-	35	1.12
F	<i>Phlox austromontana</i>	166	*108	-	73	48	1.59
F	<i>Phlox longifolia</i>	3	3	-	1	2	.01
F	<i>Schoenocrambe linifolia</i>	-	3	-	-	1	.04
F	<i>Sphaeralcea coccinea</i>	28	*3	10	10	1	.00
F	<i>Taraxacum officinale</i>	1	3	1	1	3	.04
Total for Forbs		549	461	254	254	220	7.39
B	<i>Cercocarpus montanus</i>	19	22	7	9	11	1.96

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
B	Chrysothamnus depressus	49	*26	10	27	11	.45
B	Chrysothamnus viscidiflorus lanceolatus	9	*10	4	4	6	.18
B	Eriogonum corymbosum	40	42	13	16	18	2.43
B	Eriogonum microthecum	-	-	11	-	-	-
B	Gutierrezia sarothrae	71	*13	3	33	6	.08
B	Juniperus osteosperma	-	1	2	-	1	.18
B	Pinus edulis	6	*6	2	3	2	1.02
B	Symphoricarpos oreophilus	11	*11	6	6	5	.62
B	Tetradymia canescens	1	-	5	1	-	.15
Total for Browse		206	131	63	99	60	7.07

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

BASIC COVER --

Herd unit 14, Study no: 1

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	316	12.30	10.25	21.96
Rock	265	4.00	6.25	12.46
Pavement	213	36.00	28.75	4.46
Litter	393	35.50	36.75	43.56
Cryptograms	10	.80	2.00	.53
Bare Ground	251	11.50	16.00	14.36

PELLET GROUP FREQUENCY --

Herd unit 14, Study no: 1

Type	Quadrat Frequency
	'95
Rabbit	8
Elk	2
Deer	35
Cattle	1

BROWSE CHARACTERISTICS --  
Herd unit 14, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	8	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Cercocarpus montanus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	3	19	-	-	-	-	-	-	24	-	1	-	1666		25	
	95	2	-	1	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	2	1	-	-	-	-	-	-	2	1	-	-	200	15	12	3
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	13	27	-	-	-	-	-	-	40	-	2	-	840	18	24	42
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	0%			
												'88	1666		0%			
												'95	920		2%			
<i>Chrysothamnus depressus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	62	-	-	2	-	-	-	-	-	64	-	-	-	1280	6	6	64
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	1320		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	28	-	-	-	-	-	-	-	-	28	-	-	-	560	11 9	28	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	133		0%			
												'95	700		2%			
<i>Eriogonum corymbosum</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	16	-	-	-	-	-	-	-	-	13	-	3	-	1066		16	
	95	20	-	-	1	-	-	-	-	-	21	-	-	-	420		21	
M	82	38	-	-	-	-	-	-	-	-	38	-	-	-	2533	16 12	38	
	88	19	-	-	-	-	-	-	-	-	18	-	1	-	1266	13 9	19	
	95	82	1	-	1	-	-	-	-	-	84	-	-	-	1680	14 18	84	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2533	Dec:	0%			
												'88	2465		5%			
												'95	2140		1%			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	21	-	-	-	-	-	-	-	-	21	-	-	-	420		21	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	30	-	1	-	-	-	-	-	-	31	-	-	-	2066	8 6	31	
	95	21	-	-	-	-	-	-	-	-	21	-	-	-	420	8 6	21	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	2465		2%			
												'95	860		2%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Juniperus osteosperma</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600	50	30	9
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	66			1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	666	Dec:	0%			
												'88	266		24%			
												'95	0		0%			
<i>Juniperus scopulorum</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	133			2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	200			3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	88	-	-	-	2	-	-	1	-	-	3	-	-	200	96	43	3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	400		-			
												'95	0		-			
<i>Lepidium montanum</i>																		
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	133			2	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	82	-	6	4	-	-	-	-	-	-	4	6	-	666	24	20	10	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	799	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Pinus edulis</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	3	-	-	-	-	-	-	-	-	1	-	2	200			3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	266			4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	82	2	-	-	-	-	-	-	-	-	3	-	-	133	16	5	2	
	88	-	-	-	-	-	-	1	-	-	1	-	-	66	217	118	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	332		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Symphoricarpos oreophilus																		
Y	82	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	88	9	1	-	-	-	-	-	-	-	6	-	4	-	666		10	
	95	28	-	-	-	-	-	-	-	-	28	-	-	-	560		28	
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7	9	2
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	30	-	-	-	-	-	-	-	-	30	-	-	-	600	9	15	30
Total Plants/Acre (excluding Dead & Seedlings)												'82	466	Dec:	-			
												'88	666		-			
												'95	1160		-			
Tetradymia canescens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	7	3	-	-	-	-	-	-	-	10	-	-	-	200	9	9	10
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	200		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 14, Study no: 1

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata vaseyana	0	0	.27
Cercocarpus montanus	4	20	13
Chrysothamnus depressus	0	0	18
Chrysothamnus viscidiflorus lanceolatus	0	2	10
Eriogonum corymbosum	53	29	29
Gutierrezia sarothrae	0	29	12
Juniperus osteosperma	14	3	0
Juniperus scopulorum	0	5	0
Lepidium montanum	17	0	0
Pinus edulis	3	4	0
Symphoricarpos oreophilus	10	8	16
Tetradymia canescens	0	0	3

TREND STUDY 14-2-95

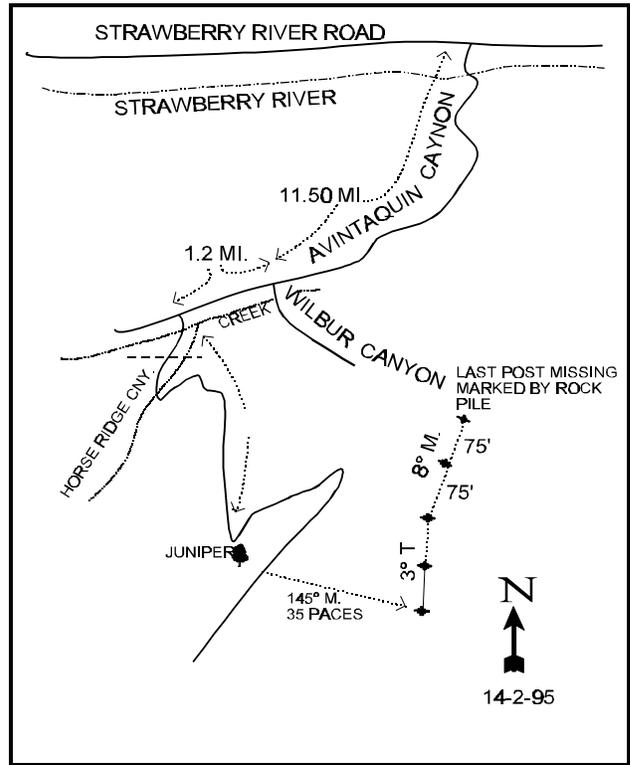
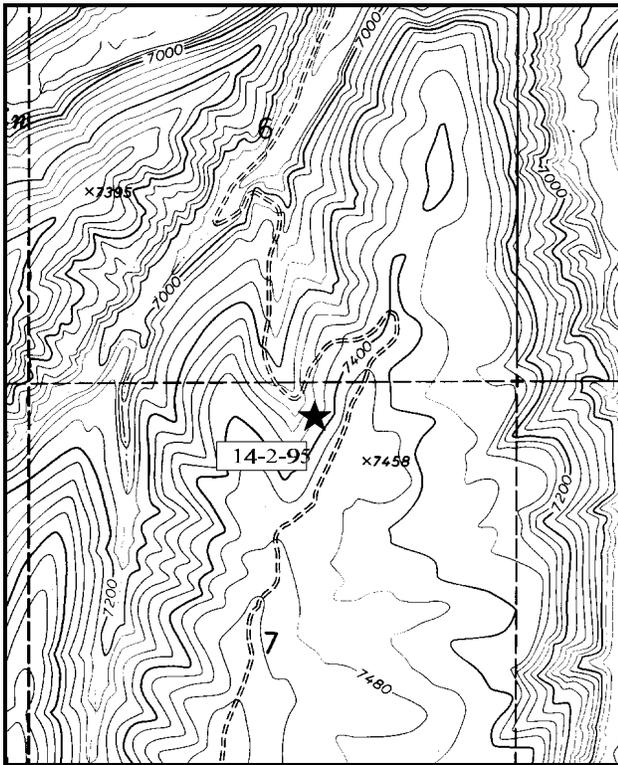
Study site name: Lower Horse Ridge. Range type: Mountain Brush.

Compass bearing: frequency baseline 0 degrees.

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 Strawberry River Road, proceed south up Avintaquin Canyon 12.7 miles. Turn left here onto a road hidden in the trees and cross Avintaquin Creek. Go up Horse Ridge Canyon .14 miles to a fence. Continue up the ridge .8 miles to a sharp left bend in the road. From the bend, walk 80 paces bearing SSW (156°) to the 0-foot baseline stake. The frequency baseline stakes are green steel fenceposts 12 to 18 inches in height.



Map Name: Gray Head Peak

Diagrammatic Sketch

Township 6S, Range 8W, Section 7

Salt Lake Meridian - T10S, R10E

## DISCUSSION

### Trend Study No. 14-2

This site is located on big game winter range near the north end of Horse Ridge at about 7,360 feet elevation. The land is owned and managed by the Division of Wildlife Resources in the Avintaquin Wildlife Management Area. The range type is mixed mountain brush on a west-southwest exposure with a 30% to 40% slope. Judging from the number of pellet groups observed, past and present, along with the high level of browse utilization, this site is likely a winter concentration area for deer.

Soils are similar to the Peatross Ranch site. Texture is a heavy clay loam with considerable surface limestone rock. Rock and pavement are concentrated on the surface between bunch grasses and shrubs. Soil pedestaling and terracing are evident on the slopes.

Several browse species occupy the site but the key species consist of true mountain mahogany and mountain big sagebrush. These two species provide 50% of the total browse cover. Mature mahogany average about 3 feet in height and displayed a heavily hedged growth form on 100% of the plants in 1982 and 60% in 1988. Current use is heavy on 65% of the mature shrubs. Vigor was reduced on 30% of the population in 1982 and 12% of the population in 1988. During the 1995 reading all plants displayed good vigor. Even with the heavy use reported in 1995, many plants were producing seed and 120 seedlings (reproductive potential of 9%) and 220 young plants/acre were estimated.

Mountain big sagebrush provides additional preferred forage on this winter range. Density was estimated at 532 plants/acre in 1982, 50% of which were decadent. Use was heavy on 63% of the population and poor vigor expressed on 50%. During the 1988 reading the age class structure remained basically the same except for the young age class increased from 66 to 1,400 plants/acre. Use was light to moderate and vigor good on all but a few decadent plants. By 1995, overall population density declined slightly due to a reduction in the number of young plants with prolonged drought. Density of mature plants increased while the number of decadent plants declined. Vigor is generally good and heavy use was only reported on 6% of the population.

Several other browse species occur on the site including dwarf rabbitbrush, mountain low rabbitbrush, white rubber rabbitbrush, snowberry, gray horsebrush, and broom snakeweed. A few Utah Rocky Mountain juniper and pinyon pine are scattered throughout the area. Canopy cover from the pinyon and juniper is only about 8% on the site.

The herbaceous understory is dominated by grasses which combine to produce 14% cover. Two species, bluebunch wheatgrass and Salina wildrye, provide 87% of the grass cover. Forbs are diverse and moderately abundant with 21 perennial species encountered in 1995.

### 1982 APPARENT TREND ASSESSMENT

Soil condition was considered poor with a continued declining trend. Short of mechanical treatment and seeding, there is probably little that can be done to quickly arrest the downward trend. Vegetative trend is also declining. The key species, with the possible exception of mountain big sagebrush, are almost certainly in trouble. Another area of potential concern is the abundance of undesirable increasers and the apparent juniper and pinyon encroachment.

#### 1988 TREND ASSESSMENT

Trend for soil is slightly up due to increased litter cover and a decline in percent bare ground. Eroding soil has been replaced by increased rock and pavement cover. Trend for browse is up. The 1982 report suggested that one of the key browse species, true mountain mahogany, was in a state of decline. The 1988 data indicate otherwise; increased frequency and increased density of seedling and young mahogany. Utilization is still moderate to heavy, but the average height of the mature plants increased from 20" to 30" and percent decadency has declined from 50% to 13%. Few mahogany have grown beyond browsing reach. Mountain big sagebrush has also increased in density and displays a more moderately hedged growth form. Trend for the herbaceous understory is up. Grass cover was good in 1982, and remains so in 1988 with an increase in overall quadrat frequency. The number of forb species encountered on the frequency baseline increased from 13 to 22 species and quadrat frequency increased 34%. Bastard toadflax remains the most abundant species.

##### TREND ASSESSMENT

soil - slightly up

browse - up

herbaceous understory - up

#### 1995 TREND ASSESSMENT

Trend for soil is stable. Percent bare ground declined slightly but percent litter cover also decreased and frequency of grasses and forbs declined since 1988. The browse trend is stable for the key species, true mountain mahogany. There are no decadent plants and vigor is good. Heavy use increased from 47% in 1988 to 65% by 1995. Recruitment (# of seedlings and young) declined slightly but there are still sufficient numbers to maintain the population and many mature plants are producing seed. Height and crown measurements have remained identical to 1988 estimates. Mountain big sagebrush also displays a stable trend with a decline in percent decadency from 13% to 7%. Use is light to moderate and vigor is generally good. One negative aspect to the sagebrush trend is the continued decline in height & crown of mature plants. This may just be a result of a younger, mature plants. Trend for the herbaceous understory is stable for grasses and down for forbs. The grasses make up 75% of the herbaceous understory cover. Nested frequency of bluebunch wheatgrass and Salina wildrye increased significantly while nested frequency of all other grasses declined noticeably. Sum of nested frequency for forbs declined by 26%. Overall trend is stable.

##### TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable for grasses to slightly down for forbs, stable overall

VEGETATIVE TRENDS --

Herd unit 14, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Agropyron spicatum</i>	219	*230	44	87	82	7.10
G	<i>Carex</i> spp.	62	*37	-	27	19	1.20
G	<i>Elymus salina</i>	46	*140	13	20	49	5.44
G	<i>Oryzopsis hymenoides</i>	81	*49	40	37	25	.58
G	<i>Poa fendleriana</i>	-	3	-	-	1	.03
G	<i>Poa secunda</i>	68	*2	6	32	1	.03
Total for Grasses		476	461	136	203	177	14.40
F	<i>Achillea millefolium</i>	3	-	-	1	-	-
F	<i>Androsace septentrionalis</i>	-	2	1	-	1	.00
F	<i>Arabis</i> spp.	-	*6	6	-	3	.06
F	<i>Aster chilensis</i>	-	*26	-	-	13	.31
F	<i>Astragalus convallarius</i>	2	*15	28	1	10	.17
F	<i>Astragalus purshii</i>	1	3	-	1	2	.01
F	<i>Astragalus tenellus</i>	4	-	-	1	-	-
F	<i>Aster</i> spp.	86	*-	-	34	-	-
F	<i>Castilleja chromosa</i>	33	*33	16	17	16	.51
F	<i>Chenopodium leptophyllum</i>	-	5	-	-	5	.02
F	<i>Comandra pallida</i>	196	*137	45	77	59	1.49
F	<i>Crepis acuminata</i>	4	-	-	2	-	-
F	<i>Cryptantha</i> spp.	9	26	25	3	11	.08
F	<i>Delphinium</i> spp.	1	-	-	1	-	-
F	<i>Descurainia pinnata</i>	-	10	-	-	5	.08
F	<i>Eriogonum alatum</i>	6	1	-	2	1	.03
F	<i>Erigeron</i> spp	-	1	-	-	1	.00
F	<i>Gilia aggregata</i>	-	-	1	-	-	-
F	<i>Haplopappus nuttallii</i>	-	-	5	-	-	-
F	<i>Hymenoxys richardsonii</i>	51	*16	-	25	9	.32
F	<i>Ipomopsis aggregata</i>	4	-	-	2	-	-
F	<i>Linum lewisii</i>	4	24	7	2	12	.12
F	<i>Lithospermum</i> spp.	26	*18	-	19	9	.26
F	<i>Machaeranthera canescens</i>	37	*6	10	17	4	.07
F	<i>Machaeranthera grindelioides</i>	14	50	-	6	25	.71
F	<i>Penstemon caespitosus</i>	15	*4	-	6	4	.02

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Penstemon humilis</i>	25	18	13	12	10	.07
F	<i>Phlox austromontana</i>	62	43	20	24	20	.35
F	<i>Phlox longifolia</i>	-	5	-	-	2	.01
F	<i>Potentilla gracilis</i>	-	2	-	-	1	.00
F	<i>Senecio multilobatus</i>	18	7	4	8	4	.04
F	<i>Taraxacum officinale</i>	-	5	-	-	2	.03
F	<i>Viguiera multiflora</i>	3	-	-	1	-	-
Total for Forbs		604	463	174	262	229	4.82
B	<i>Amelanchier alnifolia</i>	-	-	2	-	-	-
B	<i>Artemisia tridentata vaseyana</i>	31	*18	16	17	10	1.06
B	<i>Cercocarpus montanus</i>	30	*48	9	15	23	5.57
B	<i>Chrysothamnus depressus</i>	56	*17	18	25	9	.36
B	<i>Chrysothamnus nauseosus albicaulis</i>	5	-	1	2	-	-
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	39	32	26	20	17	.84
B	<i>Eriogonum corymbosum</i>	15	*23	13	9	14	1.76
B	<i>Gutierrezia sarothrae</i>	78	*61	26	36	31	1.14
B	<i>Juniperus osteosperma</i>	3	-	1	2	-	.30
B	<i>Pinus edulis</i>	1	-	1	1	-	2.09
B	<i>Rosa woodsii</i>	7	*-	4	3	-	-
B	<i>Symphoricarpos oreophilus</i>	2	3	3	1	1	.03
B	<i>Tetradymia canescens</i>	-	2	5	-	2	.09
Total for Browse		267	204	125	131	107	13.26

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

BASIC COVER --

Herd unit 14, Study no: 2

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	332	7.00	6.00	34.53
Rock	244	3.75	7.75	11.69
Pavement	213	19.50	21.25	4.91
Litter	388	41.50	43.50	32.45
Cryptograms	7	0	0	.39
Bare Ground	280	28.25	21.50	18.20

PELLET GROUP FREQUENCY --  
 Herd unit 14, Study no: 2

Type	Quadrat Frequency '95
Rabbit	6
Elk	2
Deer	26

BROWSE CHARACTERISTICS --  
 Herd unit 14, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	11	1	-	-	-	-	-	-	-	12	-	-	-	800		12	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66		1	
	88	19	-	-	1	-	-	1	-	-	21	-	-	-	1400		21	
	95	16	2	2	4	-	-	-	-	-	22	2	-	-	480		24	
M	82	-	2	1	-	-	-	-	-	-	2	1	-	-	200	22	25	3
	88	3	-	-	1	-	-	-	-	-	4	-	-	-	266	14	17	4
	95	17	3	-	3	1	-	-	-	-	24	-	-	-	480	11	16	24
D	82	-	-	4	-	-	-	-	-	-	-	-	4	-	266		4	
	88	-	4	-	-	-	-	-	-	-	3	-	1	-	266		4	
	95	2	1	1	-	-	-	-	-	-	3	-	-	1	80		4	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	400		20	
Total Plants/Acre (excluding Dead & Seedlings)												'82	532	Dec:	50%			
												'88	1932		13%			
												'95	1040		7%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<b>Cercocarpus montanus</b>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	5	2	-	-	-	-	-	-	6	-	1	-	466		7	
	95	3	5	2	1	-	-	-	-	-	11	-	-	-	220		11	
M	82	-	-	10	-	-	-	-	-	-	7	-	3	-	666	20 17	10	
	88	-	4	6	-	-	-	-	-	-	9	-	1	-	666	30 23	10	
	95	1	11	42	-	3	-	-	-	-	57	-	-	-	1140	30 33	57	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	666	Dec:	0%			
												'88	1132		0%			
												'95	1360		0%			
<b>Chrysothamnus depressus</b>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	2	2	-	-	-	-	-	-	-	3	-	1	-	266	4 6	4	
	95	35	-	-	4	-	-	-	-	-	39	-	-	-	780	6 8	39	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	465		14%			
												'95	900		4%			
<b>Chrysothamnus nauseosus albicaulis</b>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24 21	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			

A G E	YR	Form Class (No. of 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>																		
Y	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	88	5	1	-	-	-	-	-	-	-	5	-	1	-	400		6	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	82	27	4	-	-	-	-	-	-	-	31	-	-	-	2066	10	11	31
	88	66	8	1	-	-	-	-	-	-	71	-	4	-	5000	9	9	75
	95	118	-	-	3	-	-	-	-	-	121	-	-	-	2420	11	13	121
D	82	5	2	1	-	-	-	-	-	-	-	1	5	-	533		8	
	88	5	3	-	-	-	-	-	-	-	7	-	1	-	533		8	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2865	Dec:	18%			
												'88	5933		8%			
												'95	2520		0%			
<i>Eriogonum corymbosum</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	14	-	-	1	-	-	-	-	-	15	-	-	-	300		15	
M	82	4	-	-	-	-	-	-	-	-	3	-	1	-	266	16	11	4
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333	11	11	5
	95	34	7	-	-	-	-	-	-	-	41	-	-	-	820	12	16	41
D	82	2	-	-	-	-	-	-	-	-	1	-	-	1	133		2	
	88	3	1	-	-	-	-	-	-	-	2	-	2	-	266		4	
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	399	Dec:	33%			
												'88	932		28%			
												'95	1140		1%			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	88	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	95	18	-	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	82	37	-	-	-	-	-	-	-	-	37	-	-	-	2466	8	10	37
	88	77	-	-	-	-	-	-	-	-	77	-	-	-	5133	6	4	77
	95	162	-	-	-	-	-	-	-	-	162	-	-	-	3240	9	9	162
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2599	Dec:	0%			
												'88	6132		5%			
												'95	3600		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Juniperus osteosperma</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	-	-	-	1	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Juniperus scopulorum</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	67	45	1
	88	-	-	-	-	1	-	-	-	-	1	-	-	-	66	122	35	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Pinus edulis</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	63	44	1
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	79	55	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Symphoricarpos oreophilus</i>																		
Y	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	88	-	4	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	1	-	-	-	-	-	-	-	1	-	-	66	7	9	1
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	11	10	2
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	12	17	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	199	Dec:	-			
												'88	399		-			
												'95	60		-			
<i>Tetradymia canescens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	6	10	1
	95	7	1	-	-	-	-	-	-	-	8	-	-	-	160	9	11	8
D	82	-	-	-	-	1	-	-	-	-	1	-	-	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	100%			
												'88	332		0%			
												'95	200		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 14, Study no: 2

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia frigida</i>	0	0	.36
<i>Artemisia tridentata</i> <i>vaseyana</i>	7	11	10
<i>Cercocarpus montanus</i>	9	6	12
<i>Chrysothamnus depressus</i>	0	3	8
<i>Chrysothamnus nauseosus albicaulis</i>	0	0	.36
<i>Chrysothamnus viscidiflorus lanceolatus</i>	38	34	23
<i>Eriogonum corymbosum</i>	5	5	10
<i>Gutierrezia sarothrae</i>	35	35	33
<i>Juniperus osteosperma</i>	.88	.38	0
<i>Juniperus scopulorum</i>	.88	.38	0
<i>Pinus edulis</i>	.88	.38	0
<i>Symphoricarpos oreophilus</i>	3	2	.55
<i>Tetradymia canescens</i>	.88	2	2

TREND STUDY 14-3-95

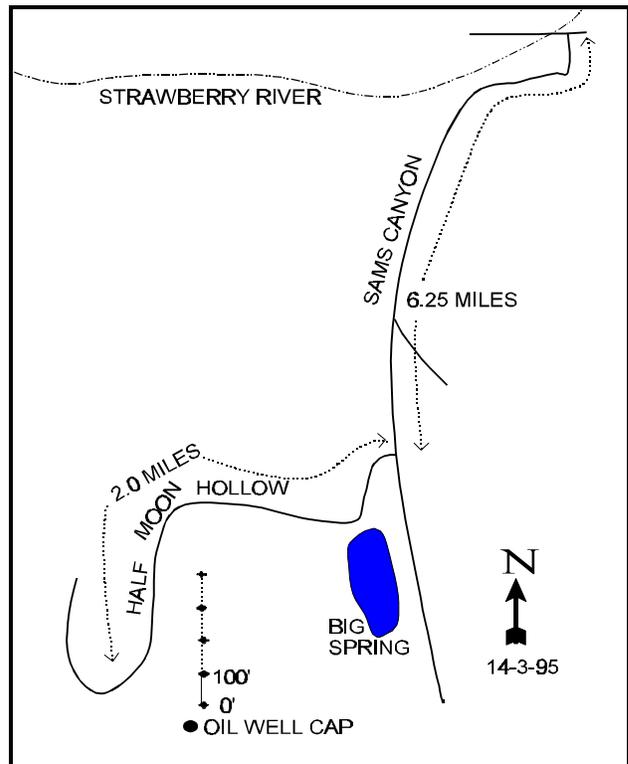
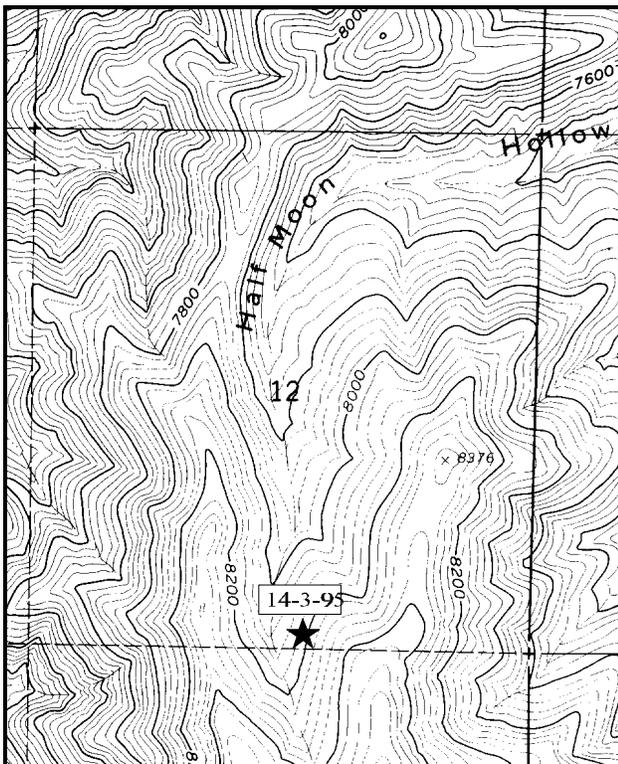
Study site name: Sam's Canyon. Range type: Mountain Brush.

Compass bearing: frequency baseline 15 degrees.

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 Strawberry River Road and U.S. 40 near Starvation Reservoir, go west up the Strawberry River for 8.8 miles. Before the bridge, turn left. From the Strawberry River Road, go 6.25 miles up Sam's Canyon. Turn right into Half Moon Hollow (about .2 miles before Big Spring). Follow the old, rabbitbrush-covered road (which may be impassable to vehicles due to washouts and tall brush) about 2 miles up the canyon to where the road turns sharply right and goes up a dugway. The old drilling platform there is hardly noticeable, just a brush-covered flat spot in the bottom of the canyon. The well cap is 15" tall. From the capped well, the 0-foot baseline stake (marked with browse tag #7080) is 44 paces bearing 40°. The baseline runs north across the slope.



Map Name: Sams Canyon

Diagrammatic Sketch

Township 5S Range 8W , Section 12 Salt Lake Meridian - T9S, R10E

## DISCUSSION

### Trend Study No. 14-3

This study is at the head of Half Moon Hollow, a tributary of Sam's Canyon. The study site is within the Ute Indian Reservation. The range type is intermediate between black sagebrush and mixed mountain brush, however, black sagebrush tends to give the area its vegetative aspect as it provides the most cover of any browse species (32%). Elevation (8,350 feet) is rather high but the site is on an exposed western slope of about 35%, so winter snow usually does not accumulate.

Soils are limestone derived and very rocky on the surface. Subsurface soil tends to be unconsolidated with a high clay content. Very little organic matter is present. Most of the finer surface soil particles have long since been eroded away. Erosion pavement and rock, cover a considerable amount of the ground surface.

Several species of browse offer forage for wildlife but true mountain mahogany would be considered one of the key species. Mahogany appears to be in good condition with respect to age structure and vigor. The average mature shrub measures only 2½ feet in height and is all available. Utilization has been extremely heavy in the past. In 1982, 69% of the mature shrubs displayed heavy use (>60% of stems browsed). By 1988, 62% of the plants were heavily utilized. Use is more moderate in 1995 with only 16% of the mahogany classified as heavily browsed and 54% moderately utilized. Vigor is good and no decadent plants were encountered in 1995. Reproductive potential and the proportion of young plants in the population have continued to decline, but there still appears to be sufficient numbers to maintain the population. The large number of young plants and reduced number of mature plants sampled in 1988 appears to be a classification problem and not a major shift in age structure.

Secondary browse species include serviceberry, black sagebrush, and small numbers of mountain big sagebrush. Mature serviceberry average about 3 feet in height and are considered all available to wildlife. These shrubs have also been heavily utilized in the past but are now mostly lightly hedged. Vigor is good and percent decadency low at 2%. A healthy moderately dense stand of black sagebrush occupies the site. It provides the most ground cover of all the browse species (32%) compared to 29% for mahogany. Density has gone down since 1988, but most of the loss was from the young age class which is not unusual with long periods of drought. Heavy use and percent decadency have declined.

The herbaceous understory accounts for 33% of the vegetation cover on the site. Bluebunch wheatgrass dominates the grass composition by producing 59% of the grass cover. A sedge and Salina wildrye are also abundant. Forb density and production is sparse, even though diversity is high with 23 perennial species encountered in 1995. Most species are low-growing forms of low to medium forage value. The most common species include Sege lily, cryptantha, and sulfur eriogonum.

### 1982 APPARENT TREND ASSESSMENT

Soil trend continues to decline. Erosion and soil loss prevent any significant litter buildup and make seedling establishment difficult over much of the area. Vegetative trend, however, appears more stable. The browse component, although heavily utilized, is in fair vigor and seems to be maintaining itself. Herbaceous diversity and density are moderately good considering the ongoing erosion, but cannot be expected to improve without direct management intervention.

1988 TREND ASSESSMENT

Few changes are evident on this high elevation winter range. Ground cover percentages are unchanged and overall soil erosion does not appear as severe as described in 1982. Photograph comparisons indicate an obvious increase in the size and vigor of the key browse species. Data from the density plots show very little increase in true mountain mahogany, although young plants comprise 82% of the population. Black sagebrush has shown the greatest increase and was rated as being moderately hedged as opposed to heavily hedged in 1982. Other browse species provide moderate amounts of forage with their status remaining unchanged. Unpalatable increaser shrubs have not expanded significantly. Trend for browse is considered stable. Grass abundance has increased largely due to an increase in Salina wildrye from a quadrat frequency of 1% to 36%. Quadrat frequency of bluebunch also increased from 55% to 82%. Sixteen species of forbs were found, yet their density remains low.

TREND ASSESSMENT

soil - stable

browse - stable

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

1995 TREND ASSESSMENT

Trend for soil is stable. Even though percent bare ground has increased slightly, there appears to be no movement of soil and bare ground still is below 10%. Trend for browse is up with reduced heavy use, good vigor and low decadency rates of the preferred browse species, true mountain mahogany, serviceberry, and black sagebrush. Unpalatable increasers do not appear to have expanding populations. Trend for the herbaceous understory appears stable.

TREND ASSESSMENT

soil - stable

browse - up

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 14, Study no: 3

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron spicatum	201	*205	65	83	72	6.77
G	Bouteloua gracilis	-	-	3	-	-	-
G	Carex spp.	64	*104	23	35	46	2.45
G	Elymus salina	74	*54	1	36	23	1.54
G	Festuca ovina	1	-	1	1	-	-
G	Koeleria cristata	-	4	-	-	2	.06
G	Oryzopsis hymenoides	16	30	6	8	17	.57
G	Poa fendleriana	18	*11	3	10	5	.10
G	Poa secunda	38	*6	12	21	2	.01
G	Stipa lettermani	-	-	1	-	-	-
Total for Grasses		412	414	115	194	167	11.52

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Androsace septentrionalis</i>	-	5	1	-	2	.01
F	<i>Antennaria</i> spp.	2	-	1	1	-	-
F	<i>Arabis</i> spp.	5	6	7	2	5	.02
F	<i>Arenaria congesta</i>	-	*13	-	-	7	.06
F	<i>Arabis perennans</i>	-	*17	-	-	9	.04
F	<i>Aster</i> spp.	-	-	6	-	-	-
F	<i>Astragalus argophyllus</i>	6	*15	6	3	8	.09
F	<i>Astragalus convallarius</i>	2	5	4	1	3	.01
F	<i>Astragalus tenellus</i>	5	4	3	2	2	.01
F	<i>Balsamorhiza sagittata</i>	1	-	1	1	-	-
F	<i>Castilleja flava</i>	7	54	12	3	24	.71
F	<i>Calochortus nuttallii</i>	-	*9	-	-	4	.04
F	<i>Chaenactis douglasii</i>	-	3	-	-	1	.00
F	<i>Chenopodium leptophyllum</i>	-	2	-	-	1	.00
F	<i>Crepis acuminata</i>	-	*18	-	-	9	.14
F	<i>Cryptantha</i> spp.	19	66	27	8	31	.94
F	<i>Descurainia pinnata</i>	-	4	-	-	2	.01
F	<i>Eriogonum elatum</i>	13	*23	-	5	9	.30
F	<i>Erigeron flagellaris</i>	-	2	-	-	2	.03
F	<i>Eriogonum umbellatum</i>	56	*68	13	26	28	1.33
F	<i>Hymenoxys acaulis</i>	2	10	15	2	5	.24
F	<i>Lappula occidentalis</i>	-	3	-	-	1	.00
F	<i>Lesquerella</i> spp.	3	-	6	2	-	-
F	<i>Lithospermum multiflorum</i>	7	9	1	3	3	.18
F	<i>Machaeranthera grindelioides</i>	24	14	4	12	9	.34
F	<i>Orobanche</i> spp.	-	2	-	-	1	.00
F	<i>Penstemon humilis</i>	92	*33	32	44	15	.10
F	<i>Petradoria pumila</i>	-	5	-	-	2	.01
F	<i>Phlox</i> spp.	-	-	1	-	-	-
F	<i>Schoenocrambe linifolia</i>	1	4	12	1	3	.01
F	<i>Senecio multilobatus</i>	-	2	1	-	2	.03
F	<i>Streptanthus cordatus</i>	-	2	3	-	1	.00

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
Total for Forbs		245	398	156	116	189	4.74
B	Amelanchier alnifolia	32	*21	13	16	10	5.11
B	Artemisia nova	50	*90	36	32	38	10.60
B	Artemisia tridentata vaseyana	6	3	2	2	2	1.09
B	Cercocarpus montanus	61	*75	31	31	34	9.68
B	Chrysothamnus depressus	74	*47	29	34	24	.98
B	Chrysothamnus viscidiflorus viscidiflorus	56	*50	23	31	26	2.04
B	Eriogonum corymbosum	1	15	3	1	9	.31
B	Gutierrezia sarothrae	8	20	-	3	12	.24
B	Leptodactylon nuttallii	34	*-	18	16	-	-
B	Pinus edulis	-	1	-	-	1	.18
B	Symphoricarpos oreophilus	54	*62	31	29	30	3.04
B	Tetradymia canescens	-	2	-	-	2	.03
Total for Browse		376	386	186	195	188	33.34

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

BASIC COVER --

Herd unit 14, Study no: 3

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	324	6.25	6.50	45.45
Rock	269	1.25	1.00	10.33
Pavement	309	43.00	46.00	10.54
Litter	381	43.00	40.25	39.87
Cryptograms	2	0	0	.03
Bare Ground	264	6.50	6.25	9.88

PELLET GROUP FREQUENCY --

Herd unit 14, Study no: 3

Type	Quadrat Frequency
	'95
Rabbit	6
Elk	4
Deer	25

BROWSE CHARACTERISTICS --  
Herd unit 14, Study no: 3

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	88	2	3	4	-	-	-	1	-	-	10	-	-	-	666		10	
	95	7	1	-	1	-	-	-	-	-	9	-	-	-	180		9	
M	82	-	2	9	-	-	-	-	-	-	8	2	1	-	733	34 29	11	
	88	-	2	2	-	-	-	-	-	-	4	-	-	-	266	40 35	4	
	95	20	8	-	3	-	-	-	-	-	31	-	-	-	620	38 50	31	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'82	799	Dec:	0%				
											'88	932		0%				
											'95	820		2%				
<i>Artemisia nova</i>																		
S	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	-	-	2	-	-	-	-	-	4	-	-	-	80		4	
Y	82	6	3	3	-	-	-	-	-	-	12	-	-	-	800		12	
	88	11	5	-	-	-	-	-	-	-	16	-	-	-	1066		16	
	95	19	3	-	-	-	-	-	-	-	22	-	-	-	440		22	
M	82	-	8	18	-	-	-	-	-	-	26	-	-	-	1733	9 15	26	
	88	15	18	1	-	-	-	1	-	-	35	-	-	-	2333	10 15	35	
	95	30	118	4	10	1	-	-	-	-	161	-	2	-	3260	12 21	163	
D	82	-	-	10	-	-	-	-	-	-	-	-	8	2	666		10	
	88	17	19	-	-	-	-	-	-	-	35	-	-	1	2400		36	
	95	6	19	-	1	-	-	-	-	-	12	-	4	10	520		26	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
Total Plants/Acre (excluding Dead & Seedlings)											'82	3199	Dec:	20%				
											'88	5799		41%				
											'95	4220		12%				

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
Y	82	-	3	-	-	-	-	-	-	-	3	-	-	-	200		3	
	88	4	1	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	4	-	-	-	-	-	-	-	4	-	-	-	266	19	19	4
	88	2	-	1	-	-	-	-	-	-	3	-	-	-	200	11	17	3
	95	1	2	-	-	-	-	-	-	-	3	-	-	-	60	17	27	3
D	82	-	-	2	-	-	-	-	-	-	1	-	1	-	133		2	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	1	-	-	-	-	-	-	-	2	-	-	1	60		3	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	599	Dec:	22%			
												'88	599		11%			
												'95	180		33%			
<i>Cercocarpus montanus</i>																		
S	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	5	10	6	-	-	-	-	-	-	21	-	-	-	1400		21	
	88	10	11	29	-	-	-	-	-	-	50	-	-	-	3333		50	
	95	13	1	-	5	-	-	-	-	-	19	-	-	-	380		19	
M	82	-	-	29	1	-	-	-	-	-	27	3	-	-	2000	23	23	30
	88	-	2	8	-	-	-	-	-	-	10	-	-	-	666	33	29	10
	95	21	78	24	2	2	-	-	-	-	127	-	-	-	2540	27	31	127
D	82	-	-	1	-	-	-	-	-	-	-	-	1	-	66		1	
	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3466	Dec:	1%			
												'88	4065		1%			
												'95	2920		0%			
<i>Chrysothamnus depressus</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	11	-	-	2	-	-	-	-	-	13	-	-	-	260		13	
M	82	-	6	2	-	-	-	-	-	-	8	-	-	-	533	6	8	8
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	3	6	2
	95	139	-	-	-	-	-	-	-	-	139	-	-	-	2780	6	9	139
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	-	-	2	40		2		
Total Plants/Acre (excluding Dead & Seedlings)												'82	599	Dec:	0%			
												'88	533		0%			
												'95	3080		1%			

A G E	YR	Form Class (No. of 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	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	19	-	-	-	-	-	-	-	-	18	-	1	-	1266		19	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	51	-	1	-	-	-	-	-	-	51	-	1	-	3466	11	9	52
	88	33	-	-	-	-	-	-	-	-	25	-	8	-	2200	12	12	33
	95	114	-	-	5	-	-	-	-	-	119	-	-	-	2380	34	54	119
D	82	-	-	1	-	-	-	-	-	-	-	-	-	1	66		1	
	88	3	-	-	-	-	-	-	-	-	2	-	1	-	200		3	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3598	Dec:	1%			
												'88	3666		5%			
												'95	2520		0%			
<i>Eriogonum corymbosum</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	1	-	-	-	-	-	-	-	2	-	1	-	200		3	
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	2	1	-	-	-	-	-	-	-	2	1	-	-	200	12	12	3
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	10	8	1
	95	22	-	-	4	-	-	-	-	-	26	-	-	-	520	10	14	26
D	82	-	1	-	-	-	-	-	-	-	-	-	1	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	24%			
												'88	266		0%			
												'95	540		0%			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	82	5	-	-	-	-	-	-	-	-	5	-	-	-	333	9	8	5
	88	9	-	-	-	-	-	-	-	-	9	-	-	-	600	6	3	9
	95	37	-	-	1	-	-	-	-	-	38	-	-	-	760	8	8	38
Total Plants/Acre (excluding Dead & Seedlings)												'82	333	Dec:	-			
												'88	600		-			
												'95	840		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	4	-	-	6	-	-	-	400		6	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	12	-	-	7	-	-	-	-	-	19	-	-	-	1266		19	
	88	40	3	-	-	-	-	10	-	-	44	1	8	-	3533		53	
	95	29	-	-	2	-	-	-	-	-	31	-	-	-	620		31	
M	82	26	3	-	-	-	-	-	-	-	29	-	-	-	1933	11	17	29
	88	4	4	1	-	-	-	1	-	-	9	1	-	-	666	12	16	10
	95	52	3	-	39	-	-	-	-	-	94	-	-	-	1880	11	16	94
D	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	2	-	-	-	-	-	-	-	-	1	-	1	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3265	Dec:	2%			
												'88	4332		3%			
												'95	2500		0%			
<i>Tetradymia canescens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	18	1	-	3	-	-	-	-	-	22	-	-	-	440	9	10	22
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	460		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 14, Study no: 3

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	5	4	5
<i>Artemisia nova</i>	20	28	23
<i>Artemisia tridentata</i> <i>vaseyana</i>	4	3	.99
<i>Cercocarpus montanus</i>	21	20	16
<i>Chrysothamnus</i> <i>depressus</i>	4	3	17
<i>Chrysothamnus</i> <i>viscidiflorus</i> <i>viscidiflorus</i>	22	18	14
<i>Eriogonum corymbosum</i>	2	1	3
<i>Gutierrezia sarothrae</i>	2	3	5
<i>Symphoricarpos</i> <i>oreophilus</i>	20	21	14
<i>Tetradymia canescens</i>	0	0	3

TREND STUDY 14-4-95

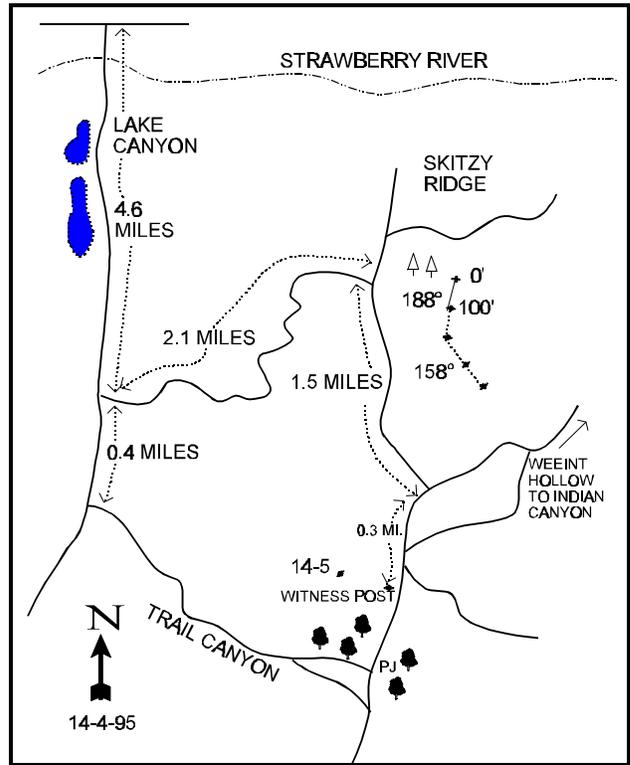
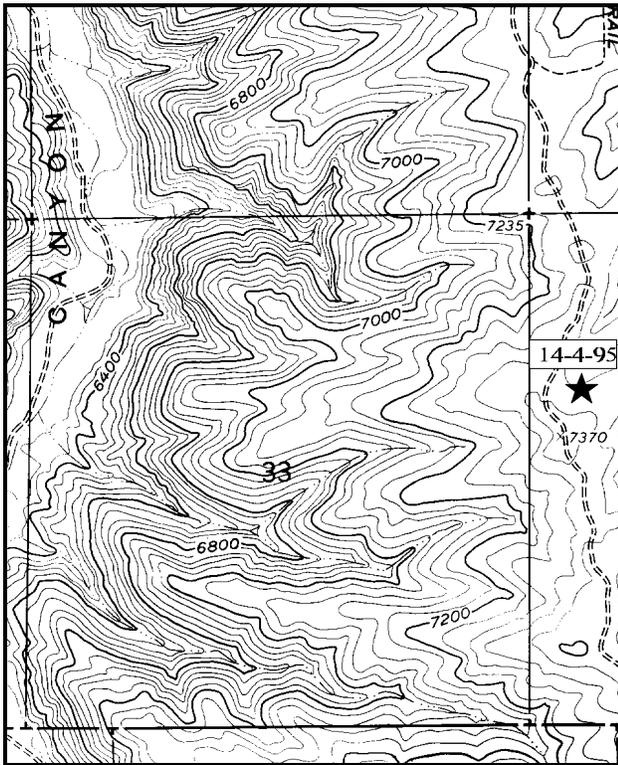
Study site name: Skitzzy Canyon. Range type: Chained & Seeded PJ.

Compass bearing: frequency baseline 203 degrees.

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 Strawberry River, take the Lake Canyon Road south for 4.6 miles to a road which goes up the canyon to the east. Turn left and drive approximately 2.1 miles up to a "T" intersection at the top of the ridge. [Skitzzy Ridge can also be reached via Trail Canyon the next (south) side canyon of Lake Canyon, or from Indian Canyon along the Weeint Hollow road]. At the top, look east into the chaining for two large conifers (Douglas firs). To the 0-foot baseline stake is located to the east of the two trees. From the 0-foot baseline stake, 0°. The frequency baseline is marked by green, steel fenceposts approximately 12-18 inches in height.



Map Name: Buck Knoll

Diagrammatic Sketch

Township 4S, Range 6W, Section 34

Salt Lake Meridian - T8S, R12E

## DISCUSSION

### Trend Study No. 14-4

This study on the Skitzzy Canyon seeding samples an area of deer winter range at 7,300 feet in elevation. Currently, pellet group quadrat frequency data indicates that elk use the area much more than deer. Land management for this area is with the Utah Division of Wildlife Resources. The study site is located on a ridge top where terrain is essentially level. The land slopes gently to the north-northeast, draining into Skitzzy Canyon. Prior to treatment in 1977-78, the site was dominated by Utah Juniper and Colorado pinyon. Currently there are only an estimated 11 trees/acre of pinyon and 9 of juniper.

Soils are fine textured, shallow and moderately rocky, but stabilized as a result of a dominant grass and forb component which makes up 96% of the total vegetative cover. Erosion and soil loss prior to treatment was heavy, which resulted in some areas of pavement and bare ground. Much of this has since filled in with herbaceous vegetation and the rate of erosion being controlled.

Browse is a minor component of this chaining for no shrubs were encountered during the 1982 reading. By 1988, only a few black sagebrush and mountain big sagebrush were sampled. Currently the most numerous shrub is black sagebrush with an estimated density of 540 plants/acre. Age class distribution indicates an increasing population. Mountain big sagebrush has an estimated density of only 60 mature plants/acre. Use of these sagebrush species is mostly light. Other preferred browse species occur on the site but did not fall within the shrub density strips. These include true mountain mahogany and antelope bitterbrush.

Grasses dominate the site providing 73% of the vegetation cover. The grass composition is very diverse with 14 species encountered in 1995. Crested wheatgrass is the most numerous species (65% of the grass cover) with smooth brome and Russian wildrye also fairly common. Forbs are diverse with 19 species encountered in 1995. They are not abundant however, with only two species, chickpea milkvetch and looseflower milkvetch, providing more than 1% cover. Alfalfa was sampled in 1995, indicating that it has apparently persisted on the treatment.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is definitely up. A great improvement in vegetative cover and litter buildup has acted to reduce erosion and soil loss. Vegetative trend is up but current composition is not the most favorable for deer. In time, shrub density will eventually increase through natural colonization of native species. However, if high value shrubs are desired more quickly, interseeding or transplanting would be required.

### 1988 TREND ASSESSMENT

Soil trend is considered slightly down due to a decline in basal vegetative cover and litter cover, combined with an increase in percent bare ground (7% to 12%). Erosion is not a problem however due to the gentle terrain and good distribution of vegetation and litter cover. Since the chaining treatment in 1977, there has been surprisingly little change in the browse component on this area. As in the 1982 study, there were only a few individual browse plants encountered. Many young shrubs were observed throughout the area, but were not common enough to be sampled. The general view photographs show a slight increase in the prominence of woody species, but grasses still dominate the site. Trend for browse is considered slightly up but density is still very low. Trend for the herbaceous understory is slightly up. Quadrat frequency of grasses increased while

frequency of forbs remained similar to 1982.

TREND ASSESSMENT

soil - slightly down

browse - slightly up but density is limited

herbaceous understory - slightly up

1995 TREND ASSESSMENT

Some ground cover characteristics have improved since 1988. Litter cover declined from 68% to 54%, but percent bare ground also declined from 12% to 7%. Browse is still limited, yet it has continually increased in density. Black sagebrush has increased to 540 plants/acre, 52% of which are young plants. Trend is considered slightly up. Trend for herbaceous understory is stable. Sum nested frequency of grasses and forbs have remained similar to those of 1988.

TREND ASSESSMENT

soil - slightly up

browse - slightly up but density is limited

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 14, Study no: 4

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron cristatum	159	*259	45	64	87	11.42
G	Agropyron intermedium	48	*56	6	19	25	.61
G	Agropyron spicatum	-	-	3	-	-	-
G	Agropyron trachycaulum	7	16	2	3	6	.64
G	Bouteloua gracilis	1	-	1	1	-	-
G	Bromus inermis	60	74	14	23	28	1.89
G	Carex spp.	40	*20	5	16	7	.13
G	Dactylis glomerata	-	1	5	-	1	.00
G	Elymus cinereus	4	17	3	2	6	.62
G	Elymus junceus	23	*19	7	11	10	1.10
G	Festuca ovina	-	1	-	-	1	.03
G	Oryzopsis hymenoides	-	4	4	-	2	.18
G	Poa fendleriana	-	3	-	-	1	.03
G	Poa secunda	-	*32	15	-	14	.25
G	Sitanion hystrix	101	*12	40	43	8	.04
G	Stipa lettermani	122	*47	35	56	22	.58
Total for Grasses		565	561	185	238	218	17.56
F	Androsace septentrionalis	-	*40	-	-	19	.12
F	Antennaria rosea	-	-	1	-	-	-
F	Arabis spp.	3	-	-	2	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Arabis drummondi</i>	-	*6	-	-	3	.01
F	<i>Arabis perennans</i>	-	*6	-	-	4	.02
F	<i>Astagalus cicer</i>	-	*14	4	-	6	2.00
F	<i>Astragalus convallarius</i>	12	4	1	5	2	.04
F	<i>Astragalus miser</i>	-	*15	-	-	8	.57
F	<i>Astragalus tenellus</i>	45	*3	13	19	3	1.78
F	<i>Calochortus nuttallii</i>	-	-	1	-	-	-
F	<i>Chaenactis douglasii</i>	-	5	5	-	2	.01
F	<i>Descurainia pinnata</i>	-	*8	-	-	4	.02
F	<i>Erigeron flagellaris</i>	-	-	1	-	-	-
F	<i>Eriogonum alatum</i>	15	*12	7	8	8	.14
F	<i>Erigeron eatonii</i>	3	2	-	1	1	.00
F	<i>Gayophytum ramosissimum</i>	-	3	-	-	2	.01
F	<i>Grindelia squarrosa</i>	-	3	1	-	1	.00
F	<i>Hedysarum boreale</i>	-	1	-	-	1	.15
F	<i>Ipomopsis aggregata</i>	1	6	1	1	2	.01
F	<i>Linum lewisii</i>	-	3	1	-	1	.00
F	<i>Medicago sativa</i>	-	7	1	-	2	.56
F	<i>Penstemon caespitosus</i>	1	-	-	1	-	-
F	<i>Penstemon pachyphyllus</i>	-	5	-	-	2	.01
F	<i>Sisymbrium altissimum</i>	-	3	-	-	1	.00
F	<i>Trifolium spp.</i>	-	-	2	-	-	-
Total for Forbs		80	146	39	37	72	5.50
B	<i>Artemisia nova</i>	16	14	-	6	6	.64
B	<i>Artemisia tridentata vaseyana</i>	1	4	-	1	2	.21
B	<i>Chrysothamnus viscidiflorus</i>	2	-	-	1	-	-
B	<i>Juniperus osteosperma</i>	-	-	-	-	-	.03
B	<i>Pinus edulis</i>	4	1	-	2	1	.03
Total for Browse		23	19	0	10	9	0.91

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

BASIC COVER --

Herd unit 14, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	325	7.50	4.75	26.94
Rock	237	3.25	4.50	12.60
Pavement	208	18.25	10.50	6.38
Litter	390	63.50	68.00	54.15
Cryptograms	13	.75	0	.05
Bare Ground	154	6.75	12.25	6.84

PELLET GROUP FREQUENCY --

Herd unit 14, Study no: 4

Type	Quadrat Frequency '95
Rabbit	7
Horse	3
Elk	42
Deer	6
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 14, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia nova																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300		15	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	9	5	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	8	11	
	95	5	8	-	-	-	-	-	-	-	13	-	-	-	260	17	32	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	133		-			
												'95	540		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	15	10	1
	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60	27	42	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	100		-			
<i>Cercocarpus montanus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	22	39	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Chrysothamnus nauseosus albicaulis</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	31	33	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Chrysothamnus viscidiflorus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	28	41	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Juniperus osteosperma</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Pinus edulis																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	41 24	1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
Purshia tridentata																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17 30	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 14, Study no: 4

Species	Percent of Total		
	'82	'88	'95
Artemisia nova	0	50	82
Artemisia tridentata vaseyana	0	25	15
Cercocarpus montanus	0	0	0
Chrysothamnus nauseosus albicaulis	0	0	3
Chrysothamnus viscidiflorus	0	0	0
Juniperus osteosperma	0	0	0
Pinus edulis	100	25	0
Purshia tridentata	0	0	0

TREND STUDY 14-5-95

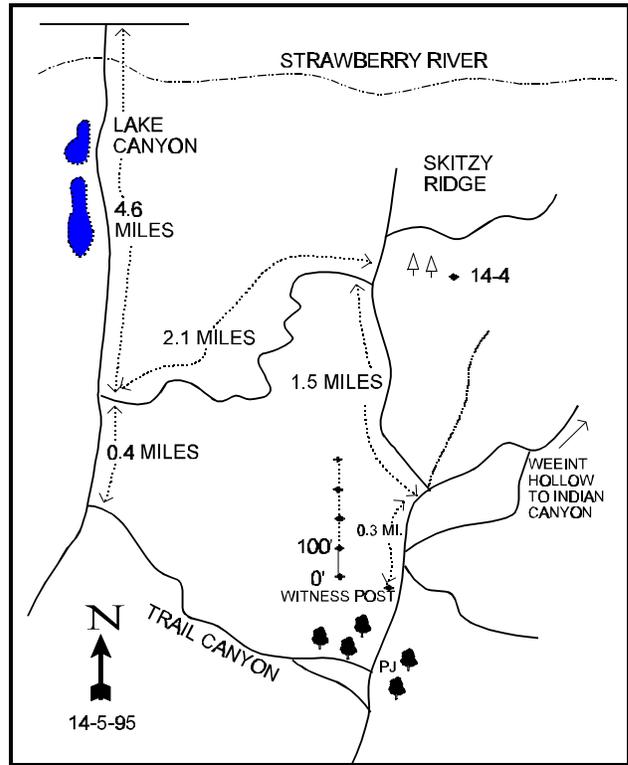
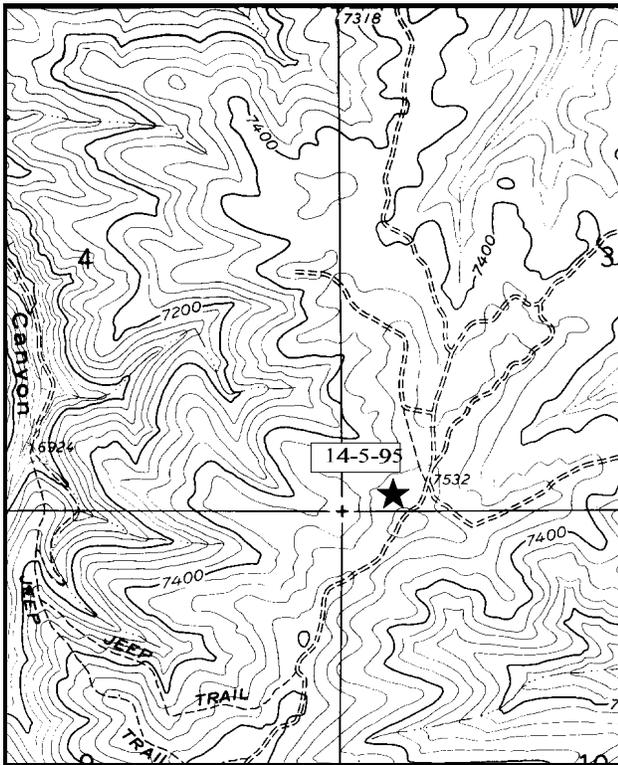
Study site name: Buck Knoll. Range type: Chained & Seeded PJ.

Compass bearing: frequency baseline 0 degrees.

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 Strawberry River, take the Lake Canyon Road south for 4.6 miles to a road which goes up the side canyon to the east. Turn left and go up the side canyon and switchback for 2.1 miles to an intersection at the top of the ridge (location of study #12A-4). Turn right and drive south 1.5 miles to an intersection. Turn right and go .25 miles to a fork. Bear right and proceed up the hill .05 miles to the witness post, a short green fencepost on the right side of the road. From the witness post, the 0-foot baseline stake is 30 paces west (290°) down the hill.



Map Name: Buck Knoll

Diagrammatic Sketch

Township 5S, Range 6W, Section 3

## DISCUSSION

### Trend Study No. 14-5

The Buck Knoll range trend study is located on a Utah Division of Wildlife Resources chaining and seeding. It is approximately one and one-half miles southwest of study #14-4 at an elevation of 7,500 feet. This site, however, is closer (within 100 yards) to the untreated juniper-pinyon woodland edge and is on a gentle (10% to 20%) north facing slope.

Soils are similar to study number 4, but slightly more bare ground and pavement is exposed. Soil movement also appears greater, due no doubt to slope steepness. Regardless, the soil condition is still vastly better than in nearby untreated juniper-pinyon woodlands.

Browse is more abundant on this site than on study #4, but is still well below optimum. The key management species consist of a small stand of true mountain mahogany which currently number 580 mostly mature plants/acre. Use has been heavy in the past when 77% of the population was heavily hedged in 1982. Current use is more moderate with 17% of the shrubs displaying heavy use. Vigor is good and there were no decadent plants sampled in 1995. Secondary browse which provide additional forage consist of small numbers of black sagebrush, mountain big sagebrush, rubber rabbitbrush, antelope bitterbrush, and elderberry.

The herbaceous understory is dominated by a variety of grasses which combine to produce 60% of the vegetation cover. The grass composition is similar to the Skitzzy Knoll site, but crested wheatgrass is not nearly as dominant. Russian wildrye, Salina wildrye, Indian ricegrass, and needle-and-thread are also abundant. Forbs are diverse but not numerous. Twenty-eight species, encountered in 1995, combine to produce less than 3% cover.

### 1982 TREND ASSESSMENT

Soil condition is fair and improving as a result of increased herbaceous cover and litter accumulation. Vegetatively, the area is grass dominated but contains a small number of desirable shrubs as well as an undesirable invader, broom snakeweed. Both can be expected to increase but probably at different rates. Broom snakeweed will likely become more abundant in the immediate future.

### 1988 TREND ASSESSMENT

As was the case with study #14-4, this chained site shows little sign of change since 1982. Ground cover characteristics remain basically unchanged. Browse species are more prominent on this study site than on Skitzzy Canyon. Other than a slight increase in grass and forb frequency and shrub density, the data from the two years is very similar. Observations based on photo point comparisons suggest an increase in the size of big sagebrush and less grass production in 1988. The expected rapid increase in broom snakeweed has not occurred. The population of true mountain mahogany is mostly comprised of young plants (78%), but density has not significantly increased in the last six years. Use of the palatable browse species; mahogany, bitterbrush, and mountain big sagebrush, is light.

### TREND ASSESSMENT

soil - stable

browse - slightly up

herbaceous understory - slightly up

1995 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1988. Protective ground cover is good and erosion is not a problem. Browse trend is stable but density is still well below what would be needed for a good deer winter range. The herbaceous understory displays a stable trend with sum nested frequency slightly down for grasses but up for forbs. Grass composition has changed. Nested frequency of crested wheatgrass and Salina wildrye declined significantly while nested frequency of Russian wildrye, Indian ricegrass and bottlebrush squirreltail increased.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 14, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron cristatum	217	*111	53	74	39	5.14
G	Agropyron dasystachyum	8	*11	11	3	4	.42
G	Agropyron intermedium	48	*7	16	20	3	.16
G	Agropyron trachycalum	-	-	6	-	-	-
G	Bouteloua gracilis	-	-	1	-	-	-
G	Bromus inermis	23	*3	8	9	1	.03
G	Carex spp.	18	*24	14	10	9	.38
G	Elymus cinereus	11	8	7	5	2	.41
G	Elymus junceus	31	40	-	12	17	2.00
G	Elymus salina	47	*38	8	17	15	1.82
G	Oryzopsis hymenoides	39	89	23	20	38	3.67
G	Poa spp.	33	*9	1	18	4	.07
G	Poa pratensis	-	*14	-	-	5	.17
G	Poa secunda	-	*24	-	-	11	.25
G	Sitanion hystrix	43	*83	2	17	33	.61
G	Sporobolus cryptandrus	-	*3	-	-	1	.00
G	Stipa comata	8	44	1	4	17	1.64
G	Unknown grass - perennial	2	-	1	1	-	-
Total for Grasses		528	508	152	210	199	16.79
F	Agoseris glauca	-	-	-	-	-	.15
F	Androsace septentrionalis	-	*23	-	-	10	.10
F	Anteneria rosea	-	-	4	-	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Arabis drummondi</i>	6	*13	1	3	5	.02
F	<i>Arenaria eastwoodiae</i>	-	1	2	-	1	.00
F	<i>Astragalus argophyllus</i>	13	8	-	5	3	.04
F	<i>Astragalus cicer</i>	21	*-	9	10	-	.03
F	<i>Astragalus miser</i>	14	17	8	6	8	.24
F	<i>Balsamorhiza sagittata</i>	1	-	-	1	-	-
F	<i>Caulanthus crassicaulis</i>	-	2	-	-	1	.00
F	<i>Calochortus nuttallii</i>	-	2	-	-	1	.00
F	<i>Chaenactis douglasii</i>	-	*18	-	-	9	.04
F	<i>Chenopodium fremontii</i>	-	*26	-	-	13	.11
F	<i>Chamaechaenactis scaposa</i>	6	-	-	2	-	-
F	<i>Cirsium spp.</i>	-	-	1	-	-	-
F	<i>Cryptantha spp.</i>	8	*19	3	5	7	.25
F	<i>Descurainia pinnata</i>	-	*29	-	-	16	.22
F	<i>Eriogonum alatum</i>	-	*17	7	-	7	.22
F	<i>Gilia spp.</i>	-	1	-	-	1	.00
F	<i>Hedysarum boreale</i>	-	1	-	-	1	.03
F	<i>Hymenoxys acaulis</i>	33	*15	2	13	7	.08
F	<i>Ipomopsis aggregata</i>	-	*12	-	-	5	.02
F	<i>Lappula occidentalis</i>	-	*73	-	-	33	.52
F	<i>Lesquerella spp.</i>	18	*12	7	9	8	.04
F	<i>Linum lewisii</i>	16	*14	33	8	7	.08
F	<i>Machaeranthera grindelioides</i>	17	18	-	7	10	.32
F	<i>Melilotus officiale</i>	-	-	1	-	-	-
F	<i>Penstemon caespitosus</i>	13	31	-	7	12	.06
F	<i>Physaria acutifolia</i>	-	10	-	-	4	.04
F	<i>Phlox spp.</i>	11	*-	-	5	-	-
F	<i>Schoenocrambe linifolia</i>	-	4	2	-	2	.01
F	<i>Senecio canus</i>	11	*4	-	6	2	.03
F	<i>Sphaeralcea coccinea</i>	-	1	-	-	1	.00
F	<i>Taraxacum officinale</i>	-	*13	-	-	5	.02
F	<i>Townsendia incana</i>	4	-	-	2	-	-
F	<i>Tragopogon dubius</i>	-	*9	-	-	5	.02
F	<i>Trifolium spp.</i>	4	-	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
Total for Forbs		196	393	81	90	184	2.79
B	Amelanchier utahensis	1	-	-	1	-	-
B	Artemisia tridentata vaseyana	-	-	-	-	-	.18
B	Cercocarpus montanus	32	*11	12	16	6	3.10
B	Chrysothamnus nauseosus graveolens	-	*17	-	-	7	2.04
B	Chrysothamnus nauseosus albicaulis	-	-	-	-	-	.56
B	Eriogonum corymbosum	-	3	-	-	1	.15
B	Gutierrezia sarothrae	20	34	8	10	17	.53
B	Juniperus osteosperma	-	3	1	-	1	.56
B	Leptodactylon nuttallii	-	-	2	-	-	-
B	Pinus edulis	-	5	-	-	2	1.16
B	Pursia tridentata	-	-	2	-	-	-
Total for Browse		53	73	25	27	34	8.31

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

BASIC COVER --

Herd unit 14, Study no: 5

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	327	8.25	8.50	25.78
Rock	198	2.25	2.50	7.89
Pavement	243	18.00	18.25	8.38
Litter	389	57.50	59.00	55.12
Cryptograms	11	0	.25	.24
Bare Ground	210	14.00	11.50	10.93

PELLET GROUP FREQUENCY --

Herd unit 14, Study no: 5

Type	Quadrat Frequency
Rabbit	5
Horse	5
Elk	12
Deer	7

BROWSE CHARACTERISTICS --  
Herd unit 14, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia nova</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20	11	20	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Artemisia tridentata vaseyana</i>																		
M	82	-	1	-	-	-	-	-	-	-	1	-	-	-	66	12	6	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	31	24	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	30	46	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	40		-			
<i>Cercocarpus montanus</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	2	3	-	-	-	-	-	-	5	-	-	-	333		5	
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	82	-	-	1	-	-	-	-	-	-	1	-	-	-	66	25	33	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	44	53	
	95	2	18	5	-	-	-	-	-	-	25	-	-	-	500	47	49	
D	82	-	-	1	-	-	-	-	-	-	-	-	1	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	465	Dec:	14%			
												'88	599		0%			
												'95	580		0%			
<i>Chrysothamnus nauseosus graveolens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	26	12	-	-	-	-	-	-	-	38	-	-	-	760	31	42	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	780		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus nauseosus albicaulis</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	28	26	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	-	-	1	-	-	-	-	-	2	-	-	-	133	6	4	2
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	10	15	5
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	133		-			
												'95	120		-			
<i>Eriogonum corymbosum</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	16	21	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	39	-	-	-	-	-	-	-	-	39	-	-	-	780			39
M	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600	11	19	9
	88	30	-	-	-	-	-	-	-	-	30	-	-	-	2000	7	4	30
	95	51	-	-	-	-	-	-	-	-	51	-	-	-	1020	8	8	51
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	600	Dec:	0%			
												'88	2333		14%			
												'95	1820		1%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Pinus edulis</i>																		
Y	82	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	88	-	-	-	-	-	-	1	-	-	-	-	-	1	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Purshia tridentata</i>																		
Y	82	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	1	-	-	-	-	-	-	-	-	-	1	-	66	8	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Sambucus spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	61	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 14, Study no: 5

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia nova</i>	0	0	1
<i>Artemisia tridentata</i> <i>vaseyana</i>	5	2	1
<i>Cercocarpus montanus</i>	37	18	17
<i>Chrysothamnus</i> <i>nauseosus graveolens</i>	0	0	23
<i>Chrysothamnus</i> <i>nauseosus albicaulis</i>	0	0	.57
<i>Chrysothamnus</i> <i>viscidiflorus</i> <i>lanceolatus</i>	0	4	3
<i>Eriogonum corymbosum</i>	0	0	2
<i>Gutierrezia sarothrae</i>	47	71	53
<i>Pinus edulis</i>	5	2	0
<i>Purshia tridentata</i>	5	2	0
<i>Sambucus spp.</i>	0	0	0

## SUMMARY

### DEER HERD UNIT - 14 - NORTH AVINTAQUIN

Five trend study sites were sampled on this unit in 1995 sampling deer winter range. Overall trends for the unit are primarily stable for soil, stable for browse and herbaceous understory.

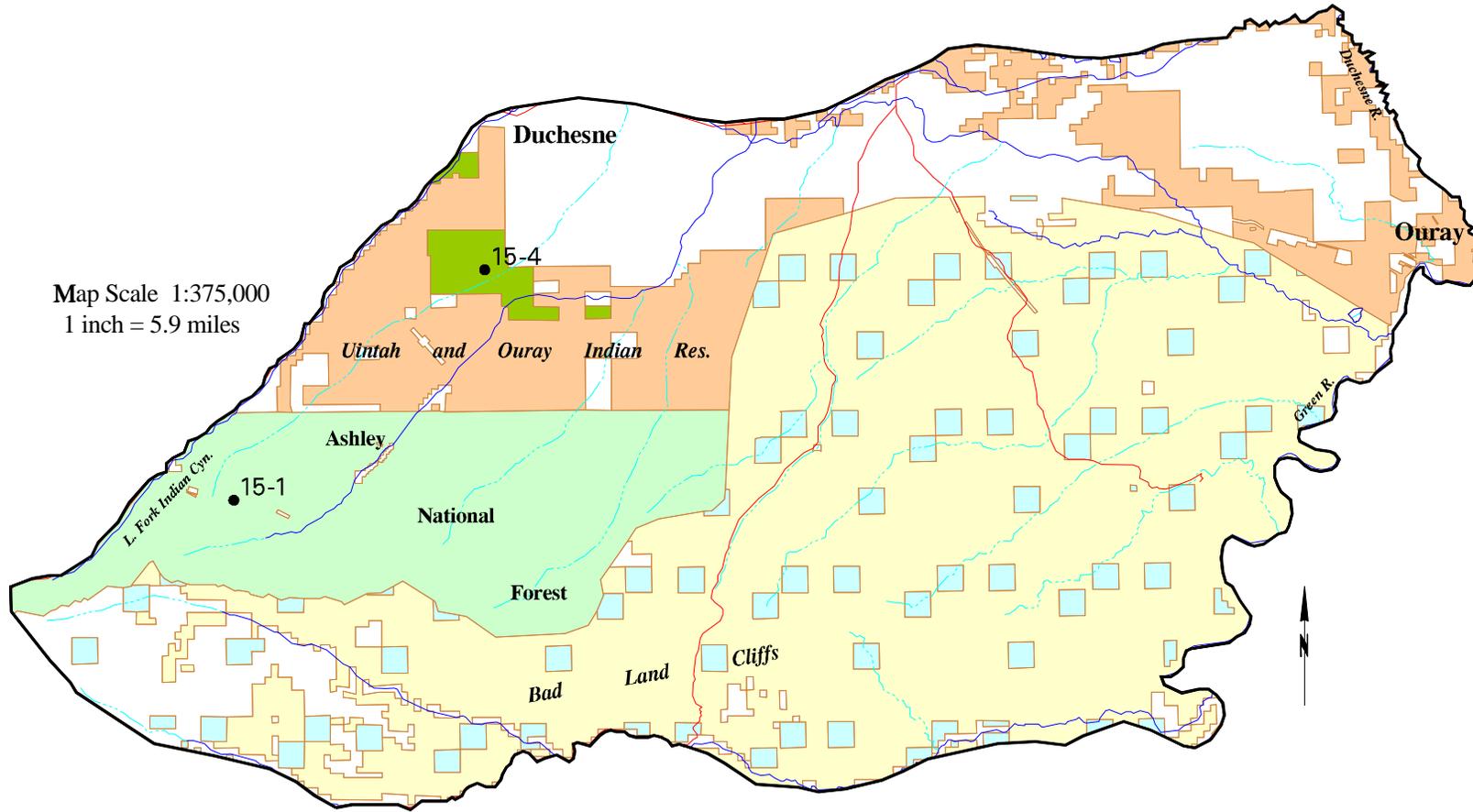
The site at Peatross Ranch samples an open pinyon-juniper woodland with a good herbaceous understory. The soil trend is currently slightly up with an overall stable trend since 1982. The browse component is deficient but stable since 1988. The herbaceous understory displays a downward trend. This site has pinyon-juniper cover of >30% which helps explain the browse and herbaceous understory trends.

Two sites, Skitzzy Knoll (#14-4) and Buck Knoll (#14-5), sample pinyon-juniper chainings. Both sites show stable soil trends with adequate soil protection. Herbaceous trends are stable since 1988 and upward to slightly upward overall. Browse is limited on both sites but more so at Skitzzy Knoll. Density of browse has increased with each reading however and overall trends are slightly up for both sites.

The trend studies at Lower Horse Ridge (#14-2) and Sam's Canyon (#14-3) sample mountain brush communities. Soil trend at Lower Horse Ridge is stable since 1988 and upward overall. Sam's Canyon displays a stable soil trend. Herbaceous trends since 1988 are slightly down for Lower Horse Ridge and stable for Sam's Canyon. Browse trend is stable for Lower Horse Ridge and up at Sam's Canyon since the last reading in 1988.

# Deer Management Unit 15 –1995 Transect Locations

Map Scale 1:375,000  
1 inch = 5.9 miles



## LEGEND

- |                 |                                |                     |
|-----------------|--------------------------------|---------------------|
| Forest Service  | Private Land                   | Road                |
| BLM             | State Wildlife Res./Mgmt. Area | Perennial Stream    |
| State of Utah   | Water Body                     | Intermittent Stream |
| Native American | Transect Location              |                     |

## MAP LOCATION



## DEER HERD UNIT 15- ANTHRO MOUNTAIN

### Boundary Description

Duchesne, Carbon, and Uintah counties - Boundary begins at Duchesne and Highway US-191; then southwesterly on US-191 to the Argyle Canyon road; southeasterly on this road to Nine Mile Canyon drainage; east along this drainage to the Green River; north along this river to the Duchesne River; northwesterly along this river to Duchesne and beginning point (excludes all Tribal Lands).

### Herd Unit Description

Summer range on the Anthro Mountain Unit is limited in both size and quality. The 1995 Utah Big Game Annual Report identified 639,228 acres of land within the herd unit. There is a long and gradual northerly slope to the Anthro Mountain terrain, which lends itself to an abundance of winter range. The long slopes are covered by pinyon-juniper woodland with natural openings of sagebrush. Grassy openings are often found in the drainages. Some ridge tops are covered with black sagebrush. The limited high country is mainly open sagebrush slopes with scattered patches of aspen. Most of the winter range in the unit is available even in severe winters. The upper limits are generally considered between 8,000 and 8,500 feet. The desert country below 4,000 feet is seldom used by migrating deer.

A majority of the range is managed federally (59%), while 14% of the range is on the Uintah and Ouray Indian Reservation. Twenty one percent of the land is private and the remaining 5% is State of Utah land.

Cattle grazing is the major activity occurring on the Forest Service land. Oil and gas exploration and drilling with their associated roads and year-round activity, are the prominent activities taking place on the lower ends of the ridges which is administered by the BLM. Firewood cutting is also a important use on the Ute lands.

Information on the current livestock grazing program was provided by the Ashley National Forest. The Cottonwood allotment, where study #15-1 is located, is a 2 unit deferred rotation system with 326 head of cattle from June 16 to October 15. Prior to 1981, the allotment was generally grazed season long. Study #15-2 is in the Anthro Mountain allotment and is currently grazed by 481 head of cattle under a 7 unit rest rotation system from June 1 to October 15. The Antelope Winter allotment, where study #15-3 is located, is a 3 unit rest rotation system with 200 head of cattle grazing the allotment from December 1 to March 23.

The Upper Cottonwood Ridge (15-1) study samples an aspen type at 9,200 feet while the Wirefence Canyon (15-2) and Chokecherry Canyon (15-3) studies are located in the predominant sagebrush/grass type. These studies were established in late September 1982, and then reread in late July 1988. Two additional studies were established in early August 1988 which sample representative winter range for the area. The Cottonwood Canyon (15-4) study is on DWR land and the Nutters Canyon (15-5) study is apparently on the Uintah and Ouray Indian Reservation (it was supposed to be on BLM). They are both located in naturally open sagebrush valleys surrounded by pinyon-juniper woodland covered hills.

A small, but increasing number of elk constitute the Anthro herd. It has been hunted under a bull only permit system since 1978, but was separated from the larger Avintaquin-White River herd unit in 1983. The elk herd is currently (1996) managed as a limited entry hunting area with an emphasis on quality hunting by maintaining low hunter numbers and a high percentage of mature bulls in the population (Greenbook). The high for bull permits came in 1990 with 22

permits allowed. In 1995, only 7 bull permits were allowed, compared to 13-15 permits allowed between 1991 and 1994. Hunter success is usually high.

Deer numbers on the Anthro Mountain unit continue to be low. Buck harvest averaged 161/year from 1979 to 1983 and then doubled to an average annual harvest of 387 bucks from 1984 to 1988. From 1989 to 1991, buck harvest numbers steadily declined from a high of 579 in 1988 to 237 in 1991. Since 1991 buck harvest numbers have stayed fairly constant with an average of 156/year. The herd unit plan for 1996 had a harvest objective of 250 bucks a year. Success has remained fairly constant over all years at around 33%.

Unfortunately, the pellet transects are no longer maintained so deer days use per hectare estimates for key areas are unavailable.

Antelope are also present in the study area, and have been observed on Myton Bench and on the pinyon-juniper and sagebrush ranges on the ridges of lower Cottonwood and Antelope Canyons. Buck hunting was first permitted in 1978 (10 permits). Twenty-two permits were issued in 1988. Buck permits had steadily increased to a high of 43 in 1994, but in 1995, buck permits dropped to 29. Spring counts peaked in 1992 at 537 with a steady decline to 271 in 1995.

TREND STUDY 15-1-95

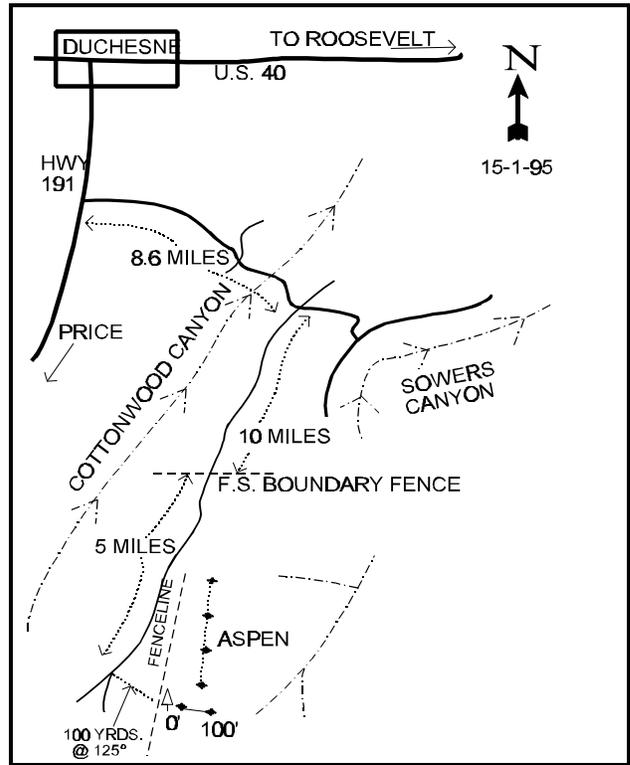
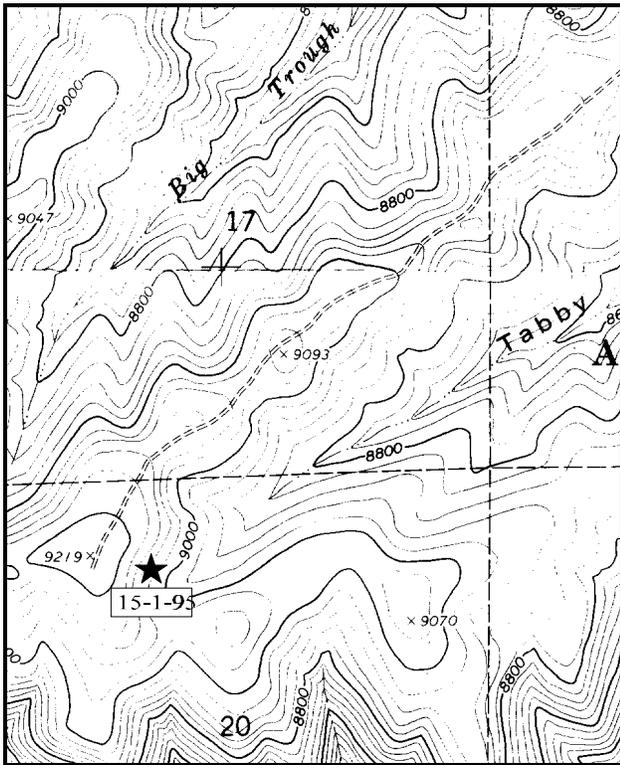
Study site name: Upper Cottonwood Ridge. Range type: Quaking Aspen.

Compass bearing: frequency baseline 125 degrees.

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

LOCATION DESCRIPTION

From Duchesne, go south on Highway 191 towards Price for approximately 2.5 miles. Turn left and proceed southeast on the main road for 8.6 miles to a fork above Sowers Canyon. Bear right and drive up along Cottonwood Ridge for about 10 miles to the FS boundary fence. From there, continue 5 miles to a faint fork on top of the ridge above the head of Tabby Canyon. From the fork, walk 64 paces bearing 125° true to the 0-foot baseline stake. The 0-foot stake is just beyond a lone conifer, on the edge of the aspens. The baseline runs SE into the young aspen stand. The 0-foot baseline stake has a red browse tag, #7088, attached.



Map Name: Lance Canyon.

Diagrammatic Sketch

Township 6S, Range 6W, Section 20 UTM COOR. 5-35-263E 12 44-21-962N

## DISCUSSION

### Trend Study No. 15-1

The Upper Cottonwood Ridge study samples summer range at an elevation of 9,160 feet. Overall, summer range is limited on this unit in both size and quality. It has an easterly aspect with a slope of 50%. Soils are fine textured and contain moderate amounts organic matter. Surface rock and pavement are scarce. Due to the steep slope, dense aspen, and shrubs in the understory, cattle do not make much use of the site.

This small, uneven-aged stand of quacking aspen at the head of Tabby Canyon receives light to moderate use by big game. This allotment is grazed by 326 head of cattle from June 16 to October 15 as part of a two-unit deferred rotation system.

Vegetative aerial cover for the site was estimated at 47% in 1995. This is an increase from the previous years data because only basal cover was previously estimated. Litter cover estimates are similar and is estimated at 69%. No erosion is evident with a low percentage of bare ground (12%) because of the high amounts of protective vegetative and litter cover.

During the 1982 and 1988 reading, aspen density was estimated using three 1/200 acre density plots which estimated 3,933 plants/acre and 6,066 plants/acre for each year respectively. All aspen trees were classified as young with no apparent hedging in 1988. In 1995, point-center quarter data estimated 1,044 trees/acre with an average diameter of 2.4 inches. Aspen was mistakenly not counted in the shrub strips and not classified for form class and vigor in 1995, so no comparisons can be made with the past data. Serviceberry, not encountered on the density plots in 1982, yet estimated at 9,800 shrubs/acre in 1988, now have an estimated density of only 180 plants/acre. The high 1988 density estimate can be attributed to an abundance of young plants and a much smaller sample size. These young plants did not survive the drier years or the intraspecific competition. The serviceberry plants show only light utilization with an average height of 20 inches and crown diameter of 29 inches. The mountain big sagebrush population has shifted from a mostly young population reported 1982 and 1988 to a mostly mature population in 1995. The plants have increased in average height to 19 inches and crown diameter to 25 inches. There is little or only light use on the plants at this time. Very few of the plants were classified as decadent and the dead to live ratio is 1:36. Snowberry has shown a steady increase over the years and now has an estimated density of 9,040 plants/acre. Snowberry is stoloniferous and was counted as a plant if it was rooted within the sample area. An increase in this specie would be expected because it is a shade tolerant plant which allows it to out-compete the surrounding species as the aspen canopy closes. The size of the plants has stayed relatively stable with an average height of 17 inches and an average crown diameter of 23 inches. The Wood's rose density has also increased and is estimated at 6,180 plants/acre in 1995. It is a mostly mature, small statured population. Chokecherry is scattered throughout the site with an estimated density of 1,000 plants/acre. These plants average less than 2 feet in height with an average crown diameter of 1½ feet. All of these browse species show only light utilization currently.

Grasses comprise 9% of the total vegetative cover. Nearly half of the grass cover is contributed by a sedge. Bluebunch wheatgrass has the next highest cover for grasses. Other grasses include Kentucky bluegrass, mountain brome, slender wheatgrass, muttongrass, and Columbia needlegrass.

Thirty three species of forbs were encountered with a *Penstemon spp.* having the highest cover value. Sum of nested frequency for perennial forbs has increased

since 1988 and total quadrat frequency has increased since 1982. Most species encountered are perennials and there is very little chance of annual species invading this site.

#### 1982 APPARENT TREND ASSESSMENT

This site is currently in good to excellent condition. It is unfortunate that deer herd unit 15 does not contain more acreage of similar vegetation. Herd unit productivity could be greatly improved. A key factor on this site is the apparent relative lack of livestock use. Other aspen sites further to the east and south have been heavily utilized and hence have rather depleted understories. Range trend is stable or perhaps even improving. A few conifers (i.e., white fir and douglas fir) are present but offer no immediate ecological threat.

#### 1988 TREND ASSESSMENT

The increased density and frequency of a variety of herbaceous vegetation found in 1988 confirms the upward vegetative trend. The increase in forbs, a key management component, was not as large as the increase in grasses. The changes in browse density shown on the density plots were not supported by the frequency data, so are probably not significant. Conifer invasion is not a factor in this aspen community type.

#### 1995 TREND ASSESSMENT

Soil trend on this site is stable and in excellent condition. The herbaceous understory and litter, as well as the aspen canopy, provide good protection to the soil. Herbaceous understory accounts for 39% of the vegetative cover (30% forbs and 9% grasses). Both forbs and grasses are diverse and fairly abundant. Sum of nested frequency for grasses and forbs has increased since 1988 with most species being relatively palatable to livestock and wildlife. Herbaceous understory trend is up. It should be noted that the large change in density for service berry was due to a combination of a very large number of young plants that were lost with the extended drought and the small sample size in 1988 was directly over a clump of plants. This has been remedied with a much larger sample size and better distributed sample giving much more reflective estimates for browse that are clumped or discontinuous in their respective distributions. Density of conifers is low at this time. There is abundant browse cover, but at this elevation, grasses and forbs will be preferred for most of the season over browse. Browse trend is stable.

#### TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up

VEGETATIVE TRENDS --

Herd unit 15, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron spicatum	46	*96	17	24	39	.72
G	Agropyron trachycaulum	65	*68	28	34	28	.27
G	Bromus anomalus	15	*27	-	6	9	.19
G	Bromus carinatus	139	*30	-	60	16	.35
G	Carex spp.	14	*72	12	6	29	2.57
G	Deschampsia caespitosa	-	*7	-	-	3	.09
G	Poa fendleriana	-	*10	-	-	4	.22
G	Poa pratensis	21	21	-	11	9	.43
G	Poa secunda	-	*20	1	-	6	.13
G	Stipa columbiana	10	24	4	6	10	.22
G	Stipa lettermani	-	4	-	-	2	.06
Total for Grasses		310	379	62	147	155	5.26
F	Achillea millefolium	14	*37	7	6	13	1.67
F	Agoseris glauca	17	7	2	9	4	.19
F	Artemisia absinthium	-	3	-	-	2	.01
F	Arabis spp.	1	8	-	1	2	.41
F	Arabis drummondii	-	*12	2	-	4	.12
F	Aster engelmannii	48	*36	-	26	14	.56
F	Astragalus newberryi	-	*6	-	-	4	.13
F	Aster spp.	-	*18	14	-	8	.43
F	Astragalus spp.	-	*17	-	-	9	.19
F	Castilleja linariaefolia	-	*14	-	-	6	.08
F	Chaenactis douglasii	3	-	-	2	-	-
F	Chenopodium fremontii	-	62	-	-	26	.18
F	Cymopterus spp.	-	4	-	-	2	.01
F	Delphinium bicolor	1	-	-	1	-	-
F	Delphinium occidentale	-	*6	-	-	3	.41
F	Erigeron spp	-	*8	-	-	3	.04
F	Fragaria spp.	6	-	-	2	-	-
F	Gentiana spp.	-	9	-	-	3	.18
F	Geranium richardsonii	20	*20	4	9	9	.54
F	Gilia spp.	-	12	1	-	4	.02
F	Lupinus argenteus	44	*32	14	24	14	.85
F	Penstemon spp.	40	115	36	19	53	5.69

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	<i>Penstemon strictus</i>	48	*14	-	23	6	1.10
F	<i>Phlox austromontana</i>	-	5	-	-	2	.01
F	<i>Phlox longifolia</i>	15	56	2	7	21	.32
F	<i>Phacelia saxicola</i>	6	10	-	3	4	.24
F	<i>Polygonum douglasii</i>	-	86	-	-	36	.18
F	<i>Senecio serra</i>	52	*27	-	28	13	.94
F	<i>Smilacina racemosa amplexicaulis</i>	53	*2	6	23	1	.03
F	<i>Stellaria jamesiana</i>	-	*35	2	-	14	.24
F	<i>Taraxacum officinale</i>	-	*12	2	-	5	.36
F	<i>Thalictrum fendleri</i>	-	3	-	-	1	.00
F	<i>Tragopogon dubius</i>	-	2	-	-	2	.01
F	<i>Vicia americana</i>	87	*35	-	35	14	.65
F	<i>Viguiera multiflora</i>	60	*41	36	30	15	.87
F	<i>Viola spp.</i>	-	2	-	-	1	.00
Total for Forbs		515	756	128	248	318	16.73
B	<i>Amelanchier alnifolia</i>	43	*5	21	21	2	.33
B	<i>Artemisia tridentata vaseyana</i>	14	*50	8	9	26	7.17
B	<i>Chrysothamnus viscidiflorus</i>	-	2	-	-	1	.18
B	<i>Populus tremuloides</i>	115	*36	49	52	15	5.95
B	<i>Prunus virginiana</i>	31	*24	17	16	13	.70
B	<i>Pseudotsuga menziesii</i>	-	-	-	-	-	1.48
B	<i>Rosa woodsii</i>	56	76	30	29	33	6.69
B	<i>Sambucus racemosa pubens microbotrys</i>	-	-	-	-	-	.03
B	<i>Symphoricarpos oreophilus</i>	84	*119	38	35	49	11.69
Total for Browse		343	312	163	162	139	34.24

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

BASIC COVER --

Herd unit 15, Study no: 1

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	336	7.5	7.50	47.06
Rock	17	0	0	.33
Pavement	18	0	0	.03
Litter	391	80.6	82.25	69.31
Cryptograms	-	0	0	0
Bare Ground	161	11.75	10.25	11.67

PELLET GROUP FREQUENCY --

Herd unit 15, Study no: 1

Type	Quadrat Frequency '95
Rabbit	2
Deer	6

BROWSE CHARACTERISTICS --

Herd unit 15, Study no: 1

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	7	-	-	-	-	-	1	-	-	8	-	-	-	533		8	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	118	9	-	1	-	-	1	-	-	128	-	1	-	8600		129	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	8	2	-	-	-	-	-	-	-	10	-	-	-	666	23	14	10
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180	20	29	9
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	9266		-			
												'95	180		-			
<i>Artemisia frigida</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	80	-	-	-	-	-	-	-	-	80	-	-	-	1600		80	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	9	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			

A G E	YR	Form Class (No. of 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	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
Y	82	28	14	-	-	-	-	-	-	-	42	-	-	-	2800		42	
	88	21	-	-	-	-	-	-	-	-	21	-	-	-	1400		21	
	95	13	-	-	3	-	-	-	-	-	16	-	-	-	320		16	
M	82	1	11	-	-	-	-	-	-	-	12	-	-	-	800	13 12	12	
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466	17 11	7	
	95	124	2	-	34	-	-	-	-	-	151	9	-	-	3200	19 25	160	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3600	Dec:	0%			
												'88	1932		3%			
												'95	3560		1%			
<i>Chrysothamnus viscidiflorus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	16 17	2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Populus tremuloides</i>																		
S	82	23	-	-	-	-	-	-	-	-	23	-	-	-	1533		23	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	21	-	-	-	-	-	-	-	-	21	-	-	-	1400		21	
	88	62	-	-	20	-	-	1	8	-	91	-	-	-	6066		91	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	38	-	-	-	-	-	-	-	-	38	-	-	-	2533	67 47	38	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3933	Dec:	-			
												'88	6066		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Prunus virginiana</i>																		
S	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	21	-	-	-	-	-	-	-	-	21	-	-	-	1400		21	
	88	13	1	-	2	-	-	1	-	-	16	1	-	-	1133		17	
	95	15	-	-	1	-	-	-	-	-	16	-	-	-	320		16	
M	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266	17 13	4	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0		
	95	34	-	-	-	-	-	-	-	-	34	-	-	-	680	22 18	34	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1666	Dec:	-			
												'88	1133		-			
												'95	1000		-			
<i>Rosa woodsii</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	88	13	-	-	1	-	-	-	-	-	14	-	-	-	933		14	
	95	53	1	-	4	-	-	-	-	-	58	-	-	-	1160		58	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	17 13	1	
	88	3	-	-	-	-	-	-	-	-	2	-	1	-	200	18 14	3	
	95	238	-	1	12	-	-	-	-	-	251	-	-	-	5020	13 12	251	
Total Plants/Acre (excluding Dead & Seedlings)												'82	732	Dec:	-			
												'88	1133		-			
												'95	6180		-			
<i>Sambucus racemosa</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0		
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	45 35	6	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	130		-			
												'95	140		-			

A G E	YR	Form Class (No. of 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	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	82	22	-	-	-	-	-	-	-	-	22	-	-	-	1466		22	
	88	61	5	1	2	-	-	2	-	-	70	-	1	-	4733		71	
	95	71	-	-	17	-	-	-	-	-	88	-	-	-	1760		88	
M	82	30	-	-	-	-	-	-	-	-	30	-	-	-	2000	21 22	30	
	88	37	3	-	1	-	-	-	-	-	38	1	2	-	2733	16 19	41	
	95	360	-	-	4	-	-	-	-	-	364	-	-	-	7280	17 23	364	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3466	Dec:	0%			
												'88	7666		2%			
												'95	9040		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 15, Study no: 1

Species	Percent of Total		
	'82	'88	'95
Amelanchier alnifolia	0	34	.89
Artemisia frigida	0	0	.09
Artemisia tridentata vaseyana	27	7	18
Chrysothamnus viscidiflorus	0	0	.19
Populus tremuloides	29	22	0
Prunus virginiana	12	4	5
Rosa woodsii	5	4	31
Sambucus racemosa	0	.48	.69
Symphoricarpos oreophilus	26	28	45

TREND STUDY 15-2-95

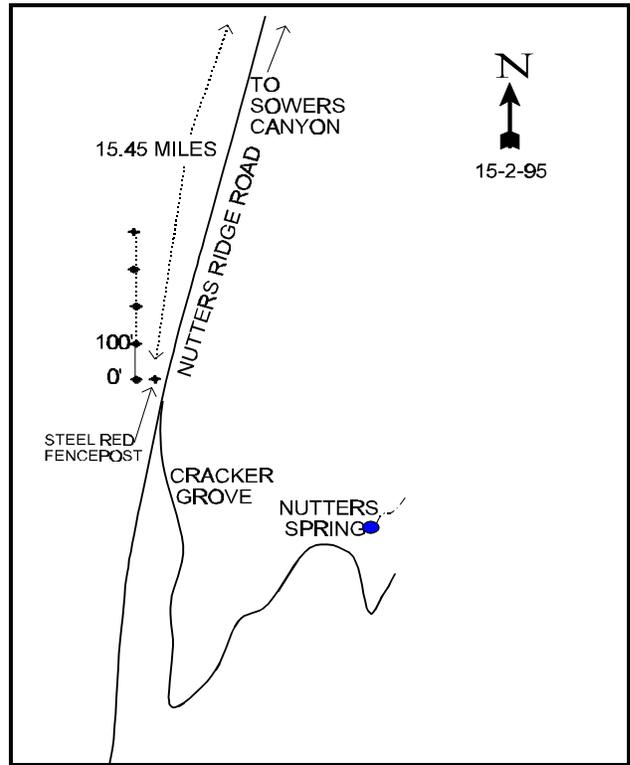
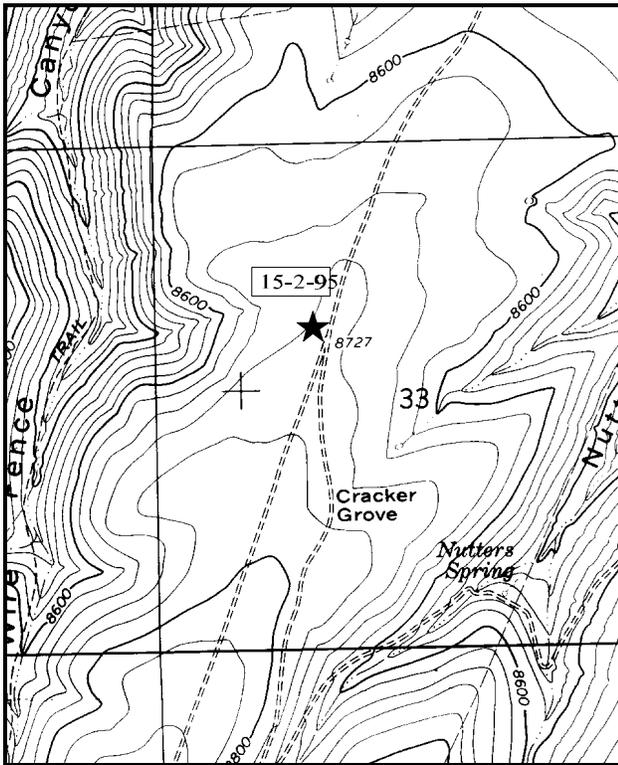
Study site name: Wirefence Canyon. Range type: Ouaking Aspen.

Compass bearing: frequency baseline 3 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (16 & 86ft), line 2 (33ft), line 3 (52ft), line 4 (66ft).

LOCATION DESCRIPTION

From the junction of Highway U.S. 40 and the Sowers Canyon Road (near Bridgeland), drive south on the Sower Canyon Road for 8.5 miles to the Nutters Ridge Road. Turn left here b an old ranch and proceed south along Nutters Ridge for 15.5 miles to a narrow "Y" in the road. Six paces west of the fork is a red steel fencepost (marking line-intercept study #15-4-77). The 0-foot baseline stake is 15 paces west of the red fencepost. The frequency baseline stakes are marked by green, 12-18 inch tall fenceposts.



Map Name: Dyer Mountain

Diagrammatic Sketch

Township 6S, Range 5W, Section 33

## DISCUSSION

### Trend Study No. 15-2

The Wirefence Canyon trend study is located on summer range within the large sagebrush-grass park occupying the flat ridge between the uppermost reaches of Wirefence and Nutters canyons. Elevation is 8,700 feet with almost flat terrain. This study is located immediately adjacent to an old permanent line-intercept study established in 1977, (27A-4), and is intended to replace it. After decades of season-long grazing by cattle and sheep from 1915 to 1944, a summer grazing system of rest/rotation was established in 1972. This study is now grazed by 481 head of cattle from June 1 to October 15 as a 7 unit rest rotation system.

Soil on the site is moderately shallow with some erosion still apparent across the surface. Escape or thermal cover is totally lacking on the study site. The nearest cover is 1/4 to 1/2 mile away in Nutters Canyon or within an isolated but badly depleted aspen grove (Cracker Grove) approximately the same distance to the southeast.

Some confusion exists on this site concerning the species of *Artemisia*. Instead of the mix of *Artemisia nova* and *A. tridentata vaseyana* reported in the 1982 data, all sagebrush on the study site are now classified as *A. tridentata vaseyana*. *Agropyron smithii* is probably a misidentification in the 1982 report, as the species is rarely found in montane communities in the area (Goodrich and Neese 1986).

Supplemental site information was provided by the Ashley National Forest. Numerous treatments have been done on the Anthro Mountain allotment, including plowing and seeding on the study site (a 2,363 acre treatment) in 1958 and 1959. The old treatments have future plans for maintenance, burning and/or spraying.

Vegetative aerial cover is now estimated at 36%. Earlier estimates are considerably lower because it was for only basal cover. Rock and pavement cover combined, show a decrease from 21% cover in 1982, to 18% cover in 1988, and finally only 6% cover in 1995. Litter cover has fluctuated through the time period as a function of precipitation. At this time litter cover is estimated at 34%. Percent bare ground, while steady at 24% in the previous two readings, has increased to an estimated 32% in 1995.

The mountain big sagebrush population on the site is healthy and vigorous with moderate hedging. Data from 1982 indicated a population of 79% mature plants and 21% young plants. The 1988 data show a population with 46% of the plants classified as mature and 46% young. The population appears to be stable with relatively the same composition of mature and young plants now. Biotic potential is moderately low at 3%, which is a decrease from 1988 of 6%. Decadency remains low at 5%. Mountain low rabbitbrush density has remained relatively constant over all years with a mostly mature age structure (89%). Mountain low rabbitbrush currently accounts for 28% of the total browse cover. Broom snakeweed was not sampled in 1982 and had an estimated density of 1,733 plants/acre in 1988. The density is now estimated at 1,580 plants/acre with 91% of the plants classified as mature. The age structure is similar to 1988 and the population does not appear to be expanding at this time. Average plant height and crown measurements have doubled to 7 and 8 inches respectively. Even at this density, they still provide less than 1% of the browse cover. Other browse species encountered in low densities in 1995 include; gray horsebrush, fringed sagebrush, and snowberry.

The predominant grass on the site is smooth brome. Smooth brome has significantly increased in nested frequency since 1988 and accounts for 66% of the grass cover and 27% of the total vegetative cover. Muttongrass has the next

highest grass cover, but has significantly decreased in nested frequency since 1988. Intermediate wheatgrass has also significantly decreased in nested frequency while crested wheatgrass nested frequency has increased. Other grasses include: Salina wildrye, six-weeks fescue, and Sandberg bluegrass. Overall, sum of nested frequency for perennial grasses has remained nearly the same since 1988.

Annual species were not counted in the 1982 or 1988 readings and many new perennial species were encountered in 1995. Sum of nested frequency for perennial forb species has greatly increased and only 2 annual species were encountered. Many of the species encountered are considered low growing increasers.

#### 1982 APPARENT TREND ASSESSMENT

Range trend is declining. The principle cause is almost certainly cattle grazing. Without some serious reduction or a grazing system allowing some rest and regeneration, the prognosis is low for a mountain low rabbitbrush type.

#### 1988 TREND ASSESSMENT

Ground cover percentages remain virtually unchanged between 1982 and 1988. The estimate for litter cover (51%) is good, especially considering the grazing pressure this site received in 1988 due to its close proximity to water and a salt lick. Current observations indicate that the soil condition and trends have stabilized.

#### 1995 TREND ASSESSMENT

The bare interspaces between the mountain big sagebrush show some signs of erosion, but this is only slight. The level terrain helps keep the soil in place along with the vegetation and litter, therefore, soil trend is considered stable. The herbaceous understory accounts for 69% of the total vegetative cover. The dominant specie is smooth brome which comprises 27% of the total vegetative cover. Smooth brome is more palatable when it is young and loses palatability with age, although, when it has been covered by snow it will soften and become more palatable. Many of the forb species are not sought after by wildlife or livestock. Although sum of nested frequency has increased for forbs, a different composition may be desired. Herbaceous understory trend is slightly upward. The mountain big sagebrush population is stable with moderate utilization and a low decadency rate. The broom snakeweed and mountain low rabbitbrush populations also appear stable with a mature age structure, although, the mature plants are increasing in size. Browse trend is stable at this time.

#### TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly upward

VEGETATIVE TRENDS --  
Herd unit 15, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Agropyron cristatum</i>	16	33	19	7	14	.97
G	<i>Agropyron intermedium</i>	41	*3	-	19	2	.01
G	<i>Bromus inermis</i>	330	*337	23	100	100	9.80
G	<i>Elymus salina</i>	34	56	-	13	24	.68
G	<i>Festuca ovina</i>	-	*45	-	-	20	.63
G	<i>Koeleria cristata</i>	52	*51	2	29	25	.73
G	<i>Poa fendleriana</i>	123	*66	-	53	30	1.52
G	<i>Poa secunda</i>	-	*40	29	-	18	.60
Total for Grasses		596	631	71	221	233	14.96
F	<i>Agoseris glauca</i>	-	2	-	-	1	.00
F	<i>Allium</i> spp.	-	3	-	-	1	.00
F	<i>Androsace septentrionalis</i>	-	32	-	-	13	.06
F	<i>Arabis</i> spp.	4	-	-	2	-	-
F	<i>Arabis drummondi</i>	-	20	-	-	10	.07
F	<i>Astragalus argophyllus</i>	4	*23	1	3	11	.22
F	<i>Astragalus convallarius</i>	4	12	1	2	5	.05
F	<i>Astragalus detritalis</i>	-	6	-	-	2	.03
F	<i>Astragalus tenellus</i>	132	*99	-	54	42	4.39
F	<i>Aster</i> spp.	-	*26	-	-	9	.70
F	<i>Castilleja flava</i>	19	*12	-	11	6	.14
F	<i>Chaenactis douglasii</i>	6	8	-	4	3	.16
F	<i>Cymopterus longipes</i>	-	122	-	-	54	.77
F	<i>Descurainia pinnata</i>	-	3	-	-	1	.00
F	<i>Eriogonum alatum</i>	-	-	5	-	-	.00
F	<i>Erigeron eatonii</i>	26	*30	2	13	17	.17
F	<i>Eriogonum umbellatum</i>	15	65	-	7	25	1.56
F	<i>Hedysarum boreale</i>	-	*18	-	-	7	.25
F	<i>Hymenoxys acaulis</i>	-	1	-	-	1	.00
F	<i>Ipomopsis aggregata</i>	8	-	-	3	-	-
F	<i>Lesquerella</i> spp.	40	*-	-	24	-	-
F	<i>Linum lewisii</i>	2	-	2	1	-	.00
F	<i>Lupinus argenteus</i>	6	*10	1	5	4	.16
F	<i>Machaeranthera canescens</i>	-	*13	1	-	6	.27
F	<i>Oxytropis sericea</i>	40	*2	-	19	2	.01

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Penstemon caespitosus	48	*48	-	24	21	.66
F	Penstemon comarrhenus	-	1	-	-	1	.15
F	Physaria acutifolia	-	*63	-	-	29	.23
F	Phlox longifolia	11	*21	-	5	9	.09
F	Potentilla spp.	3	-	-	1	-	-
F	Schoenocrambe linifolia	5	*7	-	3	3	.02
F	Senecio canus	-	*7	-	-	3	.06
F	Thlaspi arvense	-	1	-	-	1	.00
Total for Forbs		373	655	13	181	287	10.32
B	Artemisia frigida	-	3	-	-	1	.00
B	Artemisia tridentata vaseyana	60	*67	-	33	35	8.18
B	Chrysothamnus viscidiflorus lanceolatus	94	*98	42	46	49	3.20
B	Gutierrezia sarothrae	3	9	-	1	4	.04
B	Tetradymia canescens	1	3	1	1	1	.15
Total for Browse		158	180	43	81	90	11.58

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

BASIC COVER --

Herd unit 15, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	354	7.50	6.25	36.06
Rock	193	3.25	3.00	3.17
Pavement	252	18.00	15.50	3.07
Litter	392	46.25	51.25	34.34
Cryptograms	4	.50	0	.15
Bare Ground	344	24.50	24.00	32.06

PELLET GROUP FREQUENCY --

Herd unit 15, Study no: 2

Type	Quadrat Frequency '95
Rabbit	6
Elk	15
Deer	1
Cattle	1

BROWSE CHARACTERISTICS --  
Herd unit 15, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	1	-	-	-	-	-	-	-	2	-	-	-	40	4	10	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	1	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	88	19	11	-	-	-	-	-	-	-	30	-	-	-	2000		30	
	95	61	25	-	-	-	-	-	-	-	86	-	-	-	1720		86	
M	82	36	1	-	-	-	-	-	-	-	35	-	2	-	2466	15	18	
	88	24	6	-	-	-	-	-	-	-	30	-	-	-	2000	14	20	
	95	37	55	14	-	-	-	-	-	-	103	-	3	-	2120	14	26	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	4	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	4	3	5	-	-	-	-	-	-	7	-	-	5	240		12	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3132	Dec:	0%			
												'88	4333		7%			
												'95	4080		5%			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	88	13	-	-	-	-	-	-	-	-	13	-	-	-	866		13	
	95	27	-	-	-	-	-	-	-	-	27	-	-	-	540		27	
M	82	50	2	-	-	-	-	-	-	-	52	-	-	-	3466	8	13	
	88	41	2	-	-	-	-	-	-	-	43	-	-	-	2866	5	4	
	95	217	-	-	-	-	-	-	-	-	217	-	-	-	4340	8	11	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3932	Dec:	0%			
												'88	3798		1%			
												'95	4880		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Eriogonum microthecum</i>																		
M	82	9	-	-	-	-	-	-	-	-	9	-	-	-	600	2	4	9
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	600	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	25	-	-	-	-	-	1	-	-	26	-	-	-	1733	4	4	26
	95	72	-	-	-	-	-	-	-	-	72	-	-	-	1440	7	8	72
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	1733		-			
												'95	1580		-			
<i>Symphoricarpos oreophilus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	12	15	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Tetradymia canescens</i>																		
Y	82	1	4	-	-	-	-	-	-	-	1	4	-	-	333			5
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60			3
M	82	-	1	-	-	-	-	-	-	-	-	1	-	-	66	10	11	1
	88	1	-	-	-	-	-	-	-	-	1	-	-	66	9	12	1	
	95	5	2	-	-	-	-	-	-	-	7	-	-	140	7	10	7	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'82	399	Dec:	0%			
												'88	665		40%			
												'95	200		0%			

PERCENT BROWSE COMPOSITION--  
 Herd unit 15, Study no: 2

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia frigida</i>	0	0	.37
<i>Artemisia tridentata</i> <i>vaseyana</i>	39	41	38
<i>Chrysothamnus viscidiflorus</i> <i>lanceolatus</i>	49	36	45
<i>Eriogonum microthecum</i>	7	0	0
<i>Gutierrezia sarothrae</i>	0	16	15
<i>Symphoricarpos oreophilus</i>	0	0	.18
<i>Tetradymia canescens</i>	5	6	2

TREND STUDY 15-3-95

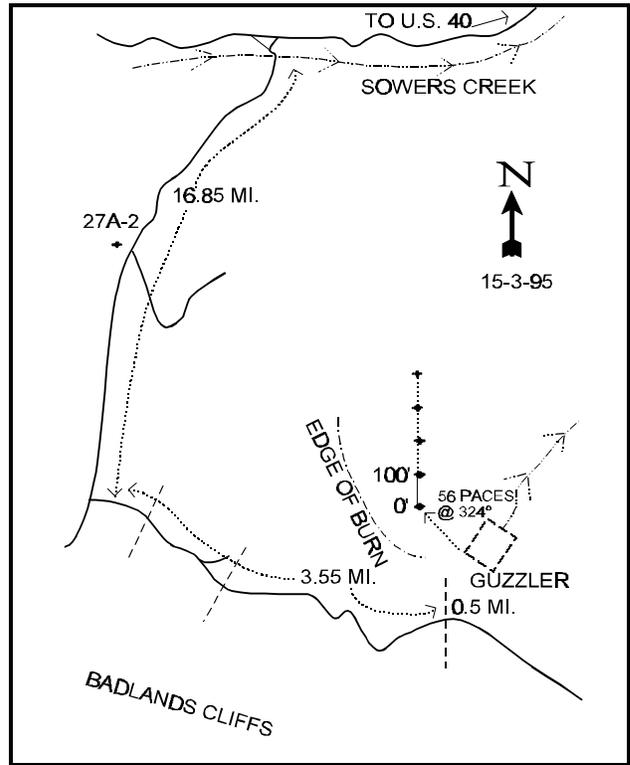
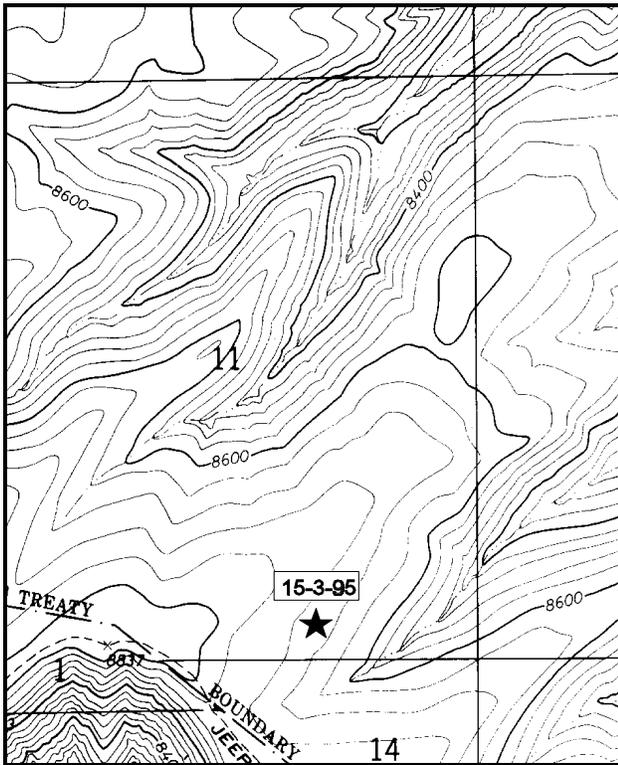
Study site name: Chokecherry Canyon. Range type: Burn.

Compass bearing: frequency baseline 3 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (6 & 95ft), line 2 (25ft), line 3 (46ft), line 4 (62ft).

LOCATION DESCRIPTION

From the junction of Highway U.S. 40 and the Sowers Canyon Road (near Bridgeland), proceed south on the Sowers Canyon Road for 8.5 miles to the Nutters Ridge road. Turn left and drive south 16.85 miles up Nutters Ridge to a "T" intersection above the Badland Cliffs. Turn left and go 3.55 miles along the edge to a fence. Continue .5 miles and stop. Walk north over the ridge to a large, fenced guzzler. From the southwest fence corner, the 0-foot baseline stake is located 56 paces away at a bearing of 324°. Density plot #1 is paces, bearing 281° from the 0-foot stake. The frequency baseline is marked by green steel fenceposts, 12-18 inches in height.



Map Name: Anthro Mountain

Diagrammatic Sketch

Township 7S, Range 5W, Section 11

## DISCUSSION

### Trend Study No. 15-3

The Chokecherry Canyon trend study is located at the head of Chokecherry and Alkali canyons and samples a prescribed burn treatment on sagebrush/grass. The burn consumed 500 acres and was completed in 1977. The burn was not seeded, but the native plants have readily recolonized. Elevation at the study site is 8,800 feet. A wildlife guzzler is located nearby. The aspect is north with a gentle 10% slope. The USFS has a similar study on file (#2240) at the Duchesne Ranger District Office, Ashley National Forest. This is a 3 unit rest rotation system allotment with 200 head of cattle grazing from December 1 to March 23.

Soils are moderately shallow and rocky on the slope but deeper and more loamy lower down the study site. Vegetative cover is moderately high at 45% which provides for good litter cover which is almost 50%. Rock and pavement cover combined are estimated at 10%. Percent bare ground is low at 13% with little evidence of erosion at this time.

The mountain low rabbitbrush population has currently been estimated at 9,660 plants/acre with a mostly mature age structure (83%). Mature plants show light to moderate hedging with a decrease in average height to 9 inches and an average crown diameter of 13 inches. The mountain big sagebrush population on the site appears productive and vigorous with many of them producing seed this year. The mountain big sagebrush population density is estimated at 1,500 plants/acre. Hedging is light to moderate and the plants are increasing in stature with an average height of 16 inches and average crown of 23 inches. Forty three percent of the plants are classified as mature and 55% are classified as young. Reproductive potential is moderately high at 64%. Snowberry density is estimated at 1,180 plants/acre with 58% of the plants sampled showing heavy utilization. This is an increase from 1988 when only 11% of the population was estimated to be heavily hedged. Percent decadence is still low at only 6%. The population has shifted from being mostly young in 1988 to mostly mature in 1995.

Sum of nested frequency for perennial grass species has decreased slightly since 1988. Letterman needlegrass provides the most grass cover, yet it has significantly declined in nested frequency since 1988. Thickspike wheatgrass has also significantly declined in sum of nested frequency and comprises 23% of the grass cover and 11% of the total vegetative cover. Other grasses that have significantly declined in nested frequency include; Carex, muttongrass and nodding brome. Needle and thread grass, slender wheatgrass, June grass, and bluebunch wheatgrass have significantly increased in nested frequency. Six weeks fescue is the only annual specie encountered and appeared in only 4 quadrats.

Twenty nine species of forbs were encountered in 1995 with an increase in sum of nested frequency for perennial forb species. Rock jasmine, goosefoot, and Douglas knotweed are the only annual species encountered and provide very little cover. Bastard toadflax provides the greatest amount of forb cover followed by sulfur eriogonum and Watson penstemon. The remaining forbs occur sporadically, but provide over half of the forb cover.

### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable but could decline if grazing intensity were to increase or if mountain low rabbitbrush continues to increase at the expense of the herbaceous understory. Vegetative condition is rather good when considered against perceived management objectives of forb enhancement. However, trend is probably declining as a result of the apparent steady increase of low rabbitbrush.

1988 TREND ASSESSMENT

Several species misidentifications in 1982 led to an inappropriate interpretation of the data. A major concern stated in the 1982 data analysis was the abundant and increasing population of low rabbitbrush. It was identified as Chrysothamnus viscidiflorus viscidiflorus, but the majority of the plants are more likely C.y. lanceolatus, a variety which can be an important forage source for livestock and big game. There was a concurrent increase in the percentage of vegetative ground cover. The resulting improvements in total ground cover reduced bare soil from 25% to 15%. There is no evidence of erosion.

1995 TREND ASSESSMENT

The soil is stable with little bare ground, excellent vegetative and litter cover. Soil trend is considered stable at this time. The herbaceous understory sum of nested frequency is increasing although there is a slight decrease in the grass sum of nested frequency. Diversity of forbs has increased along with the sum of nested frequency for perennial forbs. There are very few annual species. This would indicate a stable herbaceous understory trend. The mountain big sagebrush density appears to be expanding in size and exhibits moderate hedging. Mountain low rabbitbrush is the dominate browse specie (50% of browse cover) with light to moderate hedging and a stable population. Snowberry is heavily utilized with an apparent stable population and heavy hedging. These factors lead to a slightly upward browse trend.

TREND ASSESSMENT

soil - stable

browse - slightly upward

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

VEGETATIVE TRENDS --

Herd unit 15, Study no: 3

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	307	*211	46	96	67	4.99
G	Agropyron spicatum	-	*32	-	-	11	.87
G	Agropyron trachycaulum	16	*85	28	5	30	2.70
G	Bromus anomalus	25	*-	-	9	-	-
G	Carex spp.	49	*5	-	22	2	.03
G	Festuca ovina	-	*11	-	-	4	.04
G	Koeleria cristata	7	*49	1	5	16	2.57
G	Poa fendleriana	83	*18	-	32	10	.25
G	Stipa columbiana	-	4	9	-	1	.15
G	Stipa comata	17	*122	16	7	45	3.59
G	Stipa lettermani	252	*154	42	84	48	6.78
Total for Grasses		756	691	96	260	234	22.01

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Androsace septentrionalis</i>	-	31	-	-	14	.27
F	<i>Antennaria</i> spp.	6	*-	-	3	-	-
F	<i>Arabis</i> spp.	1	-	-	1	-	-
F	<i>Arabis drummondii</i>	-	*16	-	-	7	.06
F	<i>Astragalus convallarius</i>	1	4	9	1	1	.00
F	<i>Astragalus</i> spp.	4	-	-	2	-	-
F	<i>Castilleja flava</i>	-	*10	-	-	5	.33
F	<i>Calochortus nuttallii</i>	-	3	-	-	1	.00
F	<i>Chenopodium album</i>	-	42	-	-	16	.15
F	<i>Chaenactis douglasii</i>	34	*20	-	15	12	.13
F	<i>Comandra pallida</i>	186	*250	31	70	86	3.52
F	<i>Crepis acuminata</i>	3	76	-	1	35	.37
F	<i>Delphinium bicolor</i>	-	1	-	-	1	.00
F	<i>Eriogonum alatum</i>	-	2	-	-	1	.00
F	<i>Eriogonum eatonii</i>	19	*8	-	8	4	.07
F	<i>Eriogonum umbellatum</i>	35	70	2	15	33	1.72
F	<i>Geranium</i> spp.	3	-	3	1	-	-
F	<i>Hedysarum boreale</i>	-	1	-	-	1	.00
F	<i>Hymenoxys acaulis</i>	-	*19	-	-	10	.32
F	<i>Ipomopsis aggregata</i>	8	*3	-	3	2	.03
F	<i>Linum lewisii</i>	-	*21	-	-	10	.27
F	<i>Lithospermum ruderale</i>	-	8	-	-	5	.19
F	<i>Lupinus argenteus</i>	67	*25	30	33	12	.65
F	<i>Lychnis</i> spp.	2	-	-	1	-	-
F	<i>Machaeranthera canescens</i>	31	*4	-	15	4	.07
F	<i>Oenothera lavandulaefolia</i>	-	*22	-	-	9	.98
F	<i>Penstemon caespitosus</i>	-	*21	-	-	9	.58
F	<i>Penstemon comarrhenus</i>	-	*27	-	-	14	.36
F	<i>Penstemon</i> spp.	50	*-	-	30	-	-
F	<i>Penstemon watsonii</i>	73	*84	-	30	35	1.38
F	<i>Physaria acutifolia</i>	-	*9	-	-	5	.08
F	<i>Phlox longifolia</i>	86	*20	-	45	10	.10
F	<i>Polygonum douglasii</i>	-	51	-	-	19	.22
F	<i>Potentilla gracilis</i>	-	*8	-	-	4	.07
F	<i>Tragopogon dubius</i>	-	3	-	-	1	.03

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Unknown forb-perennial	20	-	-	10	-	-
Total for Forbs		629	859	75	284	366	12.06
B	Artemisia tridentata vaseyana	17	26	1	12	14	1.45
B	Chrysothamnus depressus	-	3	-	-	2	.16
B	Chrysothamnus viscidiflorus lanceolatus	181	*70	22	75	35	4.86
B	Gutierrezia sarothrae	-	*6	-	-	3	.01
B	Opuntia spp.	-	2	-	-	1	.03
B	Symphoricarpos oreophilus	36	*19	19	15	9	2.28
B	Tetradymia canescens	1	12	1	1	5	.83
Total for Browse		235	138	43	103	69	9.63

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

BASIC COVER --

Herd unit 15, Study no: 3

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	379	12.50	23.00	45.31
Rock	252	2.00	5.50	8.19
Pavement	136	4.75	2.50	1.29
Litter	396	55.75	53.75	47.58
Cryptograms	2	0	0	.63
Bare Ground	308	25.00	15.25	12.67

PELLET GROUP FREQUENCY --

Herd unit 15, Study no: 3

Type	Quadrat Frequency
Rabbit	4
Elk	27
Deer	3

BROWSE CHARACTERISTICS --  
Herd unit 15, Study no: 3

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia nova</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	-	1	-	-	-	-	-	-	3	-	-	-	60	5	7	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	120		33%			
<i>Artemisia tridentata vaseyana</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	48	-	-	-	-	-	-	-	-	48	-	-	-	960		48	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	95	33	8	-	-	-	-	-	-	-	41	-	-	-	820		41	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	1	2	-	-	-	-	-	-	-	3	-	-	-	200	11	16	
	95	19	12	-	-	-	-	1	-	-	30	2	-	-	640	16	23	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	1	-	-	-	1	-	1	-	40		2	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	800		0%			
												'95	1500		2%			
<i>Chrysothamnus depressus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	13	4	-	-	-	-	-	-	17	-	-	-	340	3	9	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	360		5%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	3	-	1	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	88	75	3	-	-	-	-	-	-	-	63	-	15	-	5200		78	
	95	83	-	-	-	-	-	-	-	-	83	-	-	-	1660		83	
M	82	48	-	-	-	-	-	-	-	-	48	-	-	-	3200	12 18	48	
	88	41	2	-	-	-	-	-	-	-	41	-	2	-	2866	13 14	43	
	95	296	104	-	-	-	-	-	-	-	400	-	-	-	8000	9 13	400	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	12	5	-	-	-	-	-	-	-	16	-	1	-	1133		17	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3733	Dec:	0%			
												'88	9199		12%			
												'95	9660		0%			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3 5	1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			
<i>Opuntia spp.</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4 15	4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	80		-			
<i>Symphoricarpos oreophilus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	5	2	-	-	-	-	-	-	12	-	-	-	800		12	
	95	6	-	-	1	-	-	-	-	-	7	-	-	-	140		7	
M	82	4	-	-	-	-	-	-	-	-	4	-	-	-	266	12 21	4	
	88	-	5	-	-	-	-	-	-	-	5	-	-	-	333	15 26	5	
	95	10	1	15	3	-	19	-	-	-	40	8	-	-	960	13 28	48	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	2	-	-	-	-	2	-	-	4	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	266	Dec:	0%			
												'88	1199		5%			
												'95	1180		6%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7	11	2
	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133	11	12	2
	95	2	17	-	-	-	-	-	-	-	19	-	-	-	380	9	13	19
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	0%			
												'88	199		0%			
												'95	440		4%			

PERCENT BROWSE COMPOSITION--

Herd unit 15, Study no: 3

Species	Percent of Total		
	'82	'88	'95
Artemisia nova	0	0	.89
Artemisia tridentata vaseyana	0	7	11
Chrysothamnus depressus	0	0	3
Chrysothamnus viscidiflorus lanceolatus	90	81	72
Gutierrezia sarothrae	0	0	.29
Opuntia spp.	0	0	.59
Symphoricarpos oreophilus	6	11	9
Tetradymia canescens	3	2	3

TREND STUDY 15-4-95

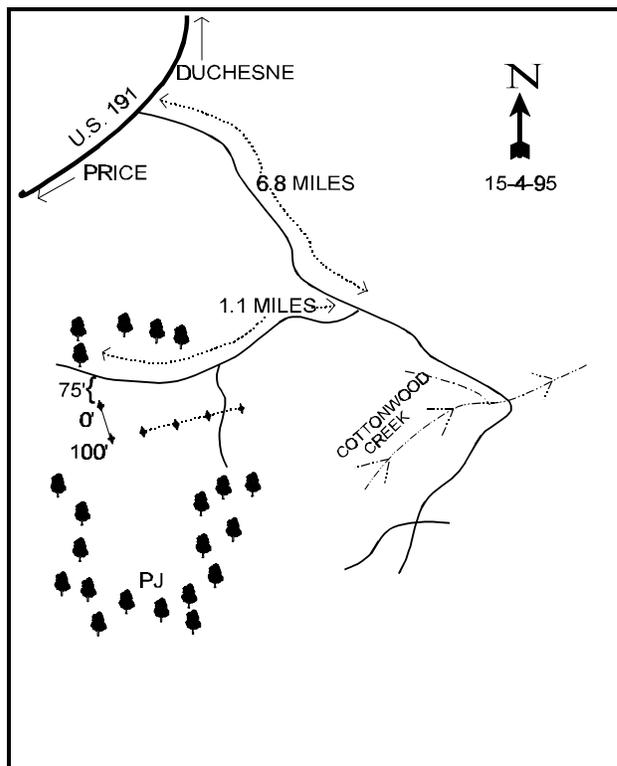
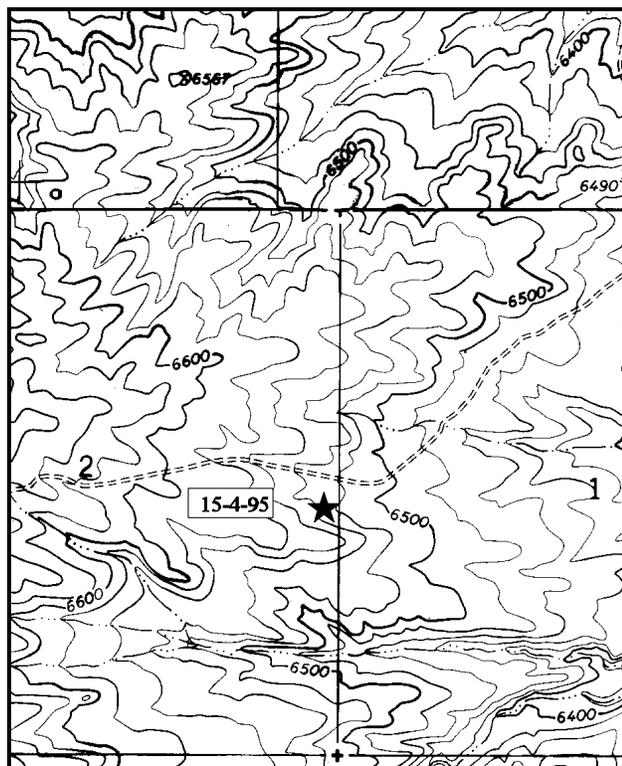
Study site name: Cottonwood Canyon. Range type: Desert Shrub-Grass.

Compass bearing: frequency baseline 166 degrees.

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

LOCATION DESCRIPTION

From Duchesne, go up Indian Canyon approximately 2.5 miles to the Cottonwood - Sower Canyon Road. Turn left and to southeast on the main road 6.8 miles to a jeep trail on top of the ridge just before Cottonwood Creek. Turn right on the jeep trail and drive 1 mile west to a fork. Continue approximately .15 miles up the right fork to the study site. The 0-foot baseline stake is 15 paces south of the road in the sage/grass type. The frequency baseline is marked with 12 inch tall fenceposts. The 0-foot baseline stake is marked with browse tag #9037.



Map Name: Duchesne SW

Diagrammatic Sketch

Township 5S, Range 5W, Section 2

UTM COOR. 5-50-321E 12 44-36-245N

## DISCUSSION

### Trend Study No. 15-4

The Cottonwood Canyon trend study samples winter range on the long slope down from Anthro Mountain and the Badland Cliffs to the Duchesne River. The study is in a mixed shrub/grass community on a 2%, east-facing slope surrounded by pinyon-juniper woodland. The site is located on a DWR wildlife management area at an elevation of 6,500 feet. The unit is surrounded by BLM and Ute tribal lands. Antelope utilize the site, but sign is relatively infrequent. Deer and elk show moderate use of the site, while livestock use appears to be light.

The sandy loam soil is moderately deep with a moderate percentage of rock fragments throughout the soil profile. Soil erosion is not a problem at the study site, although on the surrounding pinyon-juniper covered hills, runoff appears severe. Rock and pavement cover values combined are estimated at nearly 9%. Vegetative cover is estimated at 31%, of which grasses provide the majority of the cover. Litter cover (28%), combined with vegetative cover, offers good soil protection. Percent bare ground is moderate at an estimated 20% with a cryptogamic crust cover value estimated at 4%.

Fringed sagebrush is the most abundant browse species and accounts for 17% of the browse cover. The estimated density of fringed sagebrush is currently 14,260 plants/acre with 2/3 of the plants classified as young. The mature plants have increased in stature from 6 x 4 inches (height x crown) in 1988 to 15 x 9 inches in 1995. At this time there is high biotic potential with no decadent or dead plants classified. Shadscale density is estimated at 2,100 plants/acre with a predominately mature age structure and low biotic potential. Vigor appears good with most plants receiving light use. Plant height and crown measurements are similar to 1988 with an average height of 13 inches and average crown of 23 inches. The dead to live plant ratio is 1:6. The winterfat population is made up of predominately mature plants with no seedlings found in 1995. Plant height and crown measurements have doubled since 1988 to 1 foot in height and 1 foot in crown. The plants show light to moderate hedging. Bud sagebrush is in low abundance with an estimated density of 440 plants/acre and a mostly mature age structure. These plants are moderately to heavily hedged with an average height of 6 inches and an average crown of 12 inches. Other browse species that are present, but in low abundance include: black sagebrush, basin big sagebrush, Wyoming big sagebrush, four wing saltbush, rabbitbrush, broom snakeweed, and opuntia.

Grasses provide 62% of the vegetative cover while forbs provide only 10% of the vegetative cover. Thickspike wheatgrass provides the most grass cover and is followed by the bunch grass, needle-and-thread. Thickspike wheatgrass nested frequency has significantly increased since 1988, while that of needle-and-thread grass has significantly decreased. Blue grama is also common and it too has decreased in nested frequency. Other grasses include: Indian ricegrass, bottlebrush squirreltail, and galleta. Cheatgrass was also encountered, but in only one quadrat. Forbs are dominated by annual species which include: woolly navarretia, Fremont goosefoot, slimleaf goosefoot, annual stickweed, and tansy mustard. Sum of nested frequency has increased for perennial species, mostly due to slenderleaf schoenrambe, and globemallow.

### 1988 APPARENT TREND ASSESSMENT

The grasses are quite competitive. Forb density and diversity is predictably low. The grasses provide significant ground cover. Most of the vegetative ground cover is provided by the blue grama clumps and numerous western wheatgrass stems which together provide excellent erosion control. There is also a significant amount of pavement cover, 25%.

1995 TREND ASSESSMENT

The soil shows little sign of erosion due to the abundance of herbaceous vegetation and litter cover. Soil trend is stable. Sum of nested frequency for perennial grasses has stayed nearly the same with only 1 occurrence of cheatgrass. Perennial forb sum of nested frequency has increased, but the forbs are still dominated by annual species. Grasses contribute the most to the herbaceous understory. This leads to a stable herbaceous understory at this time, although there is poor forb composition. Fringed sagebrush density is high and the plants have become more robust since 1988. The most preferred forage species are found in moderate densities with mostly moderate hedging and nearly the same height and crown measurements. The exception is winterfat which doubled in height and crown. Other invasive species are in low abundance and do not appear to be increasing. The browse trend is stable, although there is a dense population of fringed sagebrush.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 15, Study no: 4

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	179	255	64	80	6.46
G	Agropyron spicatum	-	4	-	2	.04
G	Bouteloua gracilis	298	*190	89	67	4.76
G	Bromus tectorum	-	1	-	1	.00
G	Hilaria jamesii	-	-	-	-	.00
G	Oryzopsis hymenoides	12	*44	6	19	1.10
G	Sitanion hystrix	15	*15	9	8	.09
G	Stipa comata	190	*167	81	63	5.62
Total for Grasses		694	676	249	240	18.09
F	Astragalus purshii	-	*6	-	3	.01
F	Chenopodium fremontii	-	77	-	37	.55
F	Chenopodium leptophyllum	-	66	-	30	.23
F	Cryptantha spp.	5	4	3	2	.01
F	Descurainia pinnata	-	38	-	17	.39
F	Lappula occidentalis	-	32	-	15	.32
F	Machaeranthera grindelioides	-	3	-	1	.00
F	Navarretia intertexta	-	135	-	65	1.06
F	Orthocarpus luteus	3	-	1	-	-
F	Phlox austromontana	3	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Schoenocrambe linifolia	1	*48	1	24	.31
F	Sphaeralcea coccinea	9	15	7	9	.09
F	Taraxacum officinale	-	2	-	1	.00
F	Townsendia incana	-	4	-	2	.01
F	Tragopogon dubius	2	-	1	-	-
Total for Forbs		28	430	17	206	3.02
B	Artemisia frigida	27	*128	16	62	1.34
B	Artemisia nova	6	*-	3	-	-
B	Artemisia spinescens	14	*6	8	3	.19
B	Artemisia tridentata wyomingensis	9	*-	4	-	-
B	Atriplex confertifolia	22	34	15	15	4.85
B	Ceratoides lanata	28	35	13	16	1.56
B	Chrysothamnus viscidiflorus lanceolatus	2	-	2	-	-
B	Echinocactus spp.	6	-	4	-	-
B	Gutierrezia sarothrae	5	4	2	2	.15
Total for Browse		114	207	64	98	8.10

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

BASIC COVER --

Herd unit 15, Study no: 4

Cover Type	Nested frequency '95	Average Cover %	
		'88	'95
Vegetation	344	23.50	31.20
Rock	135	0	.91
Pavement	322	24.75	7.81
Litter	394	30.50	28.26
Cryptograms	194	.25	4.27
Bare Ground	343	21.00	20.09

PELLET GROUP FREQUENCY --

Herd unit 15, Study no: 4

Type	Quadrat Frequency '95
Rabbit	26
Elk	15
Deer	13
Cattle	2

BROWSE CHARACTERISTICS --  
Herd unit 15, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	88	4	-	-	-	-	-	3	-	-	7	-	-	-	466		7	
	95	146	-	-	-	-	-	-	-	-	146	-	-	-	2920		146	
Y	88	56	-	-	4	-	-	9	-	-	68	-	1	-	4600		69	
	95	485	-	-	-	-	-	-	-	-	485	-	-	-	9700		485	
M	88	76	-	-	15	-	-	4	-	-	89	-	5	1	6333	6	4	95
	95	207	16	-	5	-	-	-	-	-	228	-	-	-	4560	15	9	228
D	88	15	-	-	-	-	-	-	-	-	4	-	8	3	1000		15	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Total Plants/Acre (excluding Dead & Seedlings)											'88	11933	Dec:	8%				
											'95	14260		0%				
<i>Artemisia nova</i>																		
Y	88	2	-	-	1	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	5	-	-	-	-	-	-	-	8	-	-	-	160	13	18	8
D	88	1	-	-	-	-	-	-	-	-	-	-	-	1	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	266	Dec:	24%				
											'95	160		0%				
<i>Artemisia spinescens</i>																		
Y	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	16	-	-	1	-	-	4	-	-	20	-	1	-	1400	5	6	21
	95	-	6	15	-	-	-	-	-	-	21	-	-	-	420	6	12	21
D	88	9	-	-	-	-	-	-	-	-	5	-	1	3	600		9	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Total Plants/Acre (excluding Dead & Seedlings)											'88	2333	Dec:	25%				
											'95	440		0%				
<i>Artemisia tridentata tridentata</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20	18	20	1
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	20		-				
<i>Artemisia tridentata wyomingensis</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17	32	0
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	0		-				

A G E	YR	Form Class (No. of 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	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	31	0
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Atriplex confertifolia</i>																		
S	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	88	11	-	-	1	-	-	1	-	-	13	-	-	-	866			13
	95	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	22	3	-	-	-	-	-	-	-	25	-	-	-	1666	13	18	25
	95	84	7	2	-	-	-	-	-	-	93	-	-	-	1860	13	23	93
D	88	22	3	-	-	-	-	-	-	-	24	-	-	1	1666			25
	95	8	2	-	-	-	-	-	-	-	5	-	-	5	200			10
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	340			17
Total Plants/Acre (excluding Dead & Seedlings)												'88	4198	Dec:	39%			
												'95	2100		9%			
<i>Ceratoides lanata</i>																		
S	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	22	2	1	3	-	-	8	-	-	36	-	-	-	2400			36
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	88	9	6	-	2	-	-	1	-	-	18	-	-	-	1200	6	6	18
	95	39	27	1	1	-	-	-	-	-	68	-	-	-	1360	12	11	68
D	88	9	-	1	-	-	-	-	-	-	7	-	1	2	666			10
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'88	4266	Dec:	15%			
												'95	1420		0%			
<i>Chrysothamnus viscidiflorus lanceolatus</i>																		
Y	88	20	-	-	-	-	-	1	-	-	21	-	-	-	1400			21
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	9	-	-	-	-	-	-	-	-	9	-	-	-	600	7	4	9
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20	10	12	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	2000	Dec:	-			
												'95	20		-			
<i>Echinocactus spp.</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	1	2	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	10	12	
D	88	2	-	-	-	-	-	1	-	-	2	-	-	1	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	75%			
												'95	120		0%			
<i>Opuntia spp.</i>																		
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	12	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	14	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'95	20		100%			

PERCENT BROWSE COMPOSITION--  
Herd unit 15, Study no: 4

Species	Percent of Total	
	'88	'95
<i>Artemisia frigida</i>	47	77
<i>Artemisia nova</i>	1	.85
<i>Artemisia spinescens</i>	9	2
<i>Artemisia tridentata</i> <i>tridentata</i>	0	.10
<i>Artemisia tridentata</i> <i>wyomingensis</i>	0	0
<i>Atriplex canescens</i>	0	0
<i>Atriplex</i> <i>confertifolia</i>	17	11
<i>Ceratoides lanata</i>	17	8
<i>Chrysothamnus</i> <i>viscidiflorus</i> <i>lanceolatus</i>	8	.10
<i>Echinocactus spp.</i>	0	.32
<i>Gutierrezia sarothrae</i>	1	.64
<i>Opuntia spp.</i>	.26	.10

TREND STUDY 15-5-95

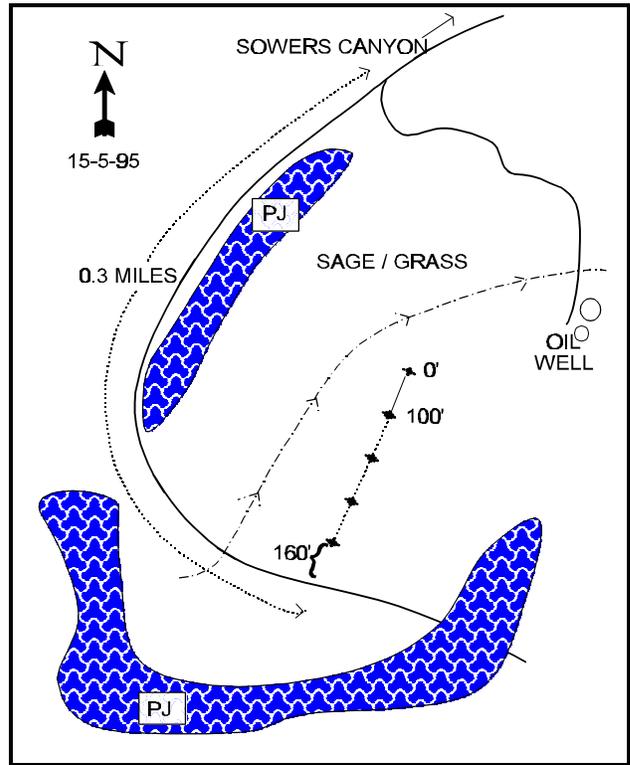
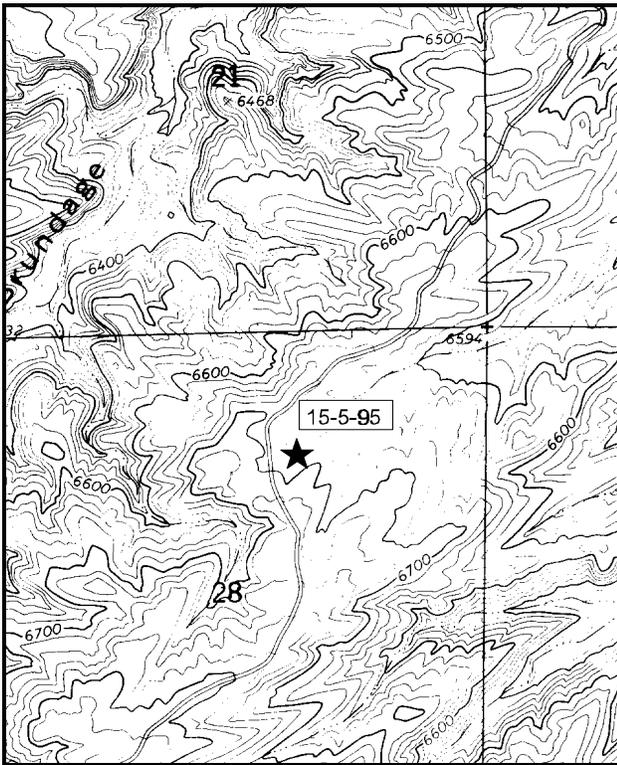
Study site name: Nutters Canyon. Range type: Black Sagebrush.

Compass bearing: frequency baseline 221 degrees.

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

LOCATION DESCRIPTION

From Highway U.S. 40 near Bridgerland, turn south and go up the Anthro Mountain-Sower Canyon Road 8.6 miles to the turnoff to Nutters Ridge by an old cabin and an oil well. Turn left and go 4.5 miles up the ridge on the main road (stay left at major forks) to another fork to an oil well. Bear right and continue .3 miles where the road curves and crosses a small drainage. Stop before you drive back into the PJs and walk down into the sage opening about 32 paces NE to density plot #3. The 0-foot baseline stake is 350 feet NE and marked with browse tag #9035. The frequency baseline is marked by green fenceposts approximately 18 inches tall.



Map Name: Duchesne SE

Diagrammatic Sketch

Township 5S, Range 4W, Section 28

UTM COOR. 5-56-469E 12 44-30-363N

## DISCUSSION

### Trend Study No. 15-5

The trend study above Nutters Canyon is located in the middle of a sagebrush/grass swale surrounded by pinyon-juniper woodland. There are roads along most of the main ridges, plus spur roads to the numerous oil wells in the area. Cattle grazing is a relatively minor use on this Ute Reservation land. The area receives light to moderate use from deer, elk and antelope.

Natural sagebrush/grass openings are found in the heads of most drainages. This swale drains to the east-northeast. The exposure on the study site is toward the north. The slope is 3-5% at an elevation of approximately 6,000 feet.

Erosion appears light at this time with 26% vegetative cover, 25% litter cover, and only about 5% bare ground. The soil is a shallow, sandy loam with a high percentage (47%) of pavement, which is concentrated in the interspaces of the black sagebrush.

The sagebrush is classified as black sagebrush, although there appears to be some hybridization between mountain big sagebrush and black sagebrush. Along the edge of the pinyon-juniper type, and along the drainage bottom, there are shrubs more characteristic of mountain big sagebrush. The patches of low, dark, mature black sagebrush support little grass, with a cover of pavement. The black sagebrush provides 16% cover or 91% of the browse cover with an estimated density of 10,840 plants/acre. It is a mostly mature population with moderately low biotic potential this season. Percent decadency has decreased since 1988, although the percentage of the decadent plants classified as dying has increased to 40%. The black sagebrush shows moderate to heavy hedging with 32% of the plants classified as heavily hedged. The winterfat population shows light to moderate hedging with an estimated population density of 320 plants/acre. The fringed sagebrush population has shifted from a young population in 1988 to a mature population in 1995 with an estimated density of 240 plants/acre. Shadscale density is estimated at 360 plants/acre with a predominately mature age structure. Other shrubs encountered, but in low densities include; white stem rabbitbrush, broom snakeweed, and opuntia. Except for a few pinyon and juniper along the wash, trees are confined to the higher slopes and ridges.

Blue grama, bottlebrush squirreltail, and needle-and-thread grass all decreased in nested frequency since 1988. Two additional species were encountered in 1995, thickspike wheatgrass and galleta. Needle-and-thread grass accounts for the most grass cover followed by bottlebrush squirreltail and blue grama. Indian ricegrass and Sandberg bluegrass were also sampled but are in low numbers.

Forbs provide very little vegetative cover on this site. Forb cover is dominated by tansy mustard, Fremont goosefoot, and annual stickseed. Annual species account for 56% of the forb cover. Dominate perennial species include; Pursh locoweed, *astragalus spp.*, and scarlet globemallow.

### 1988 APPARENT TREND ASSESSMENT

Grasses provide considerable litter cover at this site (44%). Decomposition is quite slow, and the soil contains very little organic matter. Pavement contributes 33% of the ground cover. With the 11% vegetative cover provided by the grasses, total ground cover is adequate with only 11% of the surface exposed as bare soil.

### 1995 TREND ASSESSMENT

Percent bare ground is low while pavement cover is extremely high. Although

pavement does protect from rain drop impact, it also can accelerate erosion across the ground. Percent bare ground has decreased and pavement cover has increased. This increase in pavement could have been a differing interpretation of what pavement is on the site, for there is not current evidence of soil movement. This would lead to a stable soil trend. Sum of nested frequency for perennial grasses has greatly decreased while there was a great increase in perennial forb sum of nested frequency. Many forbs are annual species and account for high amounts of cover and nested frequency values. Because of the large decrease in perennial grass, herbaceous understory trend is slightly downward. The black sagebrush population appears to be shifting to a more mature population at this time with 1 dead plant for every 11 live plants. Hedging is moderate to heavy with height staying nearly the same and the crown measurements increasing by 6 inches. There is low biotic potential which are due to drought conditions over the past years. Other increaser species such as: broom snakeweed, sticky leaf rabbitbrush, and fringed sagebrush, appear to have stable populations with low densities. Browse trend is stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly downward

VEGETATIVE TRENDS --

Herd unit 15, Study no: 5

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	-	*17	-	7	.16
G	Bouteloua gracilis	209	*139	76	53	1.20
G	Hilaria jamesii	-	*18	-	9	.24
G	Oryzopsis hymenoides	10	8	6	5	.06
G	Poa secunda	14	17	5	8	.11
G	Sitanion hystrix	221	*157	86	65	2.01
G	Stipa comata	281	*174	93	70	2.88
Total for Grasses		735	530	266	217	6.67
F	Arabis perennans	-	*18	-	8	.06
F	Astragalus purshii	-	*58	-	28	.19
F	Astragalus spp.	7	*44	2	21	.15
F	Chenopodium fremontii	-	35	-	18	.23
F	Chenopodium leptophyllum	-	3	-	2	.01
F	Cryptantha spp.	-	1	-	1	.00
F	Descurainia pinnata	-	48	-	21	.33
F	Eriogonum cernuum	-	4	-	2	.01
F	Erigeron pumilus	-	3	-	1	.00
F	Lappula occidentalis	-	49	-	20	.20
F	Machaeranthera canescens	1	3	1	2	.01

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Navarretia intertexta	-	32	-	19	.12
F	Orobanche spp.	-	1	-	1	.00
F	Phlox longifolia	-	*38	-	15	.07
F	Schoenocrambe linifolia	7	*10	2	7	.03
F	Sphaeralcea coccinea	32	*20	18	11	.13
F	Taraxacum officinale	-	1	-	1	.00
Total for Forbs		47	368	23	178	1.60
B	Artemisia frigida	7	*3	3	2	.01
B	Artemisia nova	111	*158	44	68	16.18
B	Artemisia spp.	19	-	11	-	-
B	Atriplex confertifolia	4	*7	3	3	1.32
B	Ceratoides lanata	11	*4	8	3	.06
B	Chrysothamnus nauseosus	-	*9	-	3	.07
B	Chrysothamnus viscidiflorus	22	*3	14	1	.01
B	Gutierrezia sarothrae	7	*12	3	7	.08
B	Echinocactus spp.	-	2	-	1	.00
B	Opuntia spp.	1	3	1	1	.00
B	Pinus edulis	3	*-	2	-	-
Total for Browse		185	201	89	89	17.76

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

BASIC COVER --

Herd unit 15, Study no: 5

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	329	11.00	25.97
Rock	84	.50	.84
Pavement	357	33.00	47.27
Litter	371	44.50	25.42
Cryptograms	15	0	.05
Bare Ground	188	11.00	5.48

PELLET GROUP FREQUENCY --  
 Herd unit 15, Study no: 5

Type	Quadrat Frequency '95
Rabbit	6
Elk	15
Deer	17

BROWSE CHARACTERISTICS --  
 Herd unit 15, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	12	10	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	240		-			
<i>Artemisia nova</i>																		
S	88	76	-	-	1	-	-	11	-	-	87	-	1	-	5866		88	
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320		16	
Y	88	133	1	-	-	-	-	-	-	-	132	-	2	-	8933		134	
	95	28	48	13	1	-	-	-	-	-	90	-	-	-	1800		90	
M	88	102	32	1	-	-	-	-	-	-	132	-	3	-	9000	10	12	
	95	13	213	115	4	19	23	-	-	-	383	4	-	-	7740	11	18	
D	88	38	9	-	-	-	-	-	-	-	37	-	4	6	3133		47	
	95	8	30	13	-	5	9	-	-	-	39	-	-	26	1300		65	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	980		49	
Total Plants/Acre (excluding Dead & Seedlings)												'88	21066	Dec:	14%			
												'95	10840		11%			
<i>Artemesia spp.</i>																		
S	88	16	-	-	-	-	-	-	-	-	16	-	-	-	1066		16	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	23	-	-	-	-	-	-	-	-	22	-	1	-	1533		23	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	5	6	3	-	-	-	-	-	-	13	-	1	-	933	7	11	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	2532	Dec:	2%			
												'95	0		0%			

A G E	YR	Form Class (No. of 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	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20	15	7	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Atriplex confertifolia</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	8	13	2
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320	16	29	16
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	-	-	1	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:	0%			
												'95	360		5%			
<i>Ceratoides lanata</i>																		
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	10	3	1	-	-	-	-	-	-	14	-	-	-	280	10	10	14
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	24%			
												'95	320		0%			
<i>Chrysothamnus nauseosus albicaulis</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240	9	11	12
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	300		-			
<i>Chrysothamnus viscidiflorus</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	2	1
	95	17	-	-	-	-	-	-	-	-	6	-	-	-	340	6	7	17
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	132	Dec:	50%			
												'95	340		0%			
<i>Echinocactus spp.</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	0	1	2
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	40		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Gutierrezia sarothrae</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	19	-	-	-	-	-	-	-	-	19	-	-	-	380		19	
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200	5	5	3
	95	10	-	-	1	-	-	-	-	-	11	-	-	-	220	7	6	11
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	-			
												'95	240		-			
<i>Opuntia spp.</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	6	10	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
<i>Pinus edulis</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:	-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 15, Study no: 5

Species	Percent of Total	
	'88	'95
<i>Artemisia frigida</i>	0	2
<i>Artemisia nova</i>	86	85
<i>Artemesia spp.</i>	10	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	0	.15
<i>Atriplex</i> <i>confertifolia</i>	.54	3
<i>Ceratoides lanata</i>	1	3
<i>Chrysothamnus</i> <i>nauseosus albicaulis</i>	0	2
<i>Chrysothamnus</i> <i>viscidiflorus</i>	.54	3
<i>Echinocactus spp.</i>	0	.31
<i>Gutierrezia sarothrae</i>	1	2
<i>Opuntia spp.</i>	0	.47
<i>Pinus edulis</i>	.54	0

Herd Unit 15  
SUMMARY AND EVALUATION

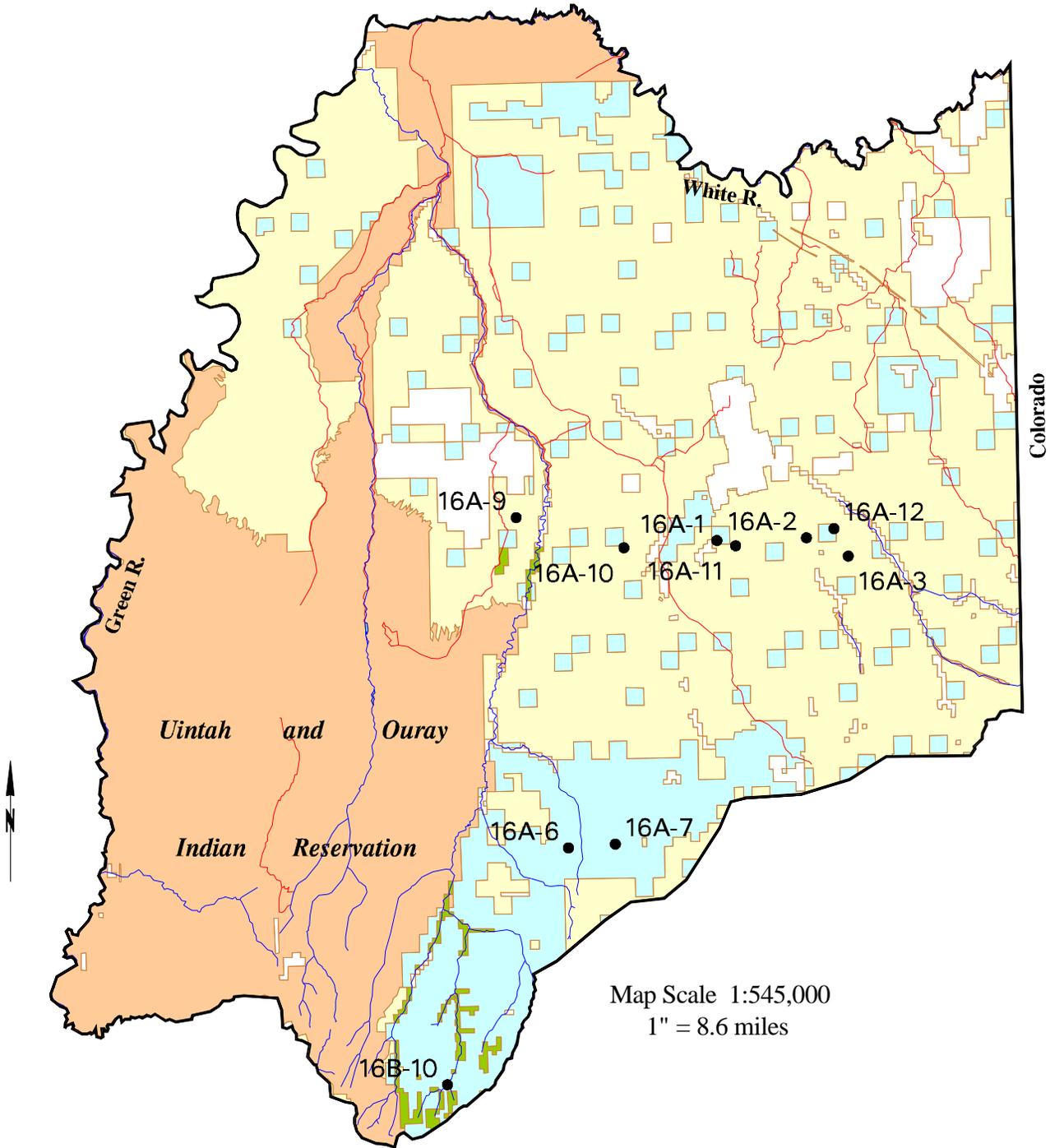
Summer range on this unit is sampled by three sites; Upper Cottonwood Ridge (15-1), Wirefence Canyon (15-2) and Chokecherry Canyon (15-3). Upper Cottonwood Ridge samples a small quaking aspen stand at an elevation of 9,160 feet. The soil and browse trend on this site is stable at this time. The soil has good protective cover and the browse densities have not highly fluctuated. Grass and forb cover and nested frequency has increased since 1988 and indicates an upward trend.

Wirefence Canyon and Chokecherry Canyon both sample mountain big sagebrush populations at 8,700 feet and 8,800 feet respectively. The soil is adequately protected on both sites which leads to a stable soil trend. The herbaceous understory trend for both sites is slightly upward, although a different herbaceous understory composition may be desired at Wirefence Canyon. The browse trend at Chokecherry Canyon is slightly upward with a healthy stand of mountain low sagebrush. The browse trend on Wirefence Canyon is stable. The broom snakeweed and mountain low rabbitbrush populations appear stable, although, the mature plants are increasing in stature.

The remaining sites, Cottonwood Canyon (15-4) and Nutters Canyon (15-5), sample winter range. The Cottonwood Canyon site shows little sign of erosion with the herbaceous understory sum of nested frequency appearing similar between years. The trend for soil, browse and herbaceous understory on this site is stable. On the Nutters Canyon site, there appears to have been serious erosion in the past, but is stable now with low amounts of bare ground, but with high amounts of pavement. Grass sum of nested frequency has decreased. Although sum of nested frequency for perennial forbs has increased, but many of the forbs encountered were annual species. The herbaceous understory trends appear to be slightly downward at this time due to decreases in grass sum of nested frequency and large amounts of annual forbs. The browse trend is considered stable.

In summary, although pinyon and juniper stands dominate much of the winter range, there are sufficient natural openings to provide good quality winter range. There are pinyon-juniper sites with the potential after treatment to provide more forage during the fall-spring period. The summer range remains the limiting factor, especially for deer.

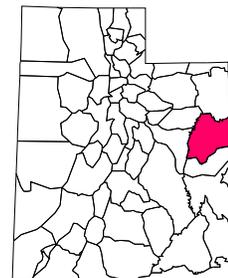
# Deer Management Unit 16A – 1995 Transect Locations



**LEGEND**

 BLM	 State Wildlife Res./Mgmt. Area	 Water Course
 State	 Water Body	 Transect Location
 Native American	 Road	
 Private Land		

**MAP LOCATION**



## DEER HERD UNIT 16A (28A)- NORTH BOOK CLIFFS

### Boundary Description

Uintah and Grand Counties - Boundary begins at the junction of the White River and the Utah-Colorado state line; then south along the state line to the Book Cliff Divide; west along the Book Cliff Divide to the Uintah and Ouray Indian Reservation Boundary; north and west along this boundary to the Green River; north along the Green River to the White River; east along the White River to the State line. Excluding all Indian Trusts Lands.

### Herd unit description

Herd unit boundaries were changed slightly and renumbered in 1992. The new number is 16A. King and Olsen (1972) measured deer herd unit 16A to be an area of 1,327,040 acres from ground truthed aerial photographs. Coles and Pederson (1967) measured 1,019,904 acres, a figure 24% smaller. The latter authors delineated a normal winter range of 440,064 acres and a reduced severe winter range of 403,008 acres. These winter range estimates are very large and suggest that the amount of available winter range should not be a limiting factor. However, it should be noted that the winter range is never uniformly utilized. Areas such as lower McCook Ridge, Big Park, the Crows Roost, Sunday School Canyon, Indian Ridge, and Atchee Ridge all support concentrations of wintering deer. Elk utilize many of the same areas, especially the McCook Ridge area. King and Olsen (1972) planimetered 141,148 acres of summer range in a relatively narrow band along the Book Cliffs Divide. The consensus is that the quantity and quality of the summer range are the most limiting factors on this unit. Vegetative composition on the summer range is principally sagebrush-grass and mountain brush with isolated patches of conifer and aspen. The winter range is predominantly pinyon-juniper interspersed with sagebrush-grass or salt-desert shrub openings. Management concerns on unit 16A principally revolve around low fawn production, summer range condition, especially fawn rearing habitat, and the accelerated pace of oil, gas, and possibly at some later date, oil shale and tar sands development.

### Big Game Trends

Deer harvest during the period 1974-77 averaged 831 bucks annually. Figures since 1977 are more difficult to determine because data from 16A (28A) and 16B (28B) were combined and influenced by changing regulations. Therefore, average harvest is not necessarily indicative of any trends. Reports from about 1989 do again have the harvests for both units separated. In addition, there have been antler point restrictions on buck deer in the past. Total harvest between 1983 and 1988 have been relatively stable, with an average of 1,466 bucks per year. Harvests since 1988 for 16A had remained above 1,000 bucks per year, then steadily declined to a low of 445 in 1994. Fawn/doe ratios, which help indicate trend, have also declined from a modestly low 50 fawns/100 does in 1988 to only 23 in 1994.

Current management objectives are to winter a herd of 10,000 deer (modeled number) on herd unit 16A and harvest 1,000 bucks annually. Antlerless permits would be issued (approximately 200) when the population and buck harvest goals are met or range conditions warrant a reduction.

Other big game species residing within the unit boundaries include elk and antelope. Elk hunting has been on a control permit basis and annual harvests between 1973 and 1987 have averaged 27 bulls and 12 antlerless in those years when antlerless permits were issued. Between 1988 and 1994 an average of 56 bulls were harvested from the combined 16A and 16B units. Most of the hunting on the North Book Cliffs unit takes place in the limited mountain brush type (summer

range). The existing elk herd management objectives are currently being revised to reflect the changes in Public Land forage reallocation for wildlife.

There are numerous pellet group trend transects (for deer and elk) established within the unit. The elk pellet group transects show low use overall. Pellet group transects in close proximity to range trend studies are located at Crows Roost (Sunday School), Indian Ridge, Lower McCook and McCook Seeding, the Big Park pellet group transect which is close to Wolf Den, outside the Crows Roost enclosure, and also on Park Ridge. Of these transects, Big Park and Lower McCook show some of the highest levels of use through 1994. These areas averaged 117 and 98 deer days use/ha respectively between 1982 and 1994. The Indian Ridge pellet group transect shows inconsistent use between years, but the five-year average between 1982 and 1987 of 51 deer days use/hectare is a significant increase over the previous five-year average (21 ddu/ha between 1977-82). Between 1988 and 1994, average deer days use/ha has increased to 68 deer days use/ha.

#### Key Areas

The range trend study sites on 16A are representative of the key areas and key vegetation types on the unit. Indian Ridge, #16A-1, and the study at the Lower McCook Ridge Exclosure (#16A-2) sample a desert shrub type on deer and elk winter range. Sunday School (#16A-10) and Park Ridge (#16A-11) sample four-wing saltbush types important as deer winter range. The Agency Draw desert shrub area, sampled by study #16A-9, is used by wintering deer and by elk year-round. The study at Wolf Den (#16A-12) samples deer winter range in a big sagebrush type. There is one study on the McCook Ridge Chaining (#16A-3), an area of high winter range value for both deer and elk.

Summer range studies were located in the mountain big sagebrush/grass and mountain brush type on Willow Flat (#16A-5) and Wire Fence Point (16A-4). These studies were first read in 1982 and reread in 1988 and 1995. Another summer range study site was placed on Black Horse (#16A-8) and Cherry Mesa (#16A-7) in 1988 and reread in 1995. Six new winter range sites were established in 1988 at Little Jim Canyon (#16A-6), Agency Draw (#16A-9), Sunday School (#16A-10), Park Ridge (#16A-11) and Wolf Den (#16A-12). One new study was established in 1995 on a prescribed burn and seeding treatment on Moon Ridge (#16A-13).

TREND STUDY 16A-1-95

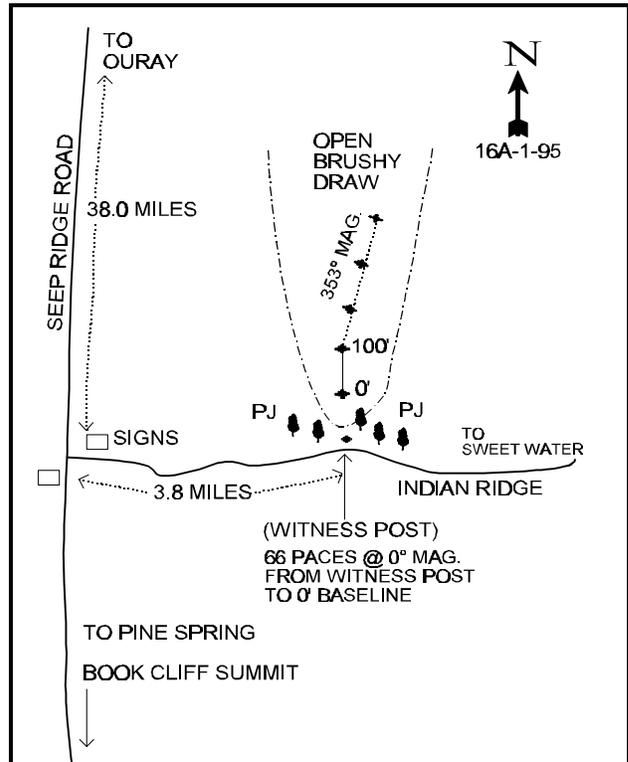
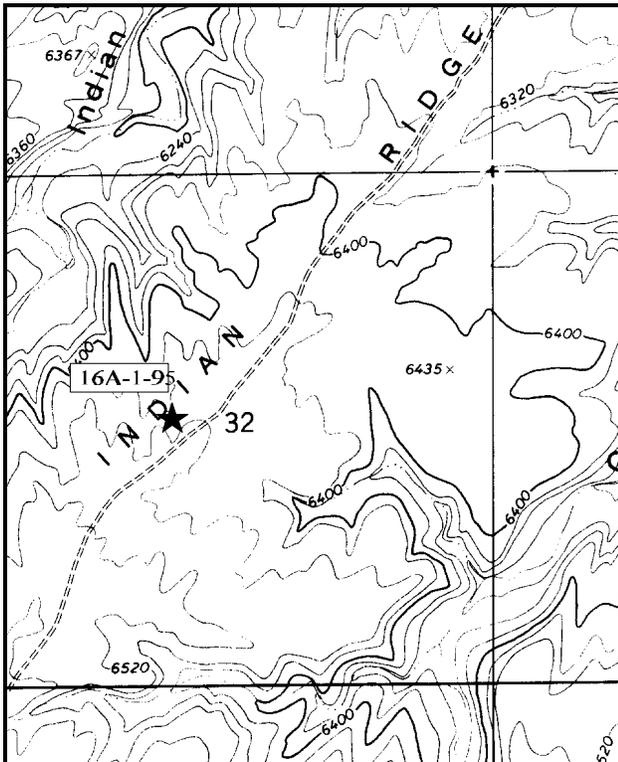
Study site name: Indian Ridge. Range type: Desert Shrub.

Compass bearing: frequency baseline 357 degrees.

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

LOCATION DESCRIPTION

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



Map Name: Cooper Canyon.

Diagrammatic Sketch

Township 13S, Range 23E, Section 32 UTM COOR. 6-39-826E 12 43-88-952N

## DISCUSSION

### Trend Study No. 16A-1

Trend study 16A-1 is located in a shallow draw on the north side of Indian Ridge. The area is principally deer winter range. The site has an elevation of 6,450 feet and a northwest aspect with a 15% slope. The range type is salt desert shrub dominated by fourwing saltbush, winterfat, and black sagebrush. The large fourwing saltbush are scattered throughout the draw. Cheatgrass brome is the principal understory species (percent cover value of 52%) with lesser amounts of sand dropseed, blue grama, and western wheatgrass. The low lying ridges surrounding the study site are dominated by juniper and pinyon. There is some cattle use between winter and spring on a rotational deferment grazing system.

Soils are alluvially deposited from limestone parent material and are deep, but become progressively more shallow toward the ridgetops. Erosion is generally outweighed by soil sedimentation coming from the surrounding woodland slopes. Protective ground cover would be low if cheatgrass was ignored.

The key browse species in order of amount of cover they contribute are: fourwing saltbush, winterfat, black sagebrush, and fringed sagebrush. Saltbush is moderately large (38" x 46") and provides 53% of the total browse cover while winter fat, though more numerous, is low growing and provides only 21% of the browse cover. During severe winters, winterfat would be covered by snow and largely unavailable. The fourwing saltbush population has increased from a small, mostly mature stand of 400 plants/acre in 1982 to a more uniform stand of 2,180 plants/acre. Composition is better with 15% being made up of seedlings and 57% young plants. Utilization has been light in all years sampled and vigor is good.

Winterfat was quite numerous (7,133 plants/acre) in 1982 and was slightly down to 6,240 plants/acre by 1995. Mature individuals are small and average only 13" in height. Utilization is difficult to determine on these shrubs due to abundant annual leader growth, but it appears that they are hedged down each year preventing them from getting taller. The population has become increasingly more mature but vigor is still good.

Black sagebrush was not picked up in the sample used in 1982 and 1988, but was sampled at 960 plants/acre with the better distribution and larger sample size of 1995. This has also affected the density estimates for the other browse species, especially the species which have clumped and discontinuous distributions. One would expect these kind of distributions from fringed sagebrush, black sagebrush, fourwing saltbush, and winterfat. Vigor for black sagebrush is good with percent decadency at only about 18% with biotic potential at 8% which is very high (percentage of seedlings to the population total). The percentage for decadency is lower than most black sagebrush populations associated with the extended drought.

Fringed sagebrush, a "sub" shrub, is also moderately abundant but only makes up 9% of the browse cover. This low-growing species does not appear to be utilized yet it can provide good winter forage for big game under the right conditions. Other browse species encountered on the site include small numbers of basin big sagebrush and broom snakeweed.

Perennial grasses are not abundant and are uneven in their distribution. Composition is limited to six species with sand dropseed, western wheatgrass and blue grama being the most numerous. None of the grasses show much evidence of grazing use. The most abundant grass by far is annual cheatgrass brome which was knee high and very vigorous in 1995 due to the unusually wet spring. Photos from 1982, 1988 and 1995 indicate that cheatgrass has steadily increased in abundance

and size. However, Since annuals were not included in the previous two readings, there is no quantitative data to make comparisons, only photographs . During the 1995 reading, cheatgrass had an average cover value of 52% which accounted for 91% of all herbaceous cover and 73% of the total vegetative cover. This large amount of fine fuel could lead to a destructive wildfire where key browse species would all be lost.

Forb composition is depleted. Four species of perennial forbs were identified in 1988 and only 5 in 1995. Scarlet globemallow is the most commonly occurring perennial, making up 52% of the total forb cover.

#### 1982 APPARENT TREND ASSESSMENT

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

#### 1988 TREND ASSESSMENT

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

#### TREND ASSESSMENT

soil - up

browse - stable

herbaceous understory - improved but in poor condition

#### 1995 TREND ASSESSMENT

The soil trend appears stable. Erosion is minimal, mainly due to the dense cover of cheatgrass. Trend for browse has improved since the last reading. Fourwing saltbush densities have increased while winterfat has slightly decreased due to a decline in young plants (3,266 to 500 plants/acre). The majority of the fourwing are young plants which make up 57% of the total population. Due to the large amounts of current annual growth on winterfat and fourwing, percent utilization was more difficult to determine this season. Use appears light for fourwing and winterfat. The dominant vegetation on the site is cheatgrass which is very vigorous this year due to the unusually wet spring. Cheatgrass has a summed nested frequency of 373 out of a possible 400 and a quadrat frequency of 97%. The plants are 20 to 30 inches tall and cover 52% of the ground surface. Perennial grasses consisting of sand dropseed, mutton bluegrass, and blue grama are present under the cheatgrass canopy while western wheatgrass occurs in small scattered patches. Sum of nested frequency for perennial grasses has declined since 1988 indicating a downward trend. Forbs are uncommon on the site and consist of mostly annuals. Scarlet globemallow is the only common perennial forb.

TREND ASSESSMENT

soil - stable

browse - up, especially for fourwing saltbush

herbaceous understory - Down and in poor condition due to the over abundance of cheatgrass and lack of perennial grasses

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron smithii	75	*38	4	25	14	1.29
G	Bouteloua gracilis	8	*26	-	4	11	1.01
G	Bromus tectorum	-	379	-	-	97	51.80
G	Oryzopsis hymenoides	-	*10	-	-	4	.09
G	Poa fendleriana	9	*16	-	3	8	.21
G	Sitanion hystrix	-	*10	-	-	5	.10
G	Sporobolus cryptandrus	161	*94	48	61	37	1.04
G	Stipa comata	-	1	-	-	1	.00
Total for Grasses		253	574	52	93	177	55.57
F	Astragalus spp.	-	1	2	-	1	.00
F	Descurainia pinnata	-	4	13	-	2	.01
F	Draba spp.	-	3	-	-	1	.00
F	Lappula occidentalis	-	57	-	-	23	.48
F	Schoenocrambe linifolia	-	*6	-	-	3	.04
F	Sphaeralcea coccinea	20	48	4	9	19	.58
F	Tragopogon dubius	5	-	-	2	-	-
F	Trifolium dubium	6	*-	-	5	-	-
F	Unknown forb-perennial	1	-	-	1	-	-
Total for Forbs		32	119	19	17	49	1.12
B	Artemisia frigida	7	*69	34	4	33	1.36
B	Artemisia nova	-	*19	-	-	8	2.27
B	Artemisia tridentata tridentata	-	3	-	-	1	.01
B	Atriplex canescens	6	*50	11	3	24	7.87
B	Ceratoides lanata	77	*91	42	36	42	3.09
B	Chrysothamnus nauseosus	3	-	4	1	-	-
B	Gutierrezia sarothrae	3	20	1	1	9	.12
Total for Browse		96	252	92	45	117	14.73

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

BASIC COVER --

Herd unit 16A, Study no: 1

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	389	2.25	8.75	65.86
Rock	132	1.25	.50	1.08
Pavement	196	13.50	4.75	3.41
Litter	397	73.00	79.50	62.46
Cryptograms	9	0	0	.39
Bare Ground	226	10.00	6.50	8.80

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 1

Type	Quadrat Frequency '95
Rabbit	6
Elk	2
Deer	9
Cattle	6

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	82	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	88	3	-	-	-	-	-	1	-	-	4	-	-	-	266		4	
	95	26	-	-	-	-	-	-	-	-	26	-	-	-	520		26	
Y	82	19	-	-	-	-	-	-	-	-	19	-	-	-	1266		19	
	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133		2	
	95	47	-	-	-	-	-	-	-	-	47	-	-	-	940		47	
M	82	38	-	-	-	-	-	-	-	-	38	-	-	-	2533	9	9	38
	88	1	-	-	1	-	-	-	-	-	2	-	-	-	133	13	5	2
	95	253	-	-	-	-	-	-	-	-	253	-	-	-	5060	14	7	253
Total Plants/Acre (excluding Dead & Seedlings)												'82	3799	Dec:		-		
												'88	266			-		
												'95	6000			-		

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	13	18	-	-	-	-	-	-	33	-	-	-	660	9	17	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	2	7	-	-	-	-	-	-	9	-	-	-	180		9	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	960		18%			
Artemisia tridentata tridentata																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	41	69	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	40		-			

A G E	YR	Form Class (No. of 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>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320		16	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	95	62	-	-	-	-	-	-	-	-	62	-	-	-	1240		62	
M	82	3	3	-	-	-	-	-	-	-	5	1	-	-	400	30 31	6	
	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	49 70	8	
	95	44	-	-	-	-	-	-	-	-	44	-	-	-	880	38 46	44	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60		3	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	0%			
												'88	599		0%			
												'95	2180		2%			
<i>Ceratoides lanata</i>																		
S	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	82	18	-	-	-	-	-	-	-	-	28	-	-	-	1200		18	
	88	27	12	4	2	-	-	4	-	-	49	-	-	-	3266		49	
	95	25	-	-	-	-	-	-	-	-	25	-	-	-	500		25	
M	82	87	2	-	-	-	-	-	-	-	89	-	-	-	5933	12 9	89	
	88	44	15	4	4	-	-	2	-	-	69	-	-	-	4600	15 10	69	
	95	285	-	-	-	-	-	-	-	-	282	-	-	3	5700	13 9	285	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	1	-	-	-	-	-	-	-	1	-	-	1	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	7133	Dec:	0%			
												'88	7932		0%			
												'95	6240		0%			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	7 11	1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	16	-	-	-	-	-	-	-	-	16	-	-	-	320	10 6	16	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	380		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 16A, Study no: 1

Species	Percent of Total		
	'82	'88	'95
<i>Artemisia frigida</i>	33	3	38
<i>Artemisia nova</i>	0	0	6
<i>Artemisia tridentata</i> <i>tridentata</i>	0	0	.25
<i>Atriplex canescens</i>	4	7	14
<i>Ceratoides lanata</i>	63	90	39
<i>Gutierrezia sarothrae</i>	.58	0	2

TREND STUDY 16A-2-95

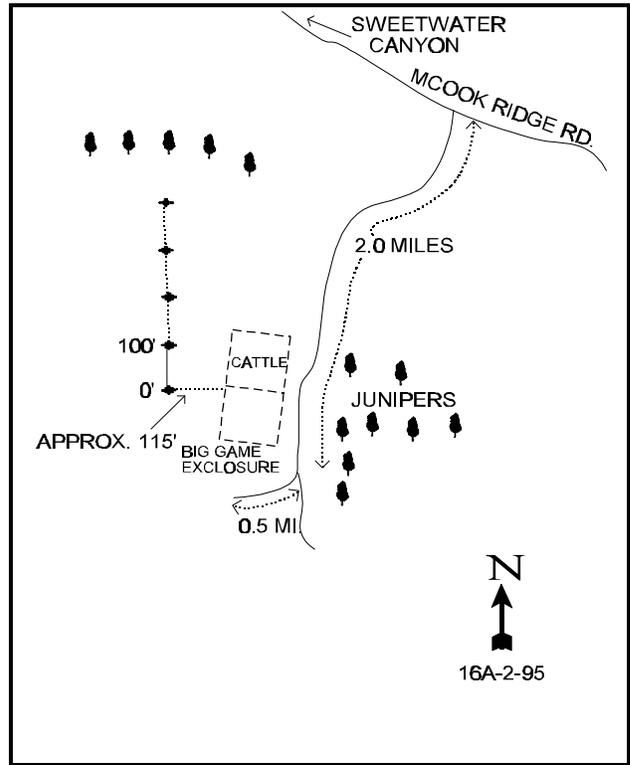
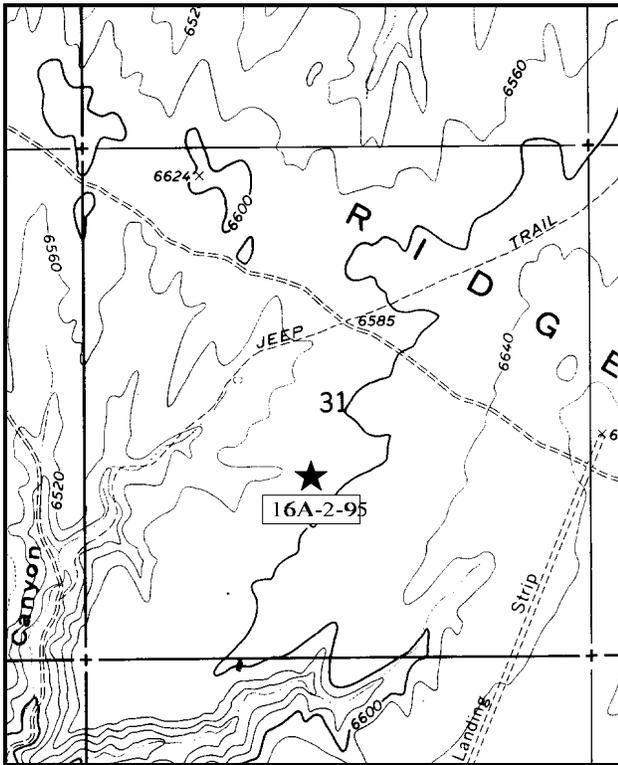
Study site name: Lower McCook Ridge Exclosure . Range type: Desert Shrub .

Compass bearing: frequency baseline 0 degrees.

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

LOCATION DESCRIPTION

From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles. A large exclosure can be seen off the south side of the road. From the northwest side of the deer fence on the lower McCook Ridge Exclosure, the 0-foot baseline stake is approximately 40 paces away bearing 278 degrees true. The frequency baseline is marked by green fenceposts, 12-18 inches tall.



Map Name: Cooper Canyon .

Diagrammatic Sketch

Township 13S , Range 24E , Section 31 UTM COOR. 6-47-916E 12 43-89-198N

## DISCUSSION

### Trend Study No. 16A-2

This study is adjacent to the Lower McCook Ridge exclosure. The site is a broad swale that slopes gently to the southwest. Elevation is 6,600 feet. Vegetative composition is dominated by a mixed stand of basin big sagebrush, fourwing saltbush, winterfat, and fringed sagebrush. Elk and deer utilize the area during the winter. Cattle (800 AUM'S) use is on a rotational deferred system between fall and spring, allowing some periods of rest. The early spring use is to help control the cheatgrass.

Soils are alluvially deposited, sandy to silty in texture and have little rock or pavement on the surface (<5%). Originally, there were extensive areas of exposed bare ground (49% in 1982), some ephemeral litter (i.e., mostly dead cheatgrass) and minimal vegetative cover. Herbaceous cover, aside from annuals, is still minimal. Vegetative cover is largely provided by the aerial portions of shrubs except for areas dominated by annual cheatgrass. Soil movement is prevalent but not severe.

The Key browse species are Basin big sagebrush, winterfat, fringed sagebrush, and fourwing saltbush. Sagebrush on the site have characteristics of basin big sagebrush (*Artemisia tridentata tridentata*) and Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). Due to the level of hybridization, identification was very difficult. As a result, all sagebrush was classified as basin big sagebrush. Currently basin big sagebrush accounts for 49% of the browse cover with a density of 3,860 plants/acre. Population density is almost the same as it was in 1982. Percent decadency increased to 30% in 1988 when heavy use was noted on 14% of the sagebrush. Vigor has generally been good. During the 1995 reading, only 11% of the shrubs encountered were classified as decadent. Seventy-seven percent of the mature and decadent shrubs display moderate use but only 5% are heavily hedged. Reproductive potential and the proportion of young plants in the population are high at 45% and 31% respectively indicating a healthy increasing population.

Fourwing saltbush, while noticeably less numerous, produces good quality forage. There are currently an estimated 760 plants/acre, 16% of which are heavily hedged. Vigor is good and percent decadency is moderately low at 13%.

Winterfat on this site is a low growing browse averaging only 10 inches in height. Density estimates in 1982 and 1988 estimated a population around 3,500 plants/acre. Estimates from 1995 indicate a much larger population of 10,420 plants/acre. The change in density is partly the result of the larger sample and better distribution used in 1995 which more accurately estimates clumped and/or discontinuous shrub populations. Utilization was difficult to determine due to the abundant annual growth because of the unusually wet spring of 1995. Winterfat displayed good vigor with few decadent or dead plants.

Other browse species encountered on the site include fringed sagebrush, broom snakeweed and prickly pear cactus.

Perennial grasses are inadequate and consist of Sandberg bluegrass, Indian ricegrass, and bottlebrush squirreltail. All had 60% to 30% of their current growth removed during the 1988 reading. Cheatgrass brome is locally very abundant in the area and now accounts for 78% of all the herbaceous cover. It does not appear to be utilized and constitutes a significant fire hazard and potentially could cause the loss of the key browse species.

If annual species are disregarded, forbs are even less common than grasses. Only two perennial species, scarlet globemallow and low fleabane daisy, were

encountered during the 1988 reading. Neither are of much value or show any evidence of use.

#### 1982 APPARENT TREND ASSESSMENT

Soil trend is stable to declining. To a large degree, the soil surface is barren of vegetation or effective litter cover. Vegetation trend is perhaps slightly more stable but still declining. With the exception of fourwing saltbush, the shrub population appears to be expanding and is only lightly used. Perhaps most ominous is an apparent rapid increase of threadleaf snakeweed. Perennial herbs are nearly absent from the site and show no evidence of increasing.

#### 1988 TREND ASSESSMENT

Changes on the Lower McCook Ridge Exclosure study site since study establishment in 1982 include an increase in the number of big sagebrush and in the degree of hedging on these key shrubs. Density of big sagebrush has increased from 3,966 plants/acre to 5,865 plants/acre. A majority of the big sagebrush have a moderately hedged growth form, with 14% appearing heavily hedged. Other browse are only lightly used. In 1988, 30% of the big sagebrush were classified as decadent, as opposed to 6% in 1982. Still, there are an adequate number of young shrubs. There were differences and difficulties in the identification of big sagebrush on this site. The 1982 study reported Wyoming big sagebrush on the base line. The sagebrush was all called Basin big sagebrush in 1988. There is a great deal of hybridization between these two subspecies on this site. A few more young four-wing saltbush were found in 1988, but populations of saltbush and winterfat are basically unchanged. Fringed sagebrush has increased as predicted, along with the snakeweed, which is currently the most abundant woody species. The density estimate for snakeweed was 6,766 plants/acre in 1988 while there were only 2,999 plants/acre in 1982. With a large number of seedlings, snakeweed continues to increase. Although cheatgrass still provides much of the ground cover, Sandberg bluegrass has increased in frequency. There continues to be a low diversity of forbs. Ground cover, in the form of mostly litter, has increased slightly. Total protective ground cover in 1988 was 64%, as opposed to 51% in 1982. Vegetative basal cover was low at 2.5%, due to a lack of understory herbaceous vegetation. Still, there was little evidence of erosion problems due to the level terrain.

##### TREND ASSESSMENT

soil - slightly improved

browse - up for key species

herbaceous understory - improved but in very poor condition

#### 1995 TREND ASSESSMENT

The soil trend has improved slightly due to increased protective ground cover provided by herbaceous vegetation, litter, and cryptogamic crusts. Litter cover has declined however due to the extended drought. Browse trend is up. Winterfat is abundant and lightly utilized. Fourwing saltbush is more heavily utilized but appears to have a stable mature population. Basin big sagebrush has declined in density from 5,865 plants/acre in 1988 to 3,860 plants/acre in 1995, but this is almost what it was originally in 1982. Percent decadence however, has decreased from 30% to 11%. The density of broom snakeweed has shown a 53% decrease since the 1988 reading. This trend, due to the drought, is consistent throughout most of the State. The herbaceous understory is in poor condition, produces little forage and is dominated by annual cheatgrass. Sandberg bluegrass is the most numerous perennial species. Forbs are not an important aspect of this site due to low frequencies, but they have shown increased nested and quadrat frequencies on each successive reading. The most common forb is still scarlet globemallow. Overall, the herbaceous trend is up due to increased nested and quadrat frequency

values of perennials, but it is still in very poor condition.

TREND ASSESSMENT

soil - slightly improved

browse - up for key species

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

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 2

T y p e	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Bromus tectorum	-	288	-	-	85	15.91
G	Festuca ovina	4	-	2	2	-	-
G	Oryzopsis hymenoides	1	7	-	1	4	.24
G	Poa secunda	30	106	1	13	38	2.04
G	Sitanion hystrix	17	52	2	8	23	.50
Total for Grasses		52	453	5	24	150	18.71
F	Allium spp.	-	2	-	-	1	.00
F	Calochortus nuttallii	-	2	-	-	1	.00
F	Delphinium bicolor	-	2	-	-	1	.00
F	Descurainia pinnata	-	32	-	-	14	.29
F	Draba spp.	-	11	-	-	5	.02
F	Erigeron flagellaris	-	1	-	-	1	.01
F	Erigeron pumilus	32	*40	-	16	22	.25
F	Lappula occidentalis	-	55	-	-	25	.27
F	Machaeranthera spp.	-	-	5	-	-	-
F	Schoenocrambe linifolia	-	*25	-	-	10	.05
F	Sisymbrium altissimum	-	6	-	-	4	.07
F	Sphaeralcea coccinea	98	*100	-	39	40	.75
F	Tragopogon dubius	-	2	-	-	2	.01
Total for Forbs		130	278	5	55	126	1.75
B	Artemisia frigida	55	112	-	26	44	3.04
B	Artemisia tridentata tridentata	63	64	-	30	27	10.39
B	Atriplex canescens	29	*10	-	11	7	1.99
B	Ceratoides lanata	132	*94	-	61	43	4.31
B	Gutierrezia sarothrae	27	*48	-	15	22	1.41
B	Leptodactylon pungens	1	-	-	1	-	-
B	Opuntia spp.	5	4	-	2	2	.18
Total for Browse		312	332	0	146	145	21.34

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

BASIC COVER --

Herd unit 16A, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	356	2.25	2.50	41.63
Rock	177	0	0	1.49
Pavement	259	0	0	3.29
Litter	391	48.50	60.75	40.01
Cryptograms	143	0	.50	3.93
Bare Ground	292	49.25	36.25	26.30

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 2

Type	Quadrat Frequency '95
Rabbit	11
Elk	18
Deer	17

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	233		7	
	95	126	-	-	-	-	-	-	-	-	126	-	-	-	2520		126	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	233		7	
	95	140	-	-	12	-	-	-	-	-	152	-	-	-	3040		152	
M	82	9	-	-	-	-	-	-	-	-	9	-	-	-	300	7 3	9	
	88	23	-	-	4	-	-	2	-	-	29	-	-	-	966	7 5	29	
	95	321	4	4	3	-	-	-	-	-	332	-	-	-	6640	12 10	332	
Total Plants/Acre (excluding Dead & Seedlings)												'82	300	Dec:	-			
												'88	1199		-			
												'95	9680		-			

A G E	YR	Form Class (No. of 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	82	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	88	45	-	-	8	-	-	-	-	-	53	-	-	-	1766		53	
	95	86	-	-	-	-	-	-	-	-	86	-	-	-	1720		86	
Y	82	18	-	-	-	-	-	-	-	-	18	-	-	-	600		18	
	88	40	28	8	1	-	-	-	-	-	77	-	-	-	2566		77	
	95	44	1	-	15	-	-	-	-	-	60	-	-	-	1200		60	
M	82	94	-	-	-	-	-	-	-	-	94	-	-	-	3133	24 33	94	
	88	13	26	7	-	-	-	-	-	-	45	1	-	-	1533	24 30	46	
	95	21	87	3	-	-	-	-	-	-	110	-	-	1	2220	22 30	111	
D	82	1	6	-	-	-	-	-	-	-	-	-	7	-	233		7	
	88	14	29	10	-	-	-	-	-	-	49	-	4	-	1766		53	
	95	4	15	2	-	-	1	-	-	-	17	1	-	4	440		22	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	180		9	
Total Plants/Acre (excluding Dead & Seedlings)												'82	3966	Dec:	5%			
												'88	5865		30%			
												'95	3860		11%			
<i>Atriplex canescens</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	6	-	-	-	-	-	-	-	-	6	-	-	-	200		6	
	95	5	1	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	82	12	-	-	-	-	-	-	-	-	12	-	-	-	400	27 21	12	
	88	15	-	-	-	-	-	-	-	-	15	-	-	-	500	26 29	15	
	95	9	9	6	1	2	-	-	-	-	27	-	-	-	540	26 33	27	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	4	1	-	-	-	-	-	-	-	5	-	-	-	100		5	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	0%			
												'88	700		0%			
												'95	760		13%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ceratoides lanata</i>																		
Y	82	22	-	-	-	-	-	-	-	-	22	-	-	-	733		22	
	88	32	-	-	-	-	-	-	-	-	32	-	-	-	1066		32	
	95	70	-	-	2	-	-	-	-	-	72	-	-	-	1440		72	
M	82	82	-	-	-	-	-	-	-	-	82	-	-	-	2733	5	5	82
	88	53	-	-	-	-	-	-	-	-	53	-	-	-	1766	7	4	53
	95	396	34	3	2	-	-	-	3	-	438	-	-	-	8760	10	10	438
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	24	2	-	-	-	-	-	-	-	23	-	3	-	866		26	
	95	11	-	-	-	-	-	-	-	-	-	-	-	220		11		
Total Plants/Acre (excluding Dead & Seedlings)												'82	3466	Dec:	0%			
												'88	3698		23%			
												'95	10420		2%			
<i>Gutierrezia sarothrae</i>																		
S	82	21	-	-	-	-	-	-	-	-	21	-	-	-	700		21	
	88	152	-	-	-	-	-	-	-	-	152	-	-	-	5066		152	
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
Y	82	40	-	-	-	-	-	-	-	-	40	-	-	-	1333		40	
	88	49	-	-	-	-	-	-	-	-	49	-	-	-	1633		49	
	95	57	-	-	-	-	-	-	-	-	57	-	-	-	1140		57	
M	82	50	-	-	-	-	-	-	-	-	50	-	-	-	1666	10	7	50
	88	148	1	1	1	-	-	-	-	-	151	-	-	-	5033	5	5	151
	95	96	-	-	4	-	-	-	-	-	100	-	-	-	2000	9	9	100
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	40			2	
Total Plants/Acre (excluding Dead & Seedlings)												'82	2999	Dec:	0%			
												'88	6766		1%			
												'95	3200		1%			
<i>Opuntia spp.</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	7	-	-	-	-	-	-	-	-	7	-	-	-	233	3	4	7
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100	4	9	3
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	12	4
Total Plants/Acre (excluding Dead & Seedlings)												'82	233	Dec:	-			
												'88	266		-			
												'95	80		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Pinus edulis																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	33		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 16A, Study no: 2

Species	Percent of Total		
	'82	'88	'95
Artemisia frigida	3	6	35
Artemisia tridentata tridentata	35	32	14
Atriplex canescens	4	4	3
Ceratoides lanata	30	20	37
Gutierrezia sarothrae	26	37	11
Opuntia spp.	2	1	.28
Pinus edulis	0	.17	0

TREND STUDY 16A-3-95

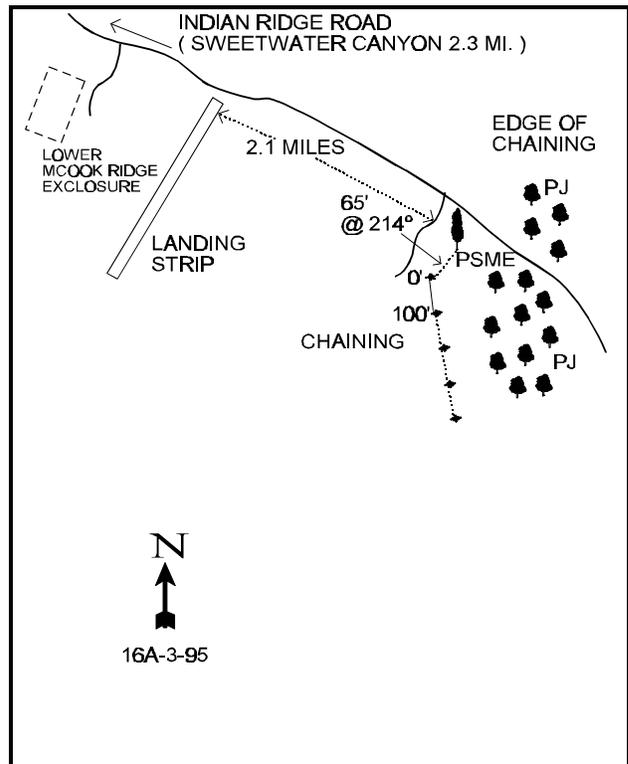
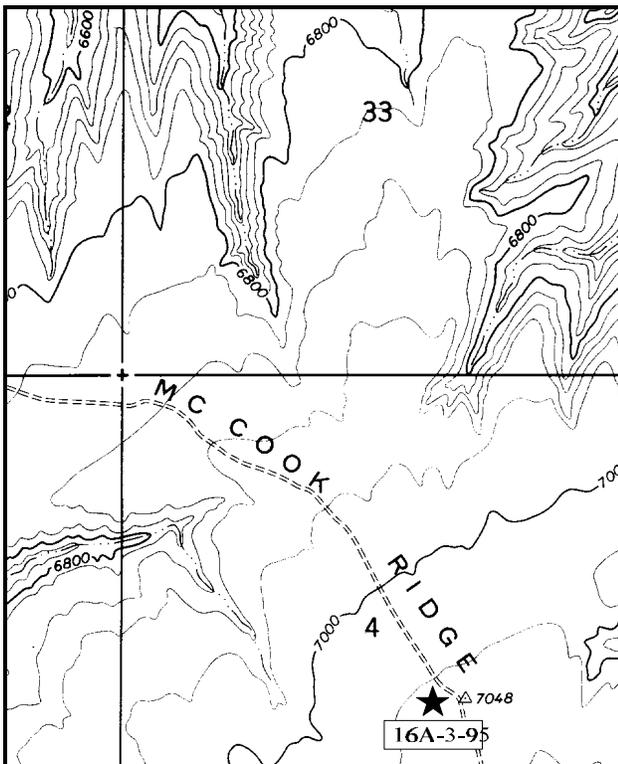
Study site name: Lower McCook Ridge Chaining. Range type: Chained, Seeded PJ.

Compass bearing: frequency baseline 164 degrees.

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

LOCATION DESCRIPTION

From the intersection of the Indian Ridge and McCook Ridge roads, go southeast on McCook Ridge for 2.3 miles to a landing strip on the right side of the road (just past enclosure). Proceed an additional 2.1 miles up McCook Ridge into a chained area. Turn right off the main road before the edge of the chaining, and proceed over to a large, lone douglass fir. The 0-foot baseline stake, marked by browse tag # 9036, is 13 paces from the tree at a bearing of 214 degrees. The frequency baseline is marked by a green, 12-18 inch tall fenceposts.



Map Name: Burnt Timber Canyon.

Diagrammatic Sketch

Township 14S, Range 24E, Section 4 UTM COOR. 6-51-696E 12 43-87-538N

## DISCUSSION

### Trend Study No. 16A-3

This study is on the Lower McCook Ridge chaining at approximately 7,030 feet elevation. The prevailing terrain is a broad, flat ridge. The study site monitors important deer and elk winter range that is also grazed by livestock. The cattle use the area on a rotational deferred management system during the spring or fall, with selective periods for rest. The early spring use is periodically done to help control annual cheatgrass.

Soils are intermediate in texture on the surface but increasingly more clay a few inches below the surface. Erosion is minimal because of level terrain, a fair vegetative cover, and the presence of large amounts of persistent, well distributed litter and chaining debris.

The shrub community is still developing. Large palatable shrubs are limited to mountain big sagebrush, black sagebrush, and basin big sagebrush which have a combined density of almost 3,200 plants/acre. Additionally, there are a few rubber rabbitbrush and winterfat which provides some additional forage. If more palatable shrubs such as antelope bitterbrush, true mountain mahogany or fourwing saltbush were a part of the original seed mixture, they have failed to emerge. During the 1982 reading, all sagebrush were classified as mountain big sagebrush. Vigor was good and the level of utilization was moderate. In 1988 both mountain big sagebrush (*Artemisia tridentata vaseyana*), basin big sagebrush (*A. tridentata tridentata*), and black sagebrush (*Artemisia nova*) were identified. There appears to have been problems with identification of the sagebrush due to the high degree of hybridization. Combined, the sagebrush population increased in density between 1982 and 1995. Overall, vigor remains good, percent decadence is moderately low, and utilization is light to moderate.

The most numerous browse species is dwarf rabbitbrush. This small prostrate shrub numbered 6,266 plants/acre in 1982 and 27,266 by 1988. All plants were classified as heavily hedged in 1982 but use in 1988 was reported light. Densities have since dropped to 13,640 plants/acre and use appears light. These large changes in density for this shrub could be partially attributed to the much larger sample size and better distribution for a species that is usually clumped and/or discontinuous in its distribution which makes density estimates difficult.

Surviving pinyon and juniper trees are increasing in size on this chaining. Point-center quarter data from 1995 estimate of 106 pinyon trees/acre while junipers number just 89 trees/acre. During the 1995 reading, tree density was determined using only the point quarter method so tree density is not reported in the shrub density tables. Photos indicate that juniper and pinyon trees have increased considerably in size since 1982. Line intercept data estimate an average of 12% cover from p-j. A follow up treatment might be warranted to eradicate the young trees and encourage more herbaceous vegetation.

Grass composition consists of four seeded and eight native species. The most common is crested wheatgrass which accounts for 53% of the grass cover. Blue grama and muttongrass are the only other species which makeup more than 1% cover. These grasses were reportedly heavily grazed in the past. Smooth brome commonly occurs in the shelter of tree litter and often is physically protected from grazing.

Forb composition is markedly deficient, especially for a seeded area. All forbs combined account for only 4% cover. The only seeded forb encountered was alfalfa which had a quadrat frequency of only 6% in 1995. Other common forbs are rockcress and stemless hymenoxys, neither of which are utilized as forage.

#### 1982 APPARENT TREND ASSESSMENT

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

#### 1988 TREND ASSESSMENT

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

##### TREND ASSESSMENT

soil - slightly up

browse - slightly down

herbaceous understory - up

#### 1995 TREND ASSESSMENT

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

##### TREND ASSESSMENT

soil - stable

browse - up

herbaceous understory - up

VEGETATIVE TRENDS --  
Herd unit 16A, Study no: 3

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	<i>Agropyron cristatum</i>	257	*168	54	85	52	6.43
G	<i>Agropyron intermedium</i>	67	*21	-	27	7	.16
G	<i>Agropyron smithii</i>	2	132	2	2	48	.56
G	<i>Agropyron trachycaulum</i>	13	*16	-	6	7	.16
G	<i>Bouteloua gracilis</i>	6	*106	-	2	39	1.25
G	<i>Bromus inermis</i>	52	*22	11	22	7	.28
G	<i>Carex</i> spp.	33	*11	5	19	5	.36
G	<i>Elymus junceus</i>	16	12	-	6	4	.33
G	<i>Koeleria cristata</i>	11	*54	-	5	23	.48
G	<i>Oryzopsis hymenoides</i>	6	6	14	3	5	.07
G	<i>Poa</i> spp.	3	-	-	2	-	-
G	<i>Poa fendleriana</i>	15	*81	1	6	31	2.02
G	<i>Sitanion hystrix</i>	8	4	1	5	2	.01
G	<i>Stipa comata</i>	1	9	-	1	3	.01
Total for Grasses		490	642	88	191	233	12.16
F	<i>Antennaria</i> spp.	-	*30	-	-	15	.17
F	<i>Arabis</i> spp.	7	*16	-	4	5	.84
F	<i>Arenaria fendleri</i>	14	*3	-	6	1	.03
F	<i>Arabis microphylla</i>	-	*13	-	-	6	.03
F	<i>Astragalus spatulatus</i>	34	*-	-	14	-	-
F	<i>Caulanthus crassicaulis</i>	2	-	-	1	-	-
F	<i>Carduus nutans</i>	-	6	-	-	3	.01
F	<i>Castilleja</i> spp.	-	*22	-	-	11	.11
F	<i>Crepis acuminata</i>	-	6	-	-	2	.01
F	<i>Delphinium</i> spp.	-	2	-	-	1	.00
F	<i>Erigeron pumilus</i>	-	3	-	-	1	.04
F	<i>Haplopappus acaulis</i>	11	*8	-	6	3	.33
F	<i>Hymenoxys acaulis</i>	-	*12	-	-	5	.80
F	<i>Lappula occidentalis</i>	-	2	-	-	1	.00
F	<i>Lesquerella</i> spp.	9	*-	-	4	-	-
F	<i>Machaeranthera grindelioides</i>	62	*13	-	25	7	.13
F	<i>Medicago sativa</i>	1	14	-	1	6	1.24
F	<i>Orthocarpus</i> spp.	-	4	-	-	2	.01
F	<i>Penstemon pachyphyllus</i>	-	3	-	-	2	.02

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Phlox austromontana	2	-	-	1	-	-
F	Phlox longifolia	-	*41	-	-	17	.08
F	Polygonum douglasii	-	7	-	-	4	.02
F	Sphaeralcea coccinea	-	*28	-	-	12	.08
F	Streptanthus cordatus	-	1	-	-	1	.00
F	Taraxacum officinale	-	*6	-	-	3	.01
Total for Forbs		142	240	0	62	108	4.01
B	Artemisia nova	1	1		1	1	.01
B	Artemisia tridentata tridentata	13	*20	-	7	10	3.20
B	Artemisia tridentata vaseyana	1	27	13	1	11	2.51
B	Ceratoides lanata	-	4	-	-	3	.09
B	Chrysothamnus depressus	12	*104	2	6	39	5.34
B	Gutierrezia sarothrae	36	*23	4	16	11	.35
B	Juniperus osteosperma	8	2	1	3	1	.93
B	Opuntia spp.	-	3	1	-	2	.01
B	Pinus edulis	-	9	1	-	3	1.79
Total for Browse		71	193	22	34	81	14.25

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 16A, Study no: 3

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	349	5.25	12.50	32.93
Rock	150	1.00	2.50	2.11
Pavement	137	.75	5.25	2.95
Litter	392	73.25	69.00	36.46
Cryptograms	151	0	.50	6.62
Bare Ground	287	19.75	10.25	26.86

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 3

Type	Quadrat Frequency
	'95
Rabbit	16
Elk	24
Deer	13
Cattle	2

BROWSE CHARACTERISTICS --  
Herd unit 16A, Study no: 3

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	9	11	3
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<i>Artemisia nova</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	5	-	-	-	-	-	-	-	6	-	-	-	120	19	22	6
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	140		-			
<i>Artemisia tridentata tridentata</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133			2
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	3	-	1	-	-	-	-	-	5	-	-	-	333	30	31	5
	95	13	-	-	-	-	-	-	-	-	13	-	-	-	260	35	44	13
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	2	1	-	-	-	-	-	-	-	2	-	1	-	200			3
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	666		30%			
												'95	360		5%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	73	1	-	-	-	-	-	-	-	74	-	-	-	1480		74	
M	82	-	14	5	-	-	-	-	-	-	17	2	-	-	1266	22	25	19
	88	-	5	3	-	-	-	-	-	-	8	-	-	-	533	20	28	8
	95	21	33	-	1	-	-	-	-	-	55	-	-	-	1100	18	25	55
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	2	-	-	-	-	-	-	-	2	-	1	-	200		3	
	95	-	4	-	-	-	-	-	-	-	4	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1932	Dec:	0%			
												'88	866		23%			
												'95	2660		3%			
<i>Ceratoides lanata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	1	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	15	5	1
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	6	8	6
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	199		-			
												'95	120		-			
<i>Chrysothamnus depressus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	19	-	-	-	-	-	-	-	-	19	-	-	-	1266		19	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	179	3	-	1	-	-	-	-	-	183	-	-	-	12200		183	
	95	43	-	-	-	-	-	-	-	-	43	-	-	-	860		43	
M	82	-	-	94	-	-	-	-	-	-	94	-	-	-	6266	3	9	94
	88	53	159	2	4	-	-	-	-	-	218	-	-	-	14533	4	9	218
	95	640	-	-	-	-	-	-	-	-	640	-	-	-	12800	5	11	640
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	5	3	-	-	-	-	-	-	-	7	-	1	-	533		8	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	6266	Dec:	0%			
												'88	27266		1%			
												'95	13660		0%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus nauseosus albicaulis</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	36	43	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	60		-			
<i>Echinocereus spp.</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	1	4	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Gutierrezia sarothrae</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	10	-	-	6	-	-	-	-	-	16	-	-	-	1066		16	
	95	17	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	1	
	88	49	-	-	3	-	-	-	-	-	52	-	-	-	3466	8	5	
	95	57	-	-	-	-	-	-	-	-	57	-	-	-	1140	7	7	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	0%			
												'88	4598		1%			
												'95	1480		0%			
<i>Juniperus osteosperma</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	88	-	-	-	-	1	-	-	-	-	1	-	-	-	66	118	79	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	132		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	14	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	66		-			
												'95	20		-			
Pinus edulis																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	6	-	-	-	-	-	-	-	-	6	-	-	-	400	33	18	6
	88	1	-	-	-	-	-	1	-	-	2	-	-	-	133	94	73	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	400	Dec:	-			
												'88	399		-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 16A, Study no: 3

Species	Percent of Total		
	'82	'88	'95
Artemisia frigida	0	0	.32
Artemisia nova	0	0	.75
Artemisia tridentata tridentata	0	2	2
Artemisia tridentata vaseyana	22	3	14
Ceratoides lanata	0	.58	.64
Chrysothamnus depressus	71	80	74
Chrysothamnus nauseosus albicaulis	0	0	.32
Echinocereus spp.	.75	0	0
Gutierrezia sarothrae	.75	13	8
Juniperus osteosperma	.75	.38	0
Opuntia spp.	0	.19	.10
Pinus edulis	5	1	0

TREND STUDY 16A-4-95

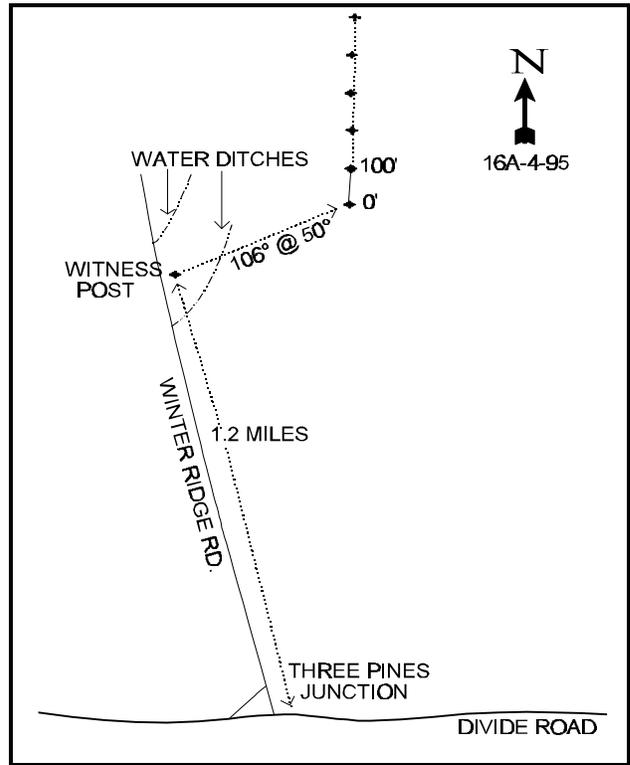
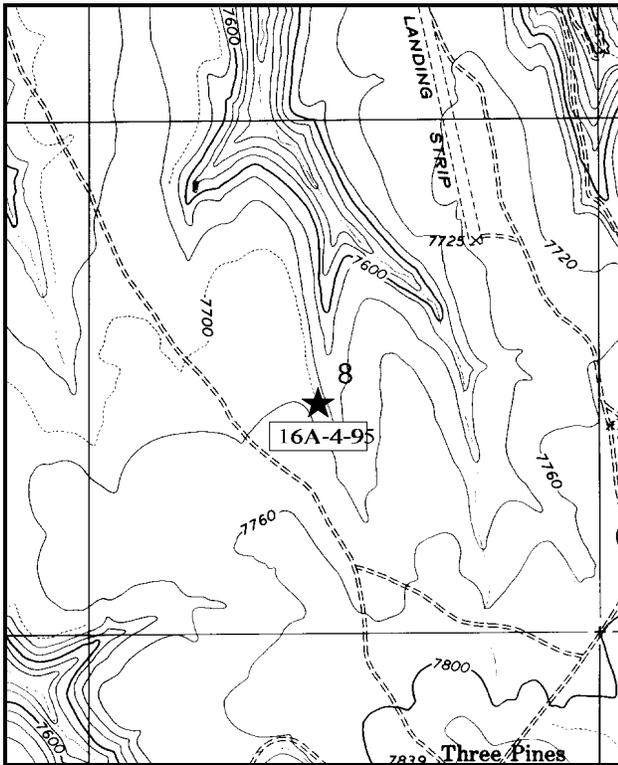
Study site name: Wirefence Point. Range type: Mixed Mountain Brush.

Compass bearing: frequency baseline 0 degrees.

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

LOCATION DESCRIPTION

From the Book Cliffs Summit road near Three Pines, turn right on the Winter Ridge Road. Travel 1.2 miles towards Winter Ridge. There may be an old drainage ditch or faint fork on the right hand side of the road. From the road, walk out 102 paces bearing  $52^\circ$  true to the 0-foot baseline stake. The frequency baseline is marked by green fenceposts 12-18 inches in height.



Map Name: Cedar Camp Canyon

Diagrammatic Sketch

Township 16S, Range 23E, Section 8

## DISCUSSION

### Trend Study No. 16A-4

This study is on the Book Cliffs summer range near the head of Wire Fence Canyon at an elevation of 7,640 feet on nearly level terrain. The study site is a sagebrush-grass and/or mountain brush range type since a 2,4-D spraying treatment has greatly thinned the shrubs. This area is grazed by cattle on a rotation deferred system between spring and summer.

Soils are moderately deep and sandy with minimal surface rock cover (<1%). Abundant litter and vegetation cover adequately protect the soil from erosion. Important browse species on the site consist of mountain big sagebrush, serviceberry, snowberry, and squaw-apple. There was little evidence in 1988 of the 2-4D spraying treatment to thin browse on this state-owned rangeland. A few sagebrush skeletons and resprouted serviceberry were found. The initial range trend study in 1982 estimated the sagebrush population to be 4,666 plants per acre. Thirty-one percent of the population was classified as young and seedlings numbered 6,666 plants/acre. Hedging was very light and vigor was good. In 1988, the site had a slightly larger population (7,732 plants/acre) with increased decadence and fewer seedlings, yet a healthy proportion of young plants (60%). The number of mature plants declined from 3,200 to 2,266 plants/acre. Study site stakes could not be located in 1995 so new posts were placed as close as possible to the old site with old photographs of the site. Trends can still be determined by examining age class composition, form class, vigor, and percent decadence, with less emphasis placed on population densities. Data from 1995 indicate a stable population of mountain big sagebrush. Reproductive potential is still high at 32%, with 40% of the population consisting of young plants. Utilization is light and vigor is good with a low number of decadent plants (5%).

Other browse species, including squaw-apple, snowberry, serviceberry, and gray horsebrush occur in small numbers. Dwarf rabbitbrush is abundant yet declined significantly in density since 1983.

Grasses are currently abundant and consist exclusively of native species. These species probable increased considerably after the herbicide treatment. Now, with an apparent increase in mountain big sagebrush, grass production may be near its optimum. The dominant species consists of thickspike wheatgrass, prairie junegrass, muttongrass, and Sandberg bluegrass. Forbs are also diverse with 32 perennial species identified in 1995. Forbs account for 68% of the herbaceous cover. Unfortunately, 53% of the forb cover comes from pussytoes, mat penstemon, desert phlox and lanceleaved sedum, all low growing increaser species.

### 1982 APPARENT TREND ASSESSMENT

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

### 1988 TREND ASSESSMENT

Due to a slight increase in vegetative "basal" cover from 7% to 12%, and an apparent increase in cryptogamic cover (from 0% in 1982 to 8% ground cover in 1988), the amount of bare soil decreased from 39% to 23%. Trend for soil is up. The browse trend is up for the key species, mountain big sagebrush, which has

increased 40% since 1982. Reproductive potential is still high at 22% with 60% of the population consisting of young plants and 29% were mature plants. Trend for the herbaceous understory is up due to increased quadrat frequency of both grasses and forbs.

TREND ASSESSMENT

soil - slightly up

browse - up

herbaceous understory - up

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
G	Agropyron dasystachyum	195	*174	8	73	66	1.58
G	Bouteloua gracilis	25	*-	-	12	-	-
G	Carex spp.	53	*22	3	22	11	.05
G	Koeleria cristata	92	*172	56	34	63	2.52
G	Poa fendleriana	-	*84	-	-	32	1.37
G	Poa secunda	133	*137	48	57	50	2.75
G	Stipa comata	225	*42	50	81	18	.58
Total for Grasses		723	631	165	279	240	8.89
F	Agoseris glauca	-	*25	-	-	13	.11
F	Antennaria rosea	196	*99	29	66	41	2.40
F	Androsace septentrionalis	-	65	-	-	31	.18

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	<i>Arenaria congesta</i>	256	*66	34	87	26	.82
F	<i>Arabis drummondii</i>	47	*5	-	22	3	.01
F	<i>Astragalus convallarius</i>	1	19	-	1	10	.07
F	<i>Astragalus spatulatus</i>	-	1	-	-	1	.03
F	<i>Aster spp.</i>	-	*11	-	-	6	.08
F	<i>Astragalus spp.</i>	5	11	6	2	4	.59
F	<i>Castilleja flava</i>	8	*41	-	6	18	.31
F	<i>Calochortus nuttallii</i>	-	*9	-	-	5	.02
F	<i>Chaenactis douglasii</i>	-	4	-	-	1	.00
F	<i>Cirsium spp.</i>	3	-	-	1	-	-
F	<i>Comandra pallida</i>	222	*97	25	77	41	.45
F	<i>Collinsia parviflora</i>	-	30	-	-	10	.12
F	<i>Crepis acuminata</i>	6	56	-	5	32	.36
F	<i>Cryptantha spp.</i>	7	-	26	4	-	-
F	<i>Delphinium bicolor</i>	-	*6	-	-	3	.01
F	<i>Eriogonum alatum</i>	-	*17	-	-	8	.15
F	<i>Erigeron pumilus</i>	174	*109	48	69	50	.58
F	<i>Eriogonum umbellatum</i>	41	*55	12	21	22	.98
F	<i>Gayophytum ramosissimum</i>	-	1	-	-	1	.00
F	<i>Hymenopappus filifolius</i>	-	*31	-	-	11	.71
F	<i>Lesquerella ludoviciana</i>	-	*39	-	-	16	.23
F	<i>Linum lewisii</i>	-	*40	-	-	19	.18
F	<i>Lithospermum spp.</i>	-	*6	-	-	3	.01
F	<i>Lomatium spp.</i>	-	1	-	-	1	.01
F	<i>Lupinus argenteus</i>	31	59	2	16	29	1.80
F	<i>Orthocarpus spp.</i>	-	1	-	-	1	.00
F	<i>Penstemon caespitosus</i>	14	*99	4	7	40	3.32
F	<i>Penstemon humilis</i>	16	*2	2	8	1	.00
F	<i>Phlox austromontana</i>	58	*137	18	23	51	1.89
F	<i>Phlox longifolia</i>	36	47	7	17	19	.19
F	<i>Polygonum douglasii</i>	-	85	-	-	31	.25
F	<i>Senecio integerrimus</i>	-	*17	-	-	7	.06
F	<i>Sedum lanceolatum</i>	164	*111	16	60	40	2.38
F	<i>Senecio multilobatus</i>	-	*15	-	-	7	.22
F	<i>Sphaeralcea coccinea</i>	-	4	-	-	2	.01

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
F	Taraxacum officinale	1	*14	-	1	6	.05
F	Zigadenus spp.	-	3	-	-	2	.01
Total for Forbs		1286	1438	229	493	612	18.74
B	Amelanchier alnifolia	2	-	3	1	-	-
B	Artemisia tridentata vaseyana	27	86	25	16	38	13.93
B	Chrysothamnus depressus	95	*44	42	39	21	1.72
B	Chrysothamnus viscidiflorus viscidiflorus	2	39	1	2	17	.82
B	Echinocactus spp.	-	1	-	-	1	.03
B	Gutierrezia sarothrae	-	*12	-	-	5	.51
B	Juniperus scopulorum	1	2	1	1	1	.03
B	Opuntia spp.	6	-	1	2	-	-
B	Peraphyllum ramosissimum	32	*7	13	14	4	2.31
B	Symphoricarpos oreophilus	7	-	1	3	-	-
Total for Browse		172	191	87	78	87	19.38

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

BASIC COVER --

Herd unit 16A, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %		
		'82	'88	'95
Vegetation	372	7.25	12.25	47.23
Rock	47	0	0	.16
Pavement	72	0	0	.56
Litter	391	61.50	56.75	44.75
Cryptograms	107	0	8.00	1.20
Bare Ground	304	39.00	23.00	26.94

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 4

Type	Quadrat Frequency '95
Rabbit	1
Elk	4
Deer	18
Cattle	4

BROWSE CHARACTERISTICS --  
Herd unit 16A, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	1	-	-	-	-	-	-	-	-	1	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	1	-	-	-	-	-	-	-	1	-	-	-	66	26	10	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Artemisia tridentata vaseyana</i>																		
S	82	100	-	-	-	-	-	-	-	-	100	-	-	-	6666		100	
	88	21	3	-	-	-	-	1	-	-	25	-	-	-	1666		25	
	95	84	-	-	-	-	-	-	-	-	84	-	-	-	1680		84	
Y	82	22	-	-	-	-	-	-	-	-	22	-	-	-	1466		22	
	88	40	25	3	-	-	-	2	-	-	70	-	-	-	4666		70	
	95	102	-	-	1	-	-	-	-	-	102	-	1	-	2060		103	
M	82	48	-	-	-	-	-	-	-	-	48	-	-	-	3200	29	29	48
	88	11	12	11	-	-	-	-	-	-	34	-	-	-	2266	27	24	34
	95	96	44	1	-	-	-	-	-	-	140	-	1	-	2820	30	35	141
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	4	3	-	-	2	-	-	-	12	-	-	-	800		12	
	95	7	7	1	-	-	-	-	-	-	14	-	1	-	300		15	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	720		36	
Total Plants/Acre (excluding Dead & Seedlings)												'82	4666	Dec:	0%			
												'88	7732		10%			
												'95	5180		5%			
<i>Ceratoides lanata</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	3	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	100		20%			

A G E	YR	Form Class (No. of 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 depressus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	13	7	-	-	-	-	1	-	-	20	-	-	1	1400		21	
	95	18	-	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	82	175	-	-	-	-	-	-	-	-	175	-	-	-	11666	3 8	175	
	88	24	2	-	-	-	-	-	-	-	26	-	-	-	1733	4 5	26	
	95	266	-	-	-	-	-	-	-	-	266	-	-	-	5320	5 8	266	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	3	2	1	-	-	-	1	-	1	6	-	1	1	533		8	
	95	5	-	-	-	-	-	-	-	-	3	-	-	2	100		5	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'82	11666	Dec:	0%			
												'88	3666		14%			
												'95	5780		1%			
<i>Chrysothamnus viscidiflorus viscidiflorus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	48	-	-	1	-	-	-	-	-	49	-	-	-	980		49	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	85	-	-	1	-	-	-	-	-	86	-	-	-	1720	9 11	86	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	2700		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	24	-	-	-	-	-	-	-	-	24	-	-	-	480	6 7	24	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	500		-			
<i>Juniperus osteosperma</i>																		
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	66		-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Peraphyllum ramosissimum</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	31	28	2
	88	1	1	1	-	1	-	-	-	-	4	-	-	-	266	26	25	4
	95	4	5	1	-	-	-	-	-	-	10	-	-	-	200	24	30	10
D	82	5	-	-	-	-	-	-	-	-	2	3	-	-	333		5	
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	466	Dec:	71%			
												'88	598		11%			
												'95	220		0%			
<i>Purshia tridentata</i>																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	20	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
<i>Symphoricarpos oreophilus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	6	-	-	-	-	-	3	-	-	9	-	-	-	600		9	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	3	-	-	-	-	-	-	-	-	3	-	-	-	200	8	12	3
	88	-	3	-	-	-	-	-	-	-	2	-	1	-	200	20	12	3
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	10	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	200	Dec:	-			
												'88	800		-			
												'95	20		-			
<i>Tetradymia canescens</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	1	-	-	-	-	-	-	4	-	-	-	80	7	13	4
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	120		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 16A, Study no: 4

Species	Percent of Total		
	'82	'88	'95
<i>Amelanchier alnifolia</i>	.38	.51	0
<i>Artemisia tridentata</i> <i>vaseyana</i>	27	60	35
<i>Ceratoides lanata</i>	0	0	.68
<i>Chrysothamnus depressus</i>	68	28	40
<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	0	0	18
<i>Gutierrezia sarothrae</i>	0	0	3
<i>Juniperus osteosperma</i>	.38	.51	0
<i>Peraphyllum ramosissimum</i>	3	5	2
<i>Purshia tridentata</i>	0	0	0
<i>Symphoricarpos oreophilus</i>	1	6	.13
<i>Tetradymia canescens</i>	0	0	.82

TREND STUDY 16A-5-95

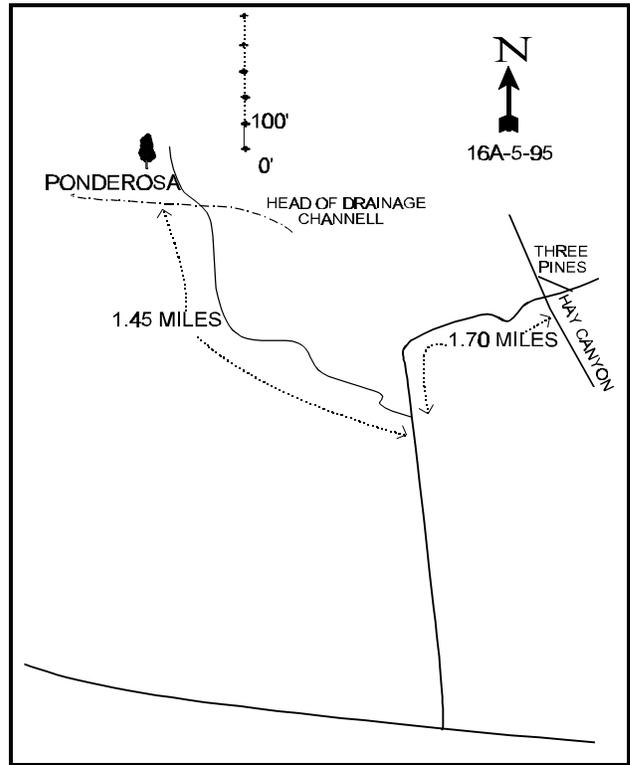
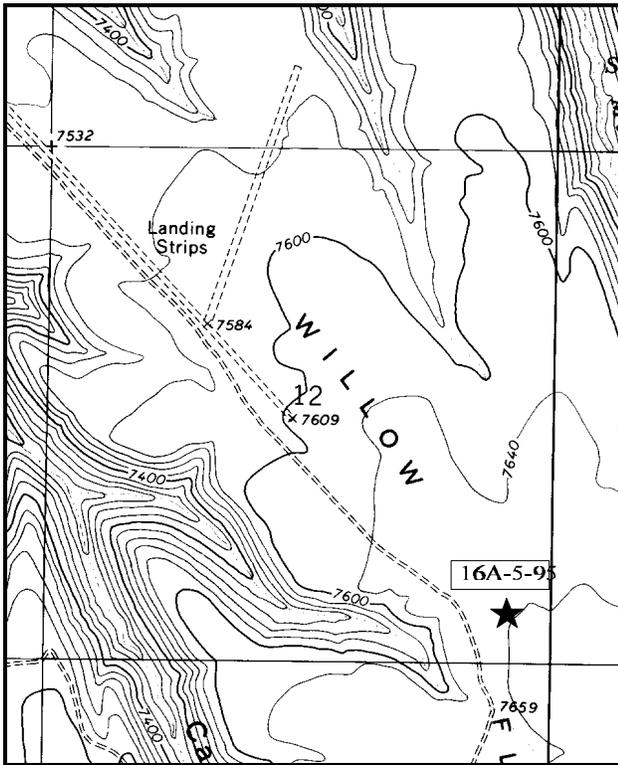
Study site name: Willow Flat. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 6 degrees.

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

LOCATION DESCRIPTION

From the intersection of the Seep Ridge and Book Cliff Divide road, proceed west along the divide for 9.4 miles to the major Three Pines - Hay Canyon intersection. Continue straight for 1.7 miles to a road to the right to Willow Flat. Turn right here and go 1.45 miles until you see a large ponderosa pine (with other conifers at the head of a small canyon)~ on the left side of the road. From the ponderosa, the 0-foot baseline stake is 160 paces away bearing 73° true. The frequency baseline is marked by green steel fenceposts, 12 to 18 inches in height.



Map Name: Cedar Camp Canyon

Diagrammatic Sketch

Township 16S, Range 22E, Section 12

## DISCUSSION

### Trend Study No. 16A-5

This trend study is a similar site to that monitored by study number 16A-4, Wirefence Point. This trend study samples a sprayed area of state land in Willow Flat. The area is used by deer, elk and livestock during the summer. Pellet group frequency data suggest that elk use this area more heavily than the Wirefence point site. Elevation is 7,700 feet and terrain is nearly level.

At the time of initial study establishment, there was a high percentage of dead sagebrush from the original spraying treatment, especially along the baseline. But, with the death of many adult plants, there were many "safe sites" for establishment as evidenced by a very large number of sagebrush seedlings (5,200 per/acre) in 1982. Density was estimated at 2,533 plants/acre, with 87% of which were mature. Estimated density increased dramatically by 1988, however the percentage of mature plants in the population declined to only 8%, with the percentage of young increasing to more than 90%. Estimated sagebrush cover in 1988 ranged from 3 to 13%, depending on the extent of the kill, with an overall average cover of 8%. During the 1995 reading there were an estimated 8,840 plants/acre, 43% of which were classified as young. The number of mature plants increased to 56% of the population, indicating a more stable population. Percent decadency continues to be low and vigor is generally good. Use has been mostly light since 1982 with only 15% of the mature sagebrush displaying moderate use in 1995.

Dwarf rabbitbrush is also abundant. These short prostrate shrubs have declined from a high of 10,599 plants/acre in 1982 to 5,400 in 1995. Use has been light to moderate in the past, but currently they don't appear to be utilized. This large change in density could be because of the much larger sample size and better sample distribution, especially for species that have discontinuous and/or clumped distributions. Other browse encountered on the site include rubber rabbitbrush, low rabbitbrush, broom snakeweed, snowberry, and gray horsebrush.

Seven species of perennial grasses were identified in 1995, providing only 34% of the herbaceous cover. Forbs are more numerous and diverse with 30 perennial and 4 annual species providing the remaining 66% of the herbaceous cover. Combined, grasses and forbs provide 51% of the total vegetative cover on the site. The grass composition is dominated by prairie junegrass, muttongrass, and Sandberg bluegrass. Dominate forbs include rose pussytoes, eaton fleabane, silver lupine, and desert phlox.

### 1982 APPARENT TREND ASSESSMENT

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

### 1988 TREND ASSESSMENT

Basal vegetative cover increased in 1988 which is consistent with the change in the herbaceous understory composition. Vegetative basal cover was calculated to be 17% in 1988, which is a significant increase over the 7.5% cover found in 1982. Percent litter cover declined slightly, but percent bare ground stayed about the same. Trend for soil is slightly up with the increase in frequency of grasses and forbs. The browse trend is up for the key species mountain big sagebrush. The number of mature shrubs actually declined from 2,200 plants/acre

to 1,400. However, the number of young increased from 333 plants/acre to 15,200 indicating a young expanding population. Dwarf and low rabbitbrush populations follow the same general trend. Trend for herbaceous species is up. Quadrat frequency of grass and forbs doubled since 1982.

TREND ASSESSMENT

soil - slightly up

browse - up with abundant seedlings and young

herbaceous understory - up

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable

browse - up

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

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover % '95
		'88	'95	'82	'88	'95	
G	Agropyron smithii	195	*131	50	73	59	.78
G	Carex spp.	52	*11	2	26	6	.05
G	Koeleria cristata	159	*115	55	65	42	1.95
G	Poa fendleriana	126	135	40	47	50	1.93
G	Poa pratensis	-	1	-	-	1	.00
G	Poa secunda	142	*120	-	57	44	1.89
G	Stipa comata	73	*75	1	32	26	.60
Total for Grasses		747	588	148	300	228	7.23
F	Agoseris glauca	-	*6	-	-	4	.02
F	Allium spp.	-	2	-	-	1	.00
F	Antennaria rosea	203	*163	45	73	63	4.20
F	Androsace septentrionalis	-	79	-	-	37	.23
F	Arabis drummondii	-	*10	-	-	5	.02
F	Astragalus convallarius	5	*15	-	3	7	.18
F	Astragalus tenellus	-	*8	2	-	3	.16

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
F	Aster spp.	92	*77	10	30	29	.87
F	Astragalus spp.	12	*23	4	9	10	.44
F	Castilleja flava	58	*85	-	31	38	.63
F	Carduus nutans	-	17	-	-	6	.03
F	Crepis acuminata	-	*37	-	-	16	.28
F	Cruciferae	-	3	-	-	2	.01
F	Cryptantha spp.	57	-	4	29	-	-
F	Delphinium bicolor	-	*61	-	-	33	.19
F	Eriogonum alatum	-	*14	4	-	7	.08
F	Erigeron eatonii	145	*84	47	66	37	1.25
F	Eriogonum racemosum	1	-	-	1	-	-
F	Eriogonum umbellatum	18	24	-	12	15	.39
F	Ipomopsis aggregata	1	5	-	1	3	.06
F	Lesquerella ludoviciana	19	62	12	10	25	.83
F	Linum lewisii	7	*5	-	4	3	.04
F	Lomatium spp.	-	6	-	-	2	.01
F	Lupinus argenteus	49	*60	5	26	30	1.40
F	Machaeranthera spp.	-	-	8	-	-	-
F	Orthocarpus spp.	-	1	-	-	1	.00
F	Penstemon caespitosus	3	3	2	1	3	.09
F	Penstemon spp.	15	6	-	6	2	.04
F	Phlox austromontana	52	*60	15	22	25	1.10
F	Phlox longifolia	44	*50	2	24	25	.18
F	Polygonum douglasii	-	227	-	-	77	.80
F	Potentilla gracilis	-	3	-	-	2	.18
F	Senecio integerrimus	-	*29	-	-	14	.07
F	Sedum lanceolatum	4	5	-	1	2	.03
F	Senecio multilobatus	-	*5	-	-	3	.01
F	Sphaeralcea coccinea	7	*2	3	3	1	.00
F	Taraxacum officinale	20	*12	1	12	5	.42
Total for Forbs		812	1249	164	364	536	14.32
B	Artemisia tridentata vaseyana	95	140	32	40	64	16.11
B	Chrysothamnus depressus	59	76	36	33	37	3.34
B	Chrysothamnus viscidiflorus	23	2	4	12	2	.02
B	Echinocereus spp.	-	1	1	-	1	.00
B	Echinocactus spp.	2	-	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency			Average Cover %
		'88	'95	'82	'88	'95	
B	Gutierrezia sarothrae	6	5	-	2	3	.21
B	Juniperus osteosperma	-	-	1	-	-	.48
B	Peraphyllum ramosissimum	3	-	-	2	-	-
B	Symphoricarpos oreophilus	-	3	-	-	1	.38
Total for Browse		188	227	74	90	108	20.54

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 16A, Study no: 5

Cover Type	Nested Frequency	Average Cover %		
		'82	'88	'95
Vegetation	360	7.50	16.75	40.15
Rock	68	0	0	.66
Pavement	99	0	0	.34
Litter	389	53.50	46.75	34.04
Cryptograms	157	.75	1.50	3.01
Bare Ground	327	38.25	35.00	34.59

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 5

Type	Quadrat Frequency
	'95
Rabbit	3
Elk	14
Deer	7

BROWSE CHARACTERISTICS --  
Herd unit 16A, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	82	78	-	-	-	-	-	-	-	-	78	-	-	-	5200		78	
	88	20	-	-	-	-	-	-	-	-	20	-	-	-	1333		20	
	95	68	-	-	13	-	-	-	-	-	81	-	-	-	1620		81	
Y	82	5	-	-	-	-	-	-	-	5	-	-	-	333		5		
	88	210	6	-	2	-	-	10	-	225	-	3	-	15200		228		
	95	189	-	-	2	-	-	-	-	191	-	-	-	3820		191		
M	82	23	10	-	-	-	-	-	-	33	-	-	-	2200	24	17	33	
	88	17	4	-	-	-	-	-	-	21	-	-	-	1400	30	22	21	
	95	209	37	-	-	-	-	-	-	246	-	-	-	4920	25	28	246	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	3	-	-	-	-	-	-	-	3	-	-	-	200		3		
	95	2	1	2	-	-	-	-	-	4	-	-	1	100		5		
X	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	-	-	-	-	-	-	-	-	-	-	-	260		13		
Total Plants/Acre (excluding Dead & Seedlings)											'82	2533	Dec:	0%				
											'88	16800		1%				
											'95	8840		1%				
<i>Chrysothamnus depressus</i>																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	8	-	-	-	-	-	-	-	8	-	-	-	533		8		
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Y	82	13	-	-	-	-	-	-	-	13	-	-	-	866		13		
	88	55	12	-	1	-	-	1	-	69	-	-	-	4600		69		
	95	34	-	-	-	-	-	-	-	34	-	-	-	680		34		
M	82	119	22	5	-	-	-	-	-	146	-	-	-	9733	4	9	146	
	88	11	20	14	1	1	-	-	-	45	-	2	-	3133	4	6	47	
	95	227	-	-	8	-	-	-	-	235	-	-	-	4700	5	7	235	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	13	6	9	-	-	-	-	-	20	-	6	2	1866		28		
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
X	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	-	-	-	-	-	-	-	-	-	-	-	60		3		
Total Plants/Acre (excluding Dead & Seedlings)											'82	10599	Dec:	0%				
											'88	9599		19%				
											'95	5400		0%				
<i>Chrysothamnus nauseosus</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
Total Plants/Acre (excluding Dead & Seedlings)											'82	0	Dec:	-				
											'88	0		-				
											'95	20		-				

A G E	YR	Form Class (No. of 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>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	2	4	-	1	-	-	-	-	-	7	-	-	-	466		7	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	82	8	10	-	-	-	-	-	-	-	17	1	-	-	1200	9	12	18
	88	-	-	3	-	-	-	-	-	-	3	-	-	-	200	8	6	3
	95	23	-	-	-	-	-	-	-	-	23	-	-	-	460	8	11	23
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	1	-	1	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	1200	Dec:	0%			
												'88	799		16%			
												'95	500		0%			
<i>Echinocereus spp.</i>																		
M	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66	1	2	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	-			
												'88	0		-			
												'95	20		-			
<i>Gutierrezia sarothrae</i>																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	5	1	2
	95	15	-	-	-	-	-	-	-	-	15	-	-	-	300	6	7	15
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	133		-			
												'95	360		-			
<i>Peraphyllum ramosissimum</i>																		
M	82	2	-	-	-	-	-	-	-	-	2	-	-	-	133	30	32	2
	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66	28	37	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	21	0
Total Plants/Acre (excluding Dead & Seedlings)												'82	133	Dec:	-			
												'88	66		-			
												'95	0		-			
<i>Symphoricarpos oreophilus</i>																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	35	1
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
D	'82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'88	-	-	1	-	-	-	-	-	-	-	-	-	1	66		1	
	'95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	66		100%			
												'95	0		0%			

PERCENT BROWSE COMPOSITION--

Herd unit 16A, Study no: 5

Species	Percent of Total		
	'82	'88	'95
Artemisia tridentata vaseyana	17	61	58
Chrysothamnus depressus	73	35	36
Chrysothamnus nauseosus	0	0	.13
Chrysothamnus viscidiflorus	8	3	3
Echinocereus spp.	.45	0	.13
Gutierrezia sarothrae	0	.48	2
Peraphyllum ramosissimum	.91	.24	0
Symphoricarpos oreophilus	0	0	.13
Tetradymia canescens	0	.24	0

TREND STUDY 16A-6-95

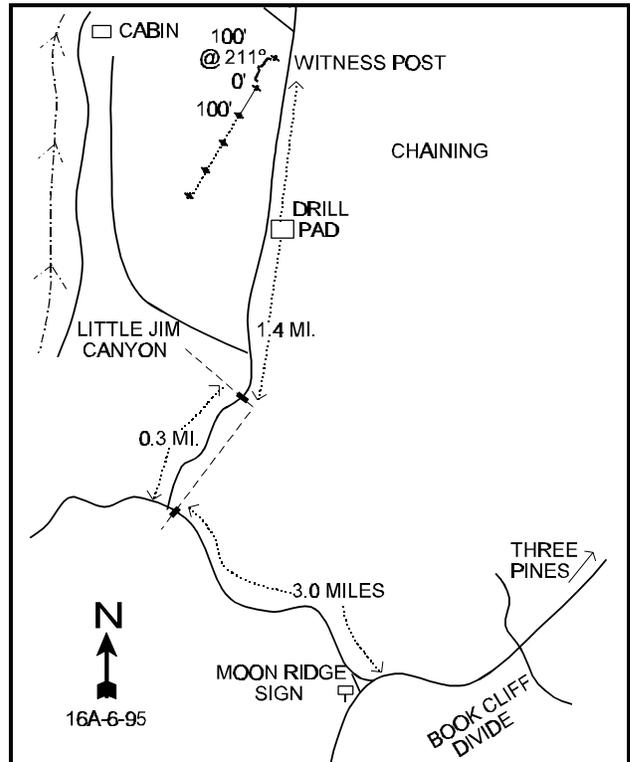
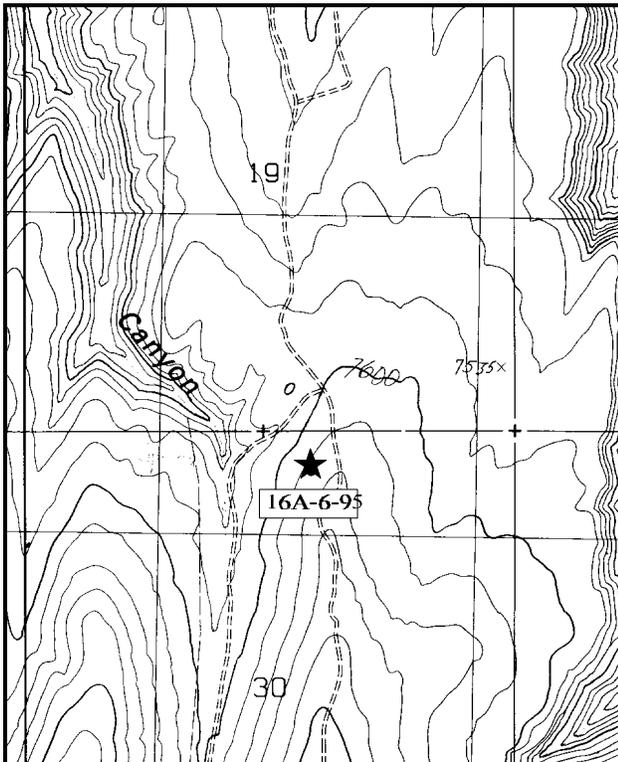
Study site name: Little Jim Canyon. Range type: Chained, Seeded PJ.

Compass bearing: frequency baseline 219 degrees.

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

LOCATION DESCRIPTION

From Three Pines, proceed southwest along the divide road for about 10.5 miles to a major junction at Moon Ridge. Bear right here, and go 3 miles to a cattleguard. Just past the cattleguard and fence, turn right and drive down along the fence .3 miles to a gate. Stay to the left, and continue down the ridge 1.4 miles to the witness post on the left. From the witness post, the 0-foot baseline stake is 100 feet bearing 211° into the chaining. The frequency baseline is marked by 2-foot tall green fenceposts.



Map Name: Tenmile Canyon North

Diagrammatic Sketch

Township 16S, Range 22E, Section 30 UTM COOR. 6-26-411E 12 43-61-159N

## DISCUSSION

### Trend Study No. 16A-6

The chained and seeded area on the ridge east of Little Jim Canyon is now occupied by a good stand of mixed mountain brush. This is part of a large block of land under the management of State Lands and Forestry. It is grazed by cattle from June through September on a rotation deferred system. This area is especially important for early winter deer use and longer season of use for elk. Pellet group quadrat frequency data indicate little big game use of the site in 1995.

The study is located at 7,700 feet, on a south-west, moderately steep facing slope (about 15%). In the bottom of the canyon, an intermittent stream has cut a deep channel. There are no gullies at the study site near the top of the ridge, yet there is evidence of substantial run-off and a heavy concentration of pavement in the open areas. The slope is broken by thick clumps of brush and piles of debris. Due to the depleted understory, the loose surface soil is exposed to erosion. The surface horizon is a gravelly loam and appears to be moderately deep.

The key browse species would include snowberry, basin big sagebrush, true mountain mahogany, and white-stemmed rabbitbrush. The most preferred species would be true mountain mahogany which averaged about four feet in height and was largely available. There were an estimated 866 mature plants/acre in 1988, 44% of which were heavily utilized. Seedlings were found in the protection of the larger plants with 31% of the population consisting of young plants. The current years growth appeared often to be fully utilized, but the plants generally had normal vigor and seed production. During the 1995 reading there were an estimated 440 plants/acre, 86% of which were mature. This population change can be explained mostly by the greatly increased sample size and much better sampling design. This design gives better population estimates when sampling populations that are discontinuous and/or clumped in their respective distributions. No seedlings were encountered and young plants number only 40 plants/acre. Utilization of mahogany was considered light to moderate.

Young pinyon and juniper trees are scattered throughout the chaining. Point-center quarter data estimated 174 pinyon and 49 juniper trees/acre. Average diameter of juniper was only 5.2 inches while that of pinyon was 1.7 inches. Twenty-seven percent of the pinyon trees sampled were tipped mature surviving trees which would indicate that it was chained only one-way or the configuration (too much distance between the crawler tractors) of the chain was not done properly, or the chain was too light.

Other preferred browse include mostly unutilized snowberry, basin big sagebrush, antelope bitterbrush, and rubber rabbitbrush.

Grass and forb density is low for a treated area at this elevation. Grasses and forbs make up only 24% of the total vegetative cover. Identification of grasses was very difficult in 1988, due to a lack of seed heads after heavy grazing by cattle. Native species appear to be the most common, namely bottlebrush squirreltail and Indian ricegrass, however annual cheatgrass is currently the most abundant grass. Forbs provide little forage and species richness is low compared to similar communities in other areas.

### 1988 APPARENT TREND ASSESSMENT

The rather sparse understory accounts for the low level of basal vegetative cover on the site, only 4%. Shrubs and trees provide 76% of the total vegetative cover. Litter is found associated with heavy browse stands. The open areas have

a nearly complete covering of pavement, 34.5% of the ground cover. Exposed soil is quickly eroded away and only 6% of the surface is bare soil. Trend for soil appears stable due to the nearly complete protective ground cover of litter and pavement. The key browse species, mountain mahogany, appears to have a stable population with adequate numbers of seedlings and young. The herbaceous understory is lacking and will likely decline as shrubs and trees become more dominant.

1995 TREND ASSESSMENT

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

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

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

TREND ASSESSMENT

soil - stable, but poor with high %cover for rock and pavement

browse - stable to slightly down for key species

herbaceous understory - down, contributing very little protective cover

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 6

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Bromus tectorum	-	70	-	25	1.61
G	Carex spp.	34	*19	19	9	.41
G	Elymus junceus	1	5	1	2	.53
G	Oryzopsis hymenoides	85	*37	39	17	1.33
G	Orzyopsis micrantha	73	*26	31	10	.20
G	Poa fendleriana	-	3	-	1	.03
G	Poa pratensis	-	4	-	2	.03
G	Sitanion hystrix	139	*53	59	23	.67
Total for Grasses		332	217	149	89	4.83

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Arabis spp.	22	*15	11	5	.02
F	Aster chilensis	1	-	1	-	-
F	Chaenactis douglasii	6	1	3	1	.00
F	Cryptantha spp.	8	*3	4	2	.01
F	Delphinium bicolor	-	1	-	1	.00
F	Descurainia spp.	-	66	-	27	1.54
F	Draba spp.	-	20	-	9	.09
F	Erigeron pumilus	4	1	2	1	.00
F	Gilia latifolia	-	11	-	5	.16
F	Lappula occidentalis	-	45	-	20	.15
F	Machaeranthera canescens	6	*-	3	-	-
F	Machaeranthera grindelioides	45	*15	24	8	.61
F	Melilotus alba	-	*7	-	3	.04
F	Penstemon palmeri	111	*-	52	-	-
F	Phlox longifolia	2	-	1	-	-
F	Physaria newberryi	30	*29	14	13	.06
F	Polygonum douglasii	-	5	-	2	.01
F	Senecio multilobatus	-	*22	-	10	.05
F	Unknown forb-perennial	3	-	1	-	-
Total for Forbs		238	241	116	107	2.78
B	Artemisia tridentata tridentata	14	*3	7	2	3.57
B	Cercocarpus montanus	17	*10	8	5	3.30
B	Chrysothamnus nauseosus albicaulis	22	*20	13	7	2.01
B	Gutierrezia sarothrae	10	*3	4	1	.00
B	Juniperus osteosperma	-	1	-	1	2.32
B	Mahonia repens	-	4	-	1	1.41
B	Opuntia spp.	4	5	3	3	.56
B	Pinus edulis	-	4	-	2	1.73
B	Purshia tridentata	-	1	-	1	.15
B	Quercus gambelii	-	*4	-	3	1.22
B	Ribes cereum cereum	-	*6	-	3	1.66
B	Symphoricarpos oreophilus	41	*21	18	10	6.42
Total for Browse		108	82	53	39	24.38

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

BASIC COVER --

Herd unit 16A, Study no: 6

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	285	3.75	33.42
Rock	150	2.50	3.23
Pavement	230	34.50	19.30
Litter	380	53.25	49.20
Cryptograms	7	0	.64
Bare Ground	157	6.00	3.25

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 6

Type	Quadrat Frequency '95
Rabbit	9
Elk	4
Deer	3

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 6

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	10	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Artemisia tridentata tridentata</i>																		
Y	88	3	-	-	1	-	-	1	-	-	5	-	-	-	333			5
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	17	-	-	1	-	-	-	-	-	18	-	-	-	360	22	27	18
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'88	333	Dec:	0%			
												'95	420		4%			

A G E	YR	Form Class (No. of 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>Cercocarpus montanus</i>																		
S	88	-	-	-	-	-	-	7	-	-	7	-	-	-	466		7	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	-	-	3	1	-	-	-	-	-	4	-	-	-	266		4	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	1	4	1	-	-	-	3	-	8	-	1	-	600	58 39	9	
	95	16	3	-	-	-	-	-	-	-	19	-	-	-	380	47 44	19	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	866	Dec:	0%			
												'95	440		4%			
<i>Chrysothamnus nauseosus albicaulis</i>																		
Y	88	2	1	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66	31 10	1	
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240	25 33	12	
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	332	Dec:	19%			
												'95	340		11%			
<i>Chrysothamnus viscidiflorus</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	1	-	-	-	-	1	-	-	-	20	22 23	1	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
<i>Juniperus osteosperma (chained)</i>																		
M	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	69 295	2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	133	Dec:	-			
												'95	0		-			
<i>Mahonia repens</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	20	-	-	-	-	-	22	-	-	-	440		22	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	20	-	-	50	-	-	-	-	-	70	-	-	-	1400	3 7	70	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	1840		-			

A G E	YR	Form Class (No. of 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</i> spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	15	4
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	0%			
												'95	120		33%			
<i>Pinus edulis</i>																		
S	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	2	-	-	-	-	-	1	-	-	3	-	-	-	200			3
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'88	200	Dec:	-			
												'95	40		-			
<i>Purshia tridentata</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	27	44	1
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	20		-			
<i>Quercus gambelii</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	15	31	3
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
<i>Ribes cereum cereum</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	36	48	4
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	80		-			
<i>Symphoricarpos oreophilus</i>																		
S	88	2	-	-	-	-	-	1	-	-	3	-	-	-	200			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	12	3	-	4	-	-	3	-	-	20	-	2	-	1466			22
	95	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
M	88	13	-	-	9	-	-	-	-	-	16	-	6	-	1466	35	38	22
	95	48	-	-	3	2	-	-	-	-	53	-	-	-	1060	22	42	53
D	88	3	-	-	-	-	-	-	-	-	1	-	2	-	200			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'88	3132	Dec:	6%			
												'95	1340		0%			

PERCENT BROWSE COMPOSITION--  
Herd unit 16A, Study no: 6

Species	Percent of Total	
	'88	'95
<i>Artemisia frigida</i>	0	.41
<i>Artemisia tridentata</i> <i>tridentata</i>	7	9
<i>Cercocarpus montanus</i>	17	9
<i>Chrysothamnus</i> <i>nauseosus albicaulis</i>	7	7
<i>Chrysothamnus</i> <i>viscidiflorus</i>	0	1
<i>Juniperus osteosperma</i> (chained)	3	0
<i>Mahonia repens</i>	0	38
<i>Opuntia</i> spp.	0	3
<i>Pinus edulis</i>	4	.83
<i>Purshia tridentata</i>	0	.41
<i>Quercus gambelii</i>	0	1
<i>Ribes cereum cereum</i>	0	2
<i>Symphoricarpos</i> <i>oreophilus</i>	63	28

TREND STUDY 16A-7-95

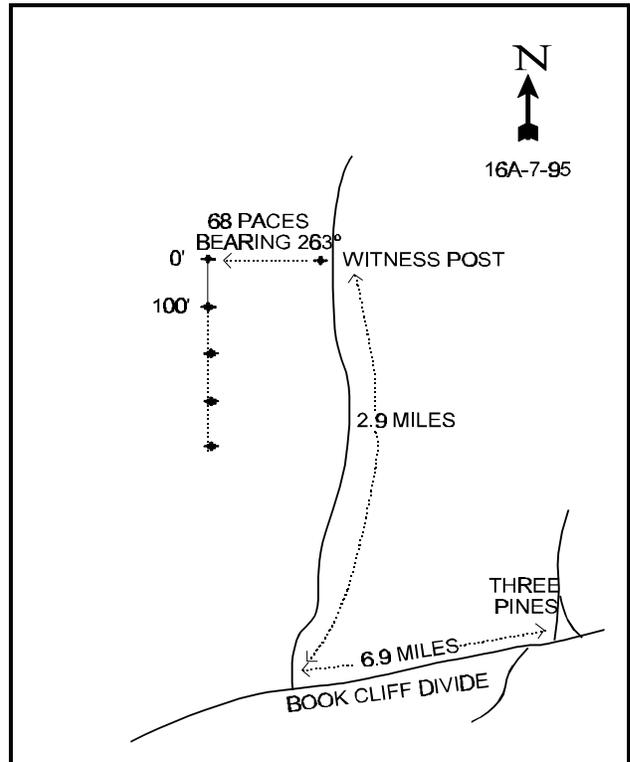
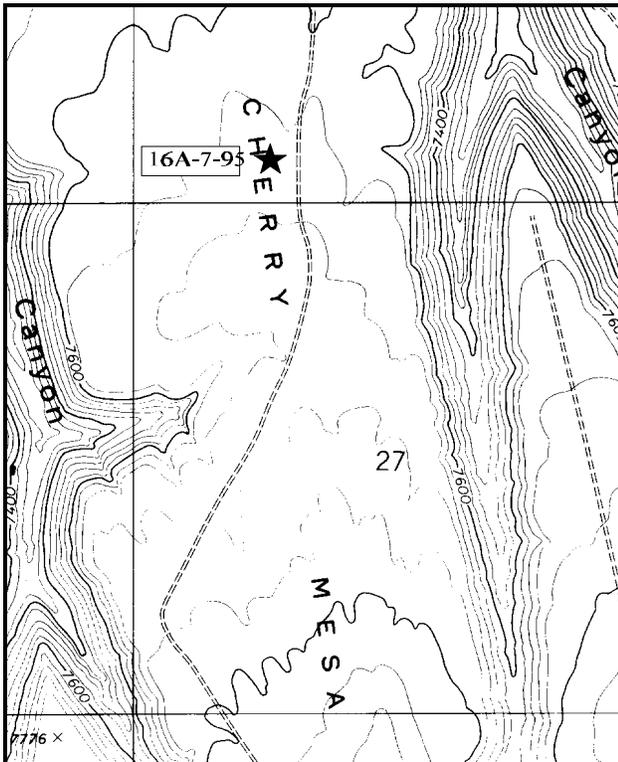
Study site name: Cherry Mesa. Range type: Chained, Seeded PJ.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the major intersection at Three Pines, continue southwest along the Book Cliff summit for 7.0 miles. Turn right off the main road onto the Cherry Mesa road. Go down through the spraying 2.9 miles to a witness post on the left side of the road. Stop, then walk westerly up the ridge, 68 paces to the 0-foot baseline stake. It is marked by browse tag #9097. The rest of the 18" green fenceposts marking the study are found to the south at 100 foot intervals.



Map Name: Cedar Camp Canyon

Diagrammatic Sketch

Township 16S, Range 22E, Section 22 UTM COOR. 6-30-647E 12 43-61-500N

## DISCUSSION

### Trend Study No. 16A-7

The trend study on Cherry Mesa samples a large pinyon-juniper chaining on the large block of state land. Cattle graze this area on a rotational deferred system from June through September. Water is a limiting factor on this mesa. There was fresh deer sign, and also evidence of winter use during the 1988 reading and elk were seen in the general area at the time of study establishment. Pellet group frequency data from 1995 indicate few deer or elk on the site.

Elevation at the site is 7,650 feet with a northerly aspect on a long, gentle slope. The fine-textured, sandy loam soil is moderately shallow, or at least compacted in the lower horizons. The surface horizon is gravelly. There is a fair amount of litter associated with the plants and also debris and organic matter from the chaining. Many plants are slightly pedestalled and there was obvious soil movement after the last rainstorm, but erosion is not serious.

Mountain big sagebrush is the dominant key species on the site. It averaged 13% cover in 1988 and 10% in 1995. There were an estimated 1,867 mature and 4,400 young plants/acre in 1988. Percent decadency was low at 3% and vigor was generally good. Utilization of the sagebrush was light to moderate with a few individuals displaying heavy use (1%). In 1995 the population declined overall due to a reduced number of young being encountered (4,400 to 1,540). The number of mature plants actually increased to 2,620 plants/acre. Much of this change in population is associated with the greatly increased sample size and much better sampling distribution providing a considerably more reliable estimates for shrub density. Percent decadency is now very low and vigor good with light to moderate use. Some of the sagebrush had characteristics of basin big sagebrush, indicating possible hybridization between the two subspecies.

The small dwarf rabbitbrush is also fairly numerous with light to moderate use. Preferred species like bitterbrush and true mountain mahogany are scattered throughout the site in low numbers. These species were heavily hedged in 1988, but currently show only light use. Tree density is estimated at 115 trees/acre, 24% pinyon and 76% juniper. Five percent of the juniper consist of old tipped but surviving trees from the chaining.

Grasses are not very abundant and are composed almost entirely of native species. The most abundant species include thickspike wheatgrass, prairie junegrass, and mutton grass which make up 74% of the total grass cover. Forbs are diverse and produce nearly as much cover as the grasses. Useful species are present in low numbers. The most abundant species includes; mat penstemon, desert phlox, and long leaf phlox, which provide little useable forage.

### 1988 APPARENT TREND ASSESSMENT

Although vegetative cover appears better on this site than at the previous site (#16A-6), basal vegetative cover is actually lower at 3.3%. Pavement (20%) constitutes a large portion of the highly variable ground surface. Litter covers an additional 65% of the ground surface leaving 11% bare ground. The key browse species, mountain big sagebrush, is vigorous and moderately utilized. A majority of the population consists of young plants (68%) and seedlings are common. Trend appears up. The herbaceous understory is diverse and fairly abundant. The most common grasses include thickspike wheatgrass, a sedge, and mutton grass.

1995 TREND ASSESSMENT

Basic ground cover characteristics have changed somewhat since 1988. Litter cover has declined from 65% to 41%. This is likely a reflection of the effects of extended drought combined with the decomposition of litter from the original churning. Percent bare ground declined slightly but not enough to warrant an improving trend. In addition, grasses and forbs only contribute 36% of the total vegetative cover. Therefore, trend for soil is considered stable. Trend for mountain big sagebrush is up slightly even though total density has declined. The number of mature plants has increased from 1,866 plants/acre to 2,620. The proportion of young plants declined from 68% to 37% but this is still more than adequate. Percent decadence is low and average height/crown measurements have increased considerably. However, this upward trend in the number of mature plants and increases in size could have a depressing effect on the herbaceous understory. Trend for the herbaceous understory is stable, but composition has changed since the last reading. Sum of nested frequency of grasses declined considerably while that of forbs increased. All perennial grasses encountered in 1988 have declined significantly.

TREND ASSESSMENT

soil - stable

browse - up for sagebrush

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

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 7

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	180	*158	69	54	1.16
G	Bouteloua gracilis	74	*54	27	22	.83
G	Bromus tectorum	-	2	-	1	.00
G	Carex spp.	139	*83	52	28	.39
G	Koeleria cristata	-	*80	-	31	1.11
G	Oryzopsis hymenoides	33	*11	15	4	.07
G	Poa fendleriana	116	*67	51	27	1.71
G	Sitanion hystrix	82	*16	42	7	.07
G	Stipa comata	79	*1	31	1	.00
Total for Grasses		703	472	287	175	5.36
F	Antennaria rosea	11	23	6	10	.10
F	Arabis spp.	29	*1	12	1	.03
F	Astragalus argophyllus	3	*32	1	17	.70
F	Aster spp.	12	*3	4	1	.00
F	Castilleja flava	9	*12	5	7	.16
F	Chaenactis douglasii	51	*20	25	8	.04
F	Comandra pallida	36	53	15	22	.38
F	Crepis acuminata	-	*53	-	24	.30

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Cryptantha spp.	3	6	1	4	.04
F	Delphinium bicolor	-	2	-	2	.01
F	Erigeron spp	47	*37	20	20	.30
F	Eriogonum umbellatum	19	*15	8	6	.22
F	Gayophytum ramosissimum	-	54	-	21	.42
F	Gilia spp.	-	111	-	40	.27
F	Lappula occidentalis	-	8	-	4	.02
F	Lesquerella spp.	50	*41	24	16	.19
F	Linum lewisii	2	-	1	-	-
F	Machaeranthera canescens	5	-	2	-	-
F	Machaeranthera grindelioides	10	*17	6	7	.37
F	Orthocarpus purpureo-albus	3	-	1	-	-
F	Penstemon caespitosus	3	26	2	10	.59
F	Penstemon pachyphyllus	-	1	-	1	.00
F	Phlox austromontana	-	*26	-	10	.29
F	Phlox longifolia	12	*104	6	43	.34
F	Polygonum douglasii	-	91	-	36	.25
F	Senecio multilobatus	3	3	2	2	.01
F	Tragopogon dubius	2	-	2	-	-
Total for Forbs		310	739	143	312	5.10
B	Artemisia tridentata vaseyana	50	*59	26	29	9.96
B	Cercocarpus montanus	-	-	-	-	.18
B	Chrysothamnus greenei	20	*38	9	19	1.00
B	Chrysothamnus viscidiflorus	9	-	4	-	-
B	Gutierrezia sarothrae	18	*4	11	2	.18
B	Juniperus osteosperma	-	-	-	-	.93
B	Opuntia spp.	-	3	-	1	.00
B	Pinus edulis	1	-	1	-	3.03
B	Purshia tridentata	14	*1	5	1	.03
B	Symphoricarpos oreophilus	51	*20	23	7	3.01
Total for Browse		163	125	79	59	18.37

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

BASIC COVER --

Herd unit 16A, Study no: 7

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	348	3.25	31.70
Rock	57	0	.88
Pavement	264	20.00	18.21
Litter	386	65.25	41.33
Cryptograms	24	.25	.20
Bare Ground	249	11.25	9.14

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 7

Type	Quadrat Frequency '95
Rabbit	12
Elk	4
Deer	4
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 7

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata vaseyana</i>																		
S	88	9	-	-	2	-	-	1	-	-	12	-	-	-	800		12	
	95	38	-	-	-	-	-	-	-	38	-	-	-	760		38		
Y	88	61	4	-	1	-	-	-	-	66	-	-	-	4400		66		
	95	76	-	-	1	-	-	-	-	77	-	-	-	1540		77		
M	88	14	13	1	-	-	-	-	-	26	1	1	-	1866	21	19	28	
	95	121	5	2	3	-	-	-	-	131	-	-	-	2620	26	31	131	
D	88	3	-	-	-	-	-	-	-	2	1	-	-	200		3		
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	-	-	-	-	-	-	-	-	-	-	-	-	20		1		
Total Plants/Acre (excluding Dead & Seedlings)											'88	6466	Dec:	3%				
											'95	4180		0%				
<i>Cercocarpus montanus</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	1	-	-	-	-	-	-	-	1	-	-	-	20		1		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	35	27	0	
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	20		-				

A G E	YR	Form Class (No. of 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 Greenei</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	88	6	1	-	1	-	-	-	-	-	8	-	-	-	533		8	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	45	16	-	1	-	-	2	-	-	64	-	-	-	4266	6 8	64	
	95	60	1	-	-	-	-	-	-	-	61	-	-	-	1220	6 13	61	
D	88	6	1	-	-	-	-	-	-	-	6	-	-	1	466		7	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
N	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	5265	Dec:	8%			
												'95	1300		4%			
<i>Chrysothamnus viscidiflorus</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7 8	2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17 25	0	
D	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	399	Dec:	33%			
												'95	0		0%			
<i>Gutierrezia sarothrae</i>																		
M	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	6 7	4	
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200	7 12	10	
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	-			
												'95	200		-			
<i>Juniperus osteosperma</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Opuntia spp.</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1 6	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	40		-			
<i>Purshia tridentata</i>																		
M	88	-	3	3	-	-	-	-	-	-	6	-	-	-	400	9 26	6	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	13 34	5	
Total Plants/Acre (excluding Dead & Seedlings)												'88	400	Dec:	-			
												'95	100		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Symphoricarpos oreophilus																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	20	2	-	1	-	-	-	-	-	-	-	-	23	460	20	34	23
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	500		-			

PERCENT BROWSE COMPOSITION--

Herd unit 16A, Study no: 7

Species	Percent of Total	
	'88	'95
Artemisia tridentata vaseyana	51	66
Cercocarpus montanus	0	.31
Chrysothamnus greenei	41	21
Chrysothamnus viscidiflorus	3	0
Gutierrezia sarothrae	2	3
Juniperus osteosperma	0	0
Opuntia spp.	0	.63
Purshia tridentata	3	2
Symphoricarpos oreophilus	0	8

TREND STUDY 16A-8-95

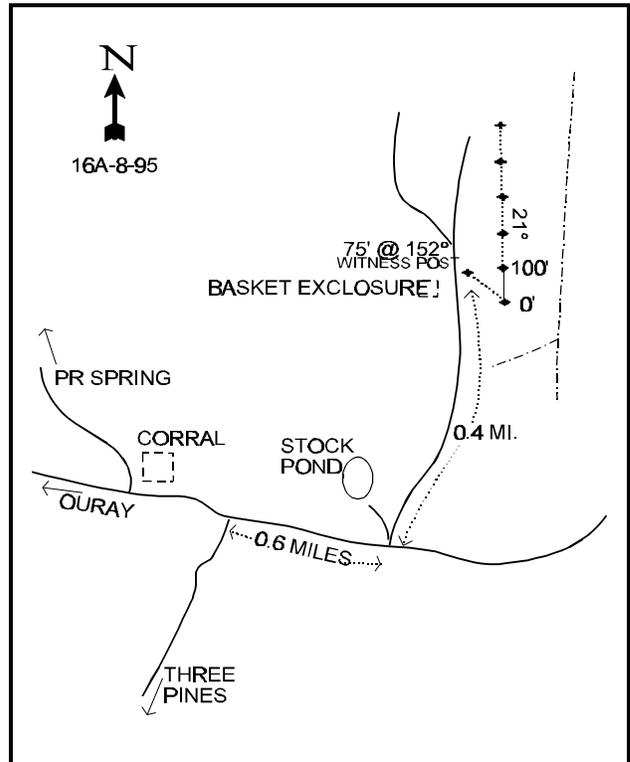
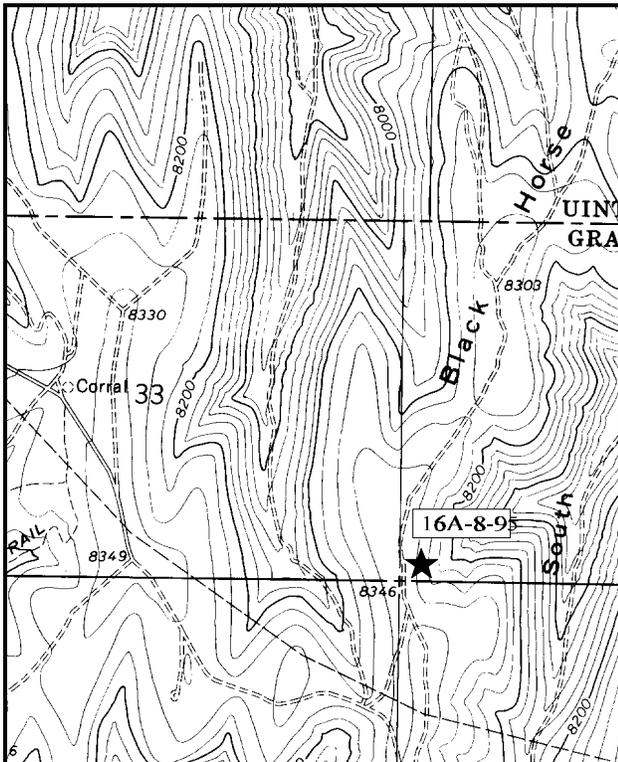
Study site name: Black Horse. Range type: Mixed Mountain Brush.

Compass bearing: frequency baseline 90 degrees.

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

LOCATION DESCRIPTION

At a point .6 miles southeast of the intersection of the Seep Ridge road and the Book Cliff Summit road, a road turns north off the divide road and heads up Black Horse Ridge. Go up this road .4 miles to a witness post on the right side of the road. The study site is on the east slope of the ridge. From the witness post, walk 75 feet bearing 152° to the 0-foot baseline stake. The baseline stake has browse tag #9039 attached. The frequency baseline runs down the slope. Study markers are 18" green metal fenceposts.



Map Name: PR Spring

Diagrammatic Sketch

Township 15 1/2S, Range 24E, Section 34 UTM COOR. 6-49-406E 12 43-68-587N

## DISCUSSION

### Trend Study No. 16A-8

The Black Horse trend study is located near the Book Cliffs summit in the mountain brush type which is used by deer as summer range. There are small stands of aspen and conifers in the drainages, but the dominant vegetation is scrub oak and associated mountain brush. Deer are commonly observed in the study area which is grazed by cattle. Cattle use is on a rotational deferred system, use can be anytime between June through September.

The study is just below the ridge, on an east-facing, moderately steep slope at an elevation of 8,300 feet. This is the highest elevation trend study on the unit.

The soils are in the Seeprid-Utso loam complex. These soils typically are moderately deep and well-drained. On the study site, there appears to be a compacted clay horizon under 4-6 inches of loose, stony surface loam. Limited run-off and pedestalling occurs in open grazed areas, but overall the vegetative cover is adequate to control excessive erosion. This soil is grouped into the Mountain Stony Loam (Browse) ecological site, indicating a potential plant community of 30% grass, 10% forbs and 60% shrubs (composition by air-dry weight).

The mixed mountain brush community is composed of a variety of valuable shrubs. Large serviceberry and clones of Gambel oak are the primary overstory species. Mature serviceberry average nearly 4 feet in height with some individuals over 5 feet tall. These shrubs are vigorous and the majority of the plants show only light to moderate hedging. The prevalence of rust on the leaves led to a poor vigor classification for 20% of the plants in 1988. Oak density changed since the last reading due to the much larger sample and better distribution used in 1995 which gives much better population estimates for species with clumped and/or discontinuous distributions. The base line was lengthened to give a more representative sample of the area. The average mature oak is nearly 5 feet in height, showing light to moderate hedging, and vigorous.

Preferred understory species include mountain big sagebrush, bitterbrush, true mountain mahogany, chokecherry, and snowberry. Of these species, mahogany and bitterbrush are the most heavily utilized. In 1988 only one mahogany was sampled. It was classified as decadent and heavily utilized. The new much larger sample design used in 1995, estimates an average of 1,140 mahogany/acre. The larger sampling design gives much better estimates for species with discontinuous and/or clumped distributions. Mature plants average nearly 4 feet in height and have good vigor. Heavy use was observed on 11% of the plants. Bitterbrush are uncommon, but these plants were also heavily hedged in 1988. Currently utilization is light.

Other common shrubs, snowberry and mountain big sagebrush, provide 33% and 24% of the browse cover respectively. These species were mostly unutilized in 1988, but during the 1995 reading, snowberry displayed some moderate to heavy use. The sagebrush plants are large and vigorous, but a majority were classified as decadent in 1988. Now, percent decadence is currently low at only 1%.

Since the area is primarily summer range, herbaceous forage is especially important. Abundance of grass species is rather low and all species were at least moderately utilized by cattle during the 1988 reading. The most numerous species are a sedge, thickspike wheatgrass, Kentucky bluegrass, and mutton grass. The sedge is especially abundant and accounts for 59% of the total grass cover in 1995.

Forbs comprise only 16% of the total vegetative cover. Twenty-eight species were

encountered in 1995. Astragalus spp. and ballhead sandwort are the most abundant forbs. Several valuable forb species occur on the site including Pacific aster, arrowleaf balsamroot, penstemon, Indian paintbrush, and sulfur buckwheat.

1988 APPARENT TREND ASSESSMENT

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

1995 TREND ASSESSMENT

Percent bare ground has declined considerably since the last reading from 22.5% to 11%. Soil trend is considered stable to slightly improving. The browse trend is up with many of the preferred species displaying lighter utilization, improved vigor, and low decadency rates. Density numbers for many of the shrubs are different due to the larger sample size giving much better population estimates for the shrubs. Trend for grasses and forbs is stable. Sum of nested frequency of grasses increased slightly with significant increases for Carex and Kentucky bluegrass. Sum of nested frequency of forbs remained about the same.

TREND ASSESSMENT

soil - stable to slightly improving

browse - up

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 8

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	108	*103	47	35	1.58
G	Bromus anomalus	71	67	30	24	.95
G	Bromus tectorum	-	3	-	1	.00
G	Carex spp.	215	*234	77	80	9.30
G	Koeleria cristata	-	3	-	1	.00
G	Poa fendleriana	35	*29	14	9	1.18
G	Poa pratensis	39	*54	16	18	1.74
G	Sitanion hystrix	3	13	1	7	.28
G	Stipa lettermani	4	23	2	11	.70
Total for Grasses		475	529	187	186	15.76
F	Achillea millefolium	15	44	6	17	.60
F	Agoseris glauca	-	3	-	1	.00
F	Androsace septentrionalis	-	1	-	1	.00

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	<i>Arenaria congesta</i>	141	*104	54	39	1.27
F	<i>Artemisia ludoviciana</i>	4	-	2	-	-
F	<i>Aster chilensis</i>	89	*51	38	22	.45
F	<i>Astragalus</i> spp.	78	*95	40	35	3.54
F	<i>Balsamorhiza sagittata</i>	79	*18	35	11	.73
F	<i>Calochortus flexuosus</i>	-	*3	-	3	.04
F	<i>Castilleja flava</i>	27	*6	15	3	.01
F	<i>Carduus nutans</i>	-	4	-	2	.01
F	<i>Chenopodium</i> spp.	-	3	-	1	.00
F	<i>Cirsium</i> spp.	28	*23	13	12	.41
F	<i>Comandra pallida</i>	120	*37	50	19	.17
F	<i>Collinsia parviflora</i>	-	4	-	2	.01
F	<i>Crepis acuminata</i>	3	*48	2	19	.26
F	<i>Delphinium bicolor</i>	-	8	-	4	.03
F	<i>Erigeron flagellaris</i>	53	*101	25	41	.67
F	<i>Eriogonum umbellatum</i>	20	36	11	17	.24
F	<i>Gayophytum ramosissimum</i>	-	8	-	3	.04
F	<i>Gilia</i> spp.	-	2	-	1	.00
F	<i>Haplopappus acaulis</i>	-	*8	-	3	.04
F	<i>Ipomopsis aggregata</i>	2	-	2	-	-
F	<i>Linum lewisii</i>	-	3	-	1	.01
F	<i>Lomatium</i> spp.	-	*7	-	4	.02
F	<i>Lupinus</i> spp.	3	11	1	5	.12
F	<i>Oenothera</i> spp.	2	-	1	-	-
F	<i>Penstemon caespitosus</i>	61	*51	28	23	.32
F	<i>Penstemon pachyphyllus</i>	3	6	1	3	.04
F	<i>Phlox longifolia</i>	37	41	17	20	.15
F	<i>Polygonum douglasii</i>	-	28	-	13	.14
F	<i>Senecio integerrimus</i>	-	3	-	2	.03
F	<i>Taraxacum officinale</i>	1	*36	1	18	.26
F	<i>Tragopogon dubius</i>	3	-	1	-	-
F	Unknown forb-annual	-	3	-	1	.00
F	Unknown forb-perennial	5	8	3	4	.04
F	<i>Vicia americana</i>	-	*14	-	6	.60
F	<i>Viguiera multiflora</i>	3	15	1	6	.13
Total for Forbs		777	833	347	362	10.49

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
B	Amelanchier alnifolia	50	*43	24	20	3.55
B	Artemisia tridentata vaseyana	24	16	11	9	9.49
B	Cercocarpus montanus	3	26	1	13	4.30
B	Chrysothamnus depressus	-	1	-	1	.01
B	Chrysothamnus viscidiflorus viscidiflorus	52	*77	27	34	3.51
B	Gutierrezia sarothrae	-	*6	-	4	.19
B	Mahonia repens	84	*50	36	21	1.05
B	Prunus virginiana	1	10	1	4	.51
B	Purshia tridentata	9	*4	5	2	.68
B	Quercus gambelii	59	*34	23	16	2.83
B	Rosa woodsii	-	2	-	1	.18
B	Symphoricarpos oreophilus	105	*114	46	51	13.24
B	Tetradymia canescens	-	-	-	-	.00
Total for Browse		387	383	174	176	39.60

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

BASIC COVER --

Herd unit 16A, Study no: 8

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	373	11.75	55.30
Rock	139	4.25	6.09
Pavement	51	6.00	.51
Litter	390	55.50	53.79
Cryptograms	9	0	.07
Bare Ground	176	22.50	10.82

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 8

Type	Quadrat Frequency '95
Rabbit	5
Deer	19
Cattle	6

BROWSE CHARACTERISTICS --  
Herd unit 16A, Study no: 8

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier alnifolia</i>																		
S	88	5	-	-	2	-	-	-	-	-	7	-	-	-	466		7	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	41	5	3	2	-	-	-	-	-	42	-	9	-	3400		51	
	95	32	4	-	25	17	-	-	-	-	78	-	-	-	1560		78	
M	88	-	-	1	-	-	-	-	-	-	-	-	1	-	66	54	55	
	95	21	9	2	3	4	-	-	-	-	39	-	-	-	780	44	34	
D	88	1	-	1	-	-	-	-	-	-	-	-	2	-	133		2	
	95	2	-	1	-	-	-	-	-	-	2	-	-	1	60		3	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'88	3599	Dec:	3%			
												'95	2400		2%			
<i>Artemisia tridentata vaseyana</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	12	1	-	-	-	-	-	-	-	13	-	-	-	260		13	
M	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466	34	31	
	95	33	10	-	1	-	-	-	-	-	42	-	2	-	880	29	40	
D	88	11	-	-	-	-	-	-	-	-	10	1	-	-	733		11	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'88	1332	Dec:	55%			
												'95	1160		1%			
<i>Cercocarpus montanus</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	12	7	-	2	-	-	-	-	-	21	-	-	-	420		21	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	4	23	4	2	1	-	-	-	2	36	-	-	-	720	44	49	
D	88	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	100%			
												'95	1140		0%			
<i>Chrysothamnus depressus</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	4	1	-	-	-	-	-	-	-	5	-	-	-	100	4	7	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	120		-			

A G E	YR	Form Class (No. of 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	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	95	66	-	-	-	-	-	-	-	-	66	-	-	-	1320		66	
M	88	43	-	-	1	-	-	-	-	-	44	-	-	-	2933	14 9	44	
	95	160	-	-	7	-	-	-	-	-	167	-	-	-	3340	12 14	167	
Total Plants/Acre (excluding Dead & Seedlings)												'88	4133	Dec:	-			
												'95	4660		-			
<i>Gutierrezia sarothrae</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200	6 7	10	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	300		-			
<i>Mahonia repens</i>																		
Y	88	24	-	-	-	-	-	1	-	-	25	-	-	-	1666		25	
	95	73	-	-	15	-	-	-	-	-	88	-	-	-	1760		88	
M	88	8	-	-	-	-	-	-	-	-	8	-	-	-	533	10 6	8	
	95	49	-	-	21	3	-	-	-	-	73	-	-	-	1460	3 5	73	
Total Plants/Acre (excluding Dead & Seedlings)												'88	2199	Dec:	-			
												'95	3220		-			
<i>Opuntia spp.</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5 9	3	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	60		-			
<i>Prunus virginiana</i>																		
Y	88	2	2	-	4	-	-	4	-	-	12	-	-	-	800		12	
	95	33	-	-	-	-	-	-	-	-	33	-	-	-	660		33	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	10 11	3	
Total Plants/Acre (excluding Dead & Seedlings)												'88	800	Dec:	-			
												'95	720		-			
<i>Purshia tridentata</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	2	-	-	-	-	-	-	2	-	-	-	133	7 15	2	
	95	3	-	-	1	-	-	-	-	-	4	-	-	-	80	8 23	4	
Total Plants/Acre (excluding Dead & Seedlings)												'88	199	Dec:	-			
												'95	80		-			

A G E	YR	Form Class (No. of 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	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	88	53	12	-	1	-	-	-	-	-	65	-	1	-	4400		66	
	95	9	-	1	-	-	-	-	-	-	10	-	-	-	200		10	
M	88	2	1	-	5	-	-	-	1	-	9	-	-	-	600	70 56	9	
	95	5	9	-	-	-	-	-	-	-	14	-	-	-	280	57 64	14	
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Total Plants/Acre (excluding Dead & Seedlings)											'88	5066	Dec:	1%				
											'95	480		0%				
<i>Rosa woodsii</i>																		
Y	88	16	-	-	-	-	-	-	-	-	15	-	1	-	1066		16	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	88	4	-	-	-	-	-	-	-	-	3	-	1	-	266	16 10	4	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7 5	1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	1332	Dec:	-				
											'95	40		-				
<i>Symphoricarpos oreophilus</i>																		
S	88	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
Y	88	63	-	-	1	-	-	-	-	-	41	-	23	-	4266		64	
	95	47	6	-	16	5	-	-	-	-	74	-	-	-	1480		74	
M	88	28	-	-	-	-	-	-	-	-	7	-	21	-	1866	15 12	28	
	95	157	17	2	23	1	-	-	-	-	200	-	-	-	4000	17 27	200	
D	88	2	-	-	-	-	-	-	-	-	-	-	2	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	6265	Dec:	2%				
											'95	5480		0%				
<i>Tetradymia canescens</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	2	-	-	1	1	-	-	-	-	4	-	-	-	80	14 12	4	
Total Plants/Acre (excluding Dead & Seedlings)											'88	66	Dec:	-				
											'95	80		-				

PERCENT BROWSE COMPOSITION--

Herd unit 16A, Study no: 8

Species	Percent of Total	
	'88	'95
<i>Amelanchier alnifolia</i>	14	12
<i>Artemisia tridentata</i> <i>vaseyana</i>	5	6
<i>Cercocarpus montanus</i>	.26	6
<i>Chrysothamnus depressus</i>	0	.60
<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	16	23
<i>Gutierrezia sarothrae</i>	0	2
<i>Mahonia repens</i>	9	16
<i>Opuntia</i> spp.	0	.30
<i>Prunus virginiana</i>	3	4
<i>Purshia tridentata</i>	.79	.40
<i>Quercus gambelii</i>	20	2
<i>Rosa woodsii</i>	5	.20
<i>Symphoricarpos oreophilus</i>	25	27
<i>Tetradymia canescens</i>	.26	.40

TREND STUDY 16A-9-95

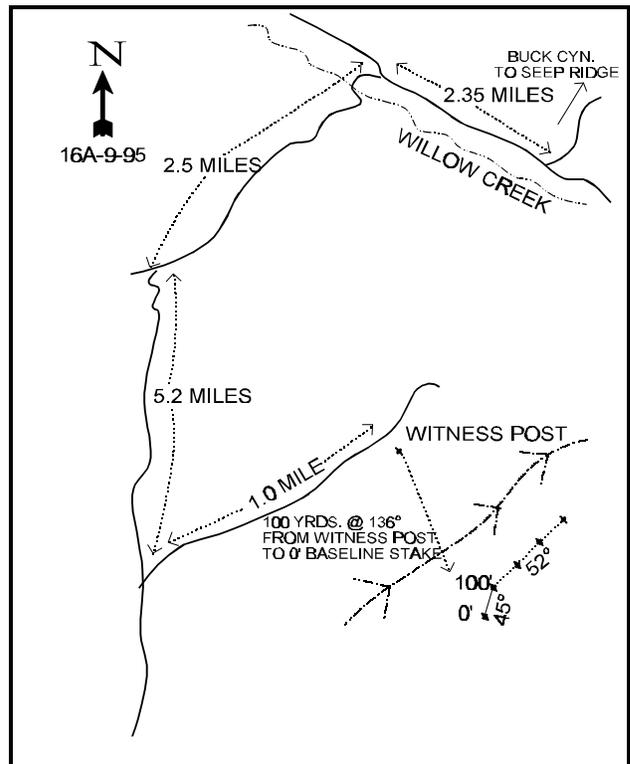
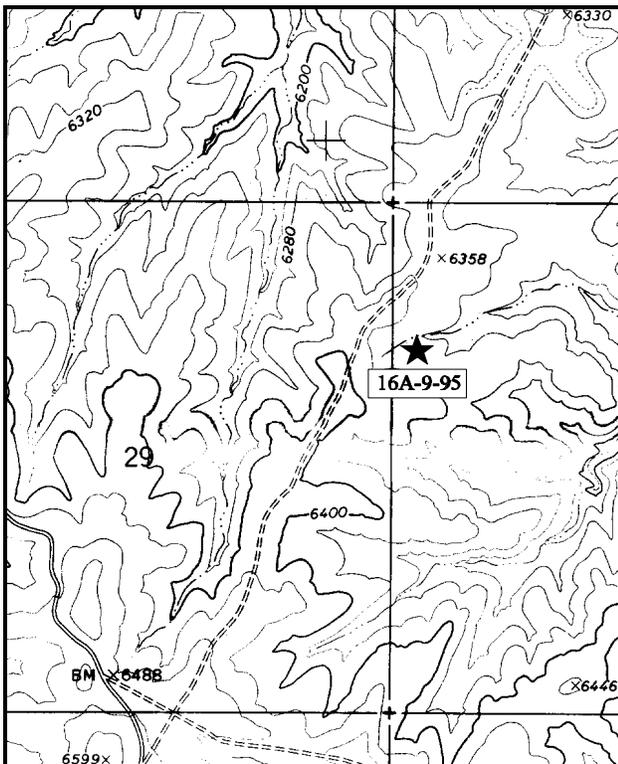
Study site name: Agency Draw. Range type: Desert Shrub.

Compass bearing: frequency baseline 60 degrees.

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

LOCATION DESCRIPTION

From the Seep Ridge Road, go down Buck Canyon to Willow Creek. Travel north down Willow Creek 2.35 miles to a fork. Bear left, cross Willow Creek then drive up out of the canyon 2.5 miles to a fork. Bear left. Continue 5.2 miles to an intersection. Turn left off the main road. Go down .1 miles to a small flat. Continue going straight (NE) down the ridge .9 miles to a witness post on the right side of the road. Walk 87 paces down into the draw, at a bearing of 136°. The 0-foot baseline stake is marked with a red browse tag, #9040. The frequency baseline is marked by green fenceposts, 12-18 inches in height.



Map Name: Agency Draw NE

Diagrammatic Sketch

Township 13S, Range 21E, Section 28 UTM COOR. 6-21-697E 12 43-91-018N

## DISCUSSION

### Trend Study 16A-9

Actually located in the Willow Creek drainage, this study is representative of the big sagebrush and desert shrub communities found throughout the Agency Draw area. At 6,300 feet in elevation, study #16A-9 is the lowest established site within the herd unit. This remote area is managed by the BLM. The area has been grazed by cattle in the winter, from January 1 to March 31. Deer also use the area in the winter, with most of their time being spent in the draws judging by the abundance of pellet groups. There is also abundant sign of sage grouse from winter use, a few birds were observed on an adjacent ridge at the time of study establishment in 1988. A small herd of elk was also observed in the area.

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

The site occurs between the deep saline soil along the wash and the shallow, very rocky soil on the ridges. The soil on the study site is a shallow, stony loam. Limitations are the low annual precipitation (<10 inches) and the shallow, rocky soils which allow rapid runoff. Soil loss from the slopes and wash are evident, but over most of the study site the vegetative cover helps to keep erosion at a moderately low level.

Shrubs are the visually dominant class of plants for this community. The key browse species includes Wyoming big sagebrush, black sagebrush, shadscale, and with fourwing saltbush and winterfat each providing less than one percent cover. Together, they make up 66% of the total browse cover. All provide winter forage, although the light to moderate use of winterfat may be unavailable due to snow depth in some years. Wyoming big sagebrush and black sagebrush are the only browse species on the site which show evidence of heavy hedging. In 1988, 40% of the black sagebrush and 16% of the Wyoming sagebrush displayed heavy use. Currently only 6% of black sagebrush and 2% of Wyoming sagebrush show heavy use. Decadency rates are low and vigor is good on most plants. Fringed sage is very abundant, but is not utilized.

Herbaceous plants compose 51% of the total vegetative cover. Cheatgrass is the most numerous grass accounting for 67% of the grass cover. Other fairly abundant perennial grasses include thickspike wheatgrass, Sandberg bluegrass, and squirreltail. Forbs are diverse, yet the 18 species encountered in 1995 only produce 1.6% total cover. The dominant forb consists of halogeton which makes up 46% of the forb cover. Other typical desert forbs includes hoary aster, pepperweed, and low fleabane which occurs in small numbers.

### 1988 APPARENT TREND ASSESSMENT

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

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - slightly improved, but to dependant on annual species for protective cover

browse - slightly up

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

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 9

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'88	'95	'88	'95	
G	Agropyron dasystachyum	7	*67	3	22	1.36
G	Agropyron trachycaulum	-	*43	-	19	.46
G	Bromus tectorum	-	209	-	63	11.78
G	Carex spp.	-	3	-	2	.01
G	Oryzopsis hymenoides	114	*54	49	27	.84
G	Poa secunda	31	125	16	54	1.75
G	Sitanion hystrix	85	*56	35	21	1.13
G	Stipa comata	22	*23	9	10	.34
Total for Grasses		259	580	112	218	17.71
F	Arabis fendleri	-	-	-	-	.00
F	Astragalus spp.	-	*13	-	7	.06
F	Cryptantha spp.	2	5	2	2	.03
F	Descurainia pinnata	-	48	-	23	.14
F	Erigeron pumilus	-	4	-	2	.01
F	Haplopappus acaulis	-	2	-	1	.00
F	Halogeton glomeratus	-	13	-	5	.71

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
F	Lappula occidentalis	-	25	-	10	.12
F	Lepidium montanum	31	26	15	11	.11
F	Machaeranthera canescens	6	*2	3	2	.01
F	Machaeranthera grindelioides	-	*7	-	3	.04
F	Orthocarpus spp.	-	*5	-	3	.01
F	Petradoria pumila	-	1	-	1	.00
F	Phlox austromontana	-	*8	-	3	.04
F	Phlox longifolia	-	*41	-	18	.11
F	Polygonum douglasii	-	4	-	1	.00
F	Sphaeralcea coccinea	6	*4	3	2	.03
F	Streptanthus cordatus	-	1	-	1	.00
F	Townsendia incana	-	*12	-	5	.05
Total for Forbs		45	221	23	100	1.52
B	Artemisia frigida	38	*17	21	8	.15
B	Artemisia nova	3	22	1	11	2.13
B	Artemisia tridentata wyomingensis	50	*34	25	17	5.95
B	Atriplex canescens	-	3	-	1	.00
B	Atriplex confertifolia	37	*28	18	14	3.14
B	Ceratoides lanata	19	27	10	15	.69
B	Gutierrezia sarothrae	1	8	1	5	.02
B	Sarcobatus vermiculatus	54	*11	24	8	6.06
Total for Browse		202	150	100	79	18.17

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

BASIC COVER --

Herd unit 16A, Study no: 9

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	339	2.50	36.44
Rock	174	.50	3.76
Pavement	242	2.50	8.98
Litter	382	60.00	33.42
Cryptograms	128	1.50	2.37
Bare Ground	298	33.00	25.00

PELLET GROUP FREQUENCY --  
Herd unit 16A, Study no: 9

Type	Quadrat Frequency '95
Rabbit	4
Horse	5
Elk	1
Deer	19
Cattle	1

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

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	88	13	-	-	-	-	-	-	-	-	13	-	-	-	866		13	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	88	21	-	-	-	-	-	-	-	-	21	-	-	-	1400		21	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	88	57	-	-	-	-	-	-	-	-	57	-	-	-	3800	8	3	57
	95	43	-	-	4	-	-	-	-	-	47	-	-	-	940	11	7	47
Total Plants/Acre (excluding Dead & Seedlings)												'88	5200	Dec:	-			
												'95	1060		-			
<i>Artemisia nova</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
Y	88	5	1	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	5	4	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	88	-	-	4	-	-	-	-	-	-	4	-	-	-	266	11	21	4
	95	12	34	3	-	-	-	-	-	-	49	-	-	-	980	15	18	49
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	3	1	-	-	-	-	-	-	2	-	-	4	120		6	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
Total Plants/Acre (excluding Dead & Seedlings)												'88	666	Dec:	0%			
												'95	1280		9%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata wyomingensis</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	49	-	-	-	-	-	-	-	-	49	-	-	-	980		49	
Y	88	19	2	-	-	-	-	-	-	-	18	-	2	1	1400		21	
	95	54	2	-	1	-	-	-	-	-	57	-	-	-	1140		57	
M	88	8	14	4	-	-	-	-	-	-	26	-	-	-	1733	21 25	26	
	95	26	32	3	-	-	-	-	-	-	60	-	1	-	1220	21 29	61	
D	88	4	2	5	-	-	-	-	-	-	11	-	-	-	733		11	
	95	2	11	-	-	-	-	-	-	-	12	-	-	1	260		13	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
Total Plants/Acre (excluding Dead & Seedlings)											'88	3866	Dec:	18%				
											'95	2620		9%				
<i>Atriplex canescens</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	-				
											'95	0		-				
<i>Atriplex confertifolia</i>																		
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	88	20	2	-	-	-	-	2	-	-	24	-	-	-	1600	16 18	24	
	95	52	7	-	1	-	-	-	-	-	59	-	1	-	1200	14 21	60	
D	88	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	20	3	-	-	-	-	-	-	-	14	-	4	5	460		23	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)											'88	2200	Dec:	18%				
											'95	1840		25%				
<i>Ceratoides lanata</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	88	14	-	-	-	-	-	-	-	-	14	-	-	-	933		14	
	95	17	-	-	-	-	-	-	-	-	17	-	-	-	340		17	
M	88	2	1	-	-	-	-	-	-	-	2	-	1	-	200	6 6	3	
	95	67	4	-	-	-	-	-	-	-	71	-	-	-	1420	10 9	71	
D	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	1266	Dec:	10%				
											'95	1780		1%				

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240		12	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	88	12	-	-	-	-	-	-	-	-	12	-	-	-	800	7 5	12	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160	9 11	8	
Total Plants/Acre (excluding Dead & Seedlings)												'88	800	Dec:	-			
												'95	340		-			
<i>Opuntia spp.</i>																		
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2 3	1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5 14	1	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'95	40		50%			
<i>Sarcobatus vermiculatus</i>																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66	54 63	1	
	95	26	-	-	-	-	-	-	-	-	26	-	-	-	520	34 49	26	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'95	680		5%			

PERCENT BROWSE COMPOSITION--  
Herd unit 16A, Study no: 9

Species	Percent of Total	
	'88	'95
<i>Artemisia frigida</i>	37	11
<i>Artemisia nova</i>	5	13
<i>Artemisia tridentata</i> <i>wyomingensis</i>	27	27
<i>Atriplex canescens</i>	0	0
<i>Atriplex</i> <i>confertifolia</i>	16	19
<i>Ceratoides lanata</i>	9	18
<i>Gutierrezia sarothrae</i>	6	4
<i>Opuntia spp.</i>	.47	.41
<i>Sarcobatus</i> <i>vermiculatus</i>	.47	7

TREND STUDY 16A-10-95

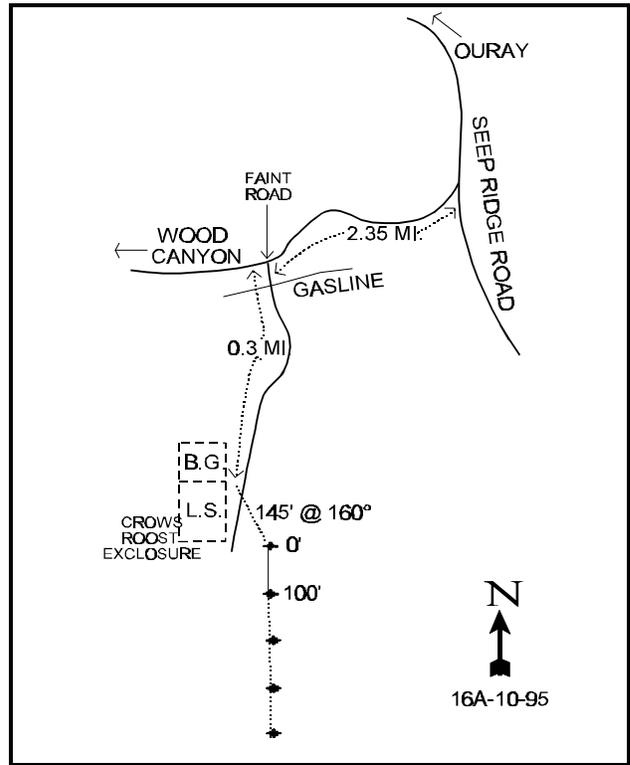
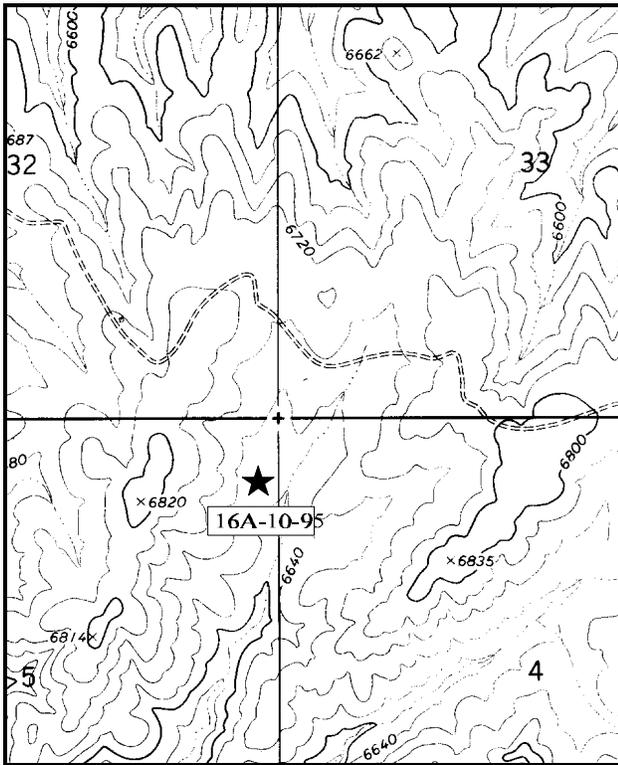
Study site name: Sunday School #1. Range type: Fourwing Saltbush.

Compass bearing: frequency base line 197 degrees.

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

LOCATION DESCRIPTION

From the Seep Ridge Road, turn onto the Wood Canyon/Willow Creek road and proceed west 2.35 miles. Turn left onto a jeep trail and go .3 miles to the Crows Roost Enclosure. The study site is on the east side of the enclosure. The 0-foot baseline stake is 29 paces from the SE corner of the big game enclosure, at a bearing of 160°. The frequency baseline runs south from there, parallel to the livestock enclosure fence. The study is marked by 2-foot tall green metal fenceposts.



Map Name: Bates Knolls

Diagrammatic Sketch

Township 14S, Range 22E, Section 5 UTM COOR. 6-31-423E 12 43-88-288N

## DISCUSSION

### Trend Study No. 16A-10

This trend study is located in a four-wing saltbush/big sagebrush draw adjacent to the Crows Roost Enclosure on BLM land. The allotment is used by cattle each winter with a rotational deferred system of grazing from November 1 through April 30. Few deer and elk pellet groups were encountered in 1988 and no pellet groups were found in 1995.

The study site is at an elevation of 6,650 feet. The wide draw drains to the south, although the bottom of the draw is relatively flat, the site has a southeast aspect.

The silt loam soil on the site is deep and well-drained. With the dense vegetative cover on the study site, there is very little erosion, except along cattle trails. A gully in the middle of the draw was reported to be 10 feet deep in 1988 with steep banks. Currently it is only about 4 feet deep with vegetation growing in the bottom.

Fourwing saltbush and basin big sagebrush are large and vigorous on this site. In terms of numbers however, the incredible abundance of fringed sagebrush and winterfat appeared to dominate the understory in 1988. Yet, in 1995 this was not the case. With the much larger sample size and better sampling design the estimates for shrub density are much more representative for discontinuous and/or clumped shrub distributions. These small shrubs display excellent growth and seed production. The majority of the winterfat are mature plants averaging 10 inches in height. The degree of browsing on these small shrubs is difficult to determine due to the abundant annual leader growth. Hedging is light with some moderately utilized and 4% heavily hedged.

Basin big sagebrush numbered an estimated 200 young plants/acre in 1988. With the larger sample used in 1995, estimated density is now 2,700 plants/acre. Reproductive potential is fairly high at 16% and 43% of the population are classified as young.

Fourwing saltbush had an estimated density of 1,333 plants/acre in 1988. Currently it provides 23% of the browse cover with an estimated density of 1,860 plants/acre. Utilization was reported light in 1988 and vigor was good on all plants. During the 1995 reading, use was mostly light but 13% of the shrubs displayed moderate to heavy use. The stand has become increasingly decadent. Currently 79% of the population is decadent with an additional 59% of these plants classified as dying. No seedlings and few young were encountered during either of the readings. With no strong evidence of excessive use, the high amount of decadence could be explained by the fact that fourwing saltbush is susceptible to winter injury and there was an extremely harsh winter during 1992-93. Another explanation for this high rate of decadency is that four-wing saltbush are fairly short-lived plants, living only 20 to 30 years under ideal conditions. Without replacement with younger age class plants, this condition would be expected because there are no safe sites for their establishment when competing with such a high density of very competitive annual cheatgrass.

The herbaceous understory is dominated by annual species. During the 1988 reading, no annual species were included in the sampling design. Three perennial grasses and 4 perennial forbs were encountered. Currently cheatgrass and tansymustard dominated the understory by providing 88% of the herbaceous cover. Due to the unusually wet spring, tansymustard was 2 to 3 feet tall. Thickspike wheatgrass was the only abundant perennial grass and scarlet globemallow was the only abundant perennial forb.

### 1988 APPARENT TREND ASSESSMENT

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

### 1995 TREND ASSESSMENT

Soil trend appears stable. Percent bare ground has declined from 28% to 21%. Litter cover also declined, but this has been the general trend with the extended drought. Due to the abundant herbaceous cover (mostly annuals), erosion is minimal. Overall browse trend is considered stable, but guarded with the high percent decadence (79%) and poor vigor (47%) of fourwing saltbush in 1995 which makes up 23% of the browse cover. In the nearby Crow's Roost Exclosure, decadent fourwing were noted in both the total and cattle exclosure. This increased decadency is not related to use, for only 13% of the mature plants have moderate to heavy use. Fourwing saltbush can be damaged by extended severe drought in association with a severe winter which took place in 1992-93. It should also be noted that even under ideal conditions four-wing salt bush has a fairly short life span of 20 to 30 years. The replacement of the older plants with younger ones is almost impossible when they are competing against a very dense population of winter annuals. Trend for winterfat appears stable, with only a small increase in moderate to heavy use than was reported in 1988 (0% vs 8%). Winterfat within the exclosure were larger and more vigorous than those sampled outside. Basin big sagebrush now provides 37% of the browse cover with good vigor, good reproductive potential, and robust percentage of young plants. The great change in density for fringed sagebrush is most likely a reflection of the much larger, better distributed sample used in 1995. It gives much better population estimates for species that are clumped and/or discontinuous in their distributions. The herbaceous understory trend is down and in poor condition. The fairly numerous perennial grasses, thickspike wheatgrass and blue grama, have sum of nested frequency values that have declined significantly. The most numerous perennial forb, scarlet globemallow, has also decreased significantly. Sum of nested frequency of perennial grasses declined 59% while frequency of perennial forbs decreased 42%. Cheatgrass and annual forbs dominate the understory by providing 91% of the total herbaceous vegetative cover. Due to the wet spring, tansymustard was very robust and abundant even within the exclosure.

#### TREND ASSESSMENT

soil - stable

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

herbaceous understory - down and dominated by annuals

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 10

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	208	*119	62	46	1.43
G	Agropyron spicatum	-	*9	-	4	.09
G	Bouteloua gracilis	177	*22	70	11	.18
G	Bromus tectorum	-	252	-	80	10.79
G	Poa secunda	20	16	11	7	.10
Total for Grasses		405	418	143	148	12.61
F	Delphinium spp.	-	1	-	1	.00
F	Descurainia pinnata	-	302	-	93	19.10
F	Erigeron eatonii	1	18	1	6	.54
F	Lappula occidentalis	-	88	-	33	.39
F	Machaeranthera canescens	9	*-	6	-	-
F	Phlox longifolia	15	*28	6	12	.11
F	Ranunculus testiculatus	-	84	-	28	.70
F	Sphaeralcea coccinea	202	*84	76	37	.63
Total for Forbs		227	605	89	210	21.48
B	Artemisia frigida	237	*92	88	37	1.78
B	Artemisia tridentata tridentata	53	*41	23	19	4.55
B	Atriplex canescens	49	*27	22	14	2.83
B	Ceratoides lanata	40	80	18	35	3.23
B	Gutierrezia sarothrae	6	-	2	-	-
Total for Browse		385	240	153	105	12.39

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

BASIC COVER --

Herd unit 16A, Study no: 10

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	376	7.00	49.70
Rock	67	.25	.27
Pavement	128	9.50	2.63
Litter	380	55.00	40.40
Cryptograms	20	.50	.03
Bare Ground	304	27.75	21.33

PELLET GROUP FREQUENCY --  
Herd unit 16A, Study no: 10

Type	Quadrat Frequency '95
Rabbit	3
Cattle	3

BROWSE CHARACTERISTICS --  
Herd unit 16A, Study no: 10

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	88	1985	-	-	-	-	-	-	-	-	1985	-	-	-	1261		1985	
	95	350	1	-	-	-	-	-	-	-	351	-	-	-	7020		351	
Y	88	940	-	-	-	-	-	-	-	-	940	-	-	-	18976		940	
	95	34	-	-	-	-	-	-	-	-	34	-	-	-	680		34	
M	88	479	-	-	-	-	-	-	-	-	479	-	-	-	10088	7 5	479	
	95	66	-	-	1	-	-	-	-	-	67	-	-	-	1340	7 5	67	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	1	20		1		
Total Plants/Acre (excluding Dead & Seedlings)												'88	29064	Dec:	0%			
												'95	2040		0%			
<i>Artemisia tridentata tridentata</i>																		
S	88	26	-	-	-	-	-	-	-	-	26	-	-	-	1733		26	
	95	21	-	-	-	-	-	-	-	-	21	-	-	-	420		21	
Y	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	57	1	-	-	-	-	-	-	-	58	-	-	-	1160		58	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	57	13	4	-	-	-	-	-	-	74	-	-	-	1480	20 26	74	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	1	1	-	-	-	-	-	2	-	-	1	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'88	200	Dec:	0%			
												'95	2700		2%			
<i>Atriplex canescens</i>																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	88	18	-	-	-	-	-	-	-	-	18	-	-	-	1200	31 28	18	
	95	13	1	-	1	-	1	-	-	-	16	-	-	-	320	18 26	16	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	39	2	5	19	2	1	6	-	-	30	-	-	44	1480		74	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'88	1333	Dec:	0%			
												'95	1860		79%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Ceratoides lanata																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	88	43	-	-	-	-	-	-	-	-	43	-	-	-	2866		43	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
M	88	98	-	-	-	-	-	-	-	-	98	-	-	-	6533	9 3	98	
	95	325	12	15	5	-	-	-	-	-	357	-	-	-	7140	10 10	357	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	30	-	-	-	-	-	-	-	-	30	-	-	-	600		30	
Total Plants/Acre (excluding Dead & Seedlings)												'88	9399	Dec:	0%			
												'95	8320		7%			
Opuntia spp.																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1 3	0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 16A, Study no: 10

Species	Percent of Total	
	'88	'95
Artemisia frigida	90	14
Artemisia tridentata tridentata	.18	18
Atriplex canescens	1	12
Ceratoides lanata	9	56
Opuntia spp.	0	0

TREND STUDY 16A-11-95

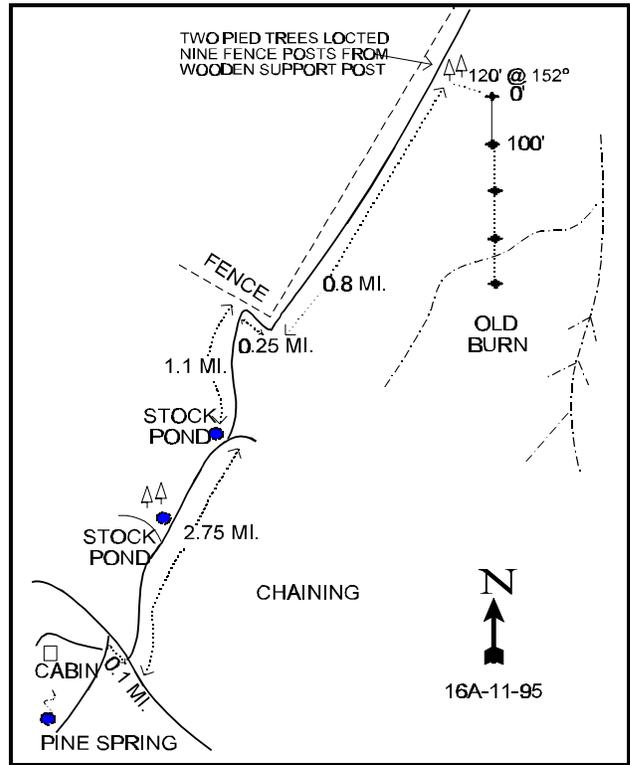
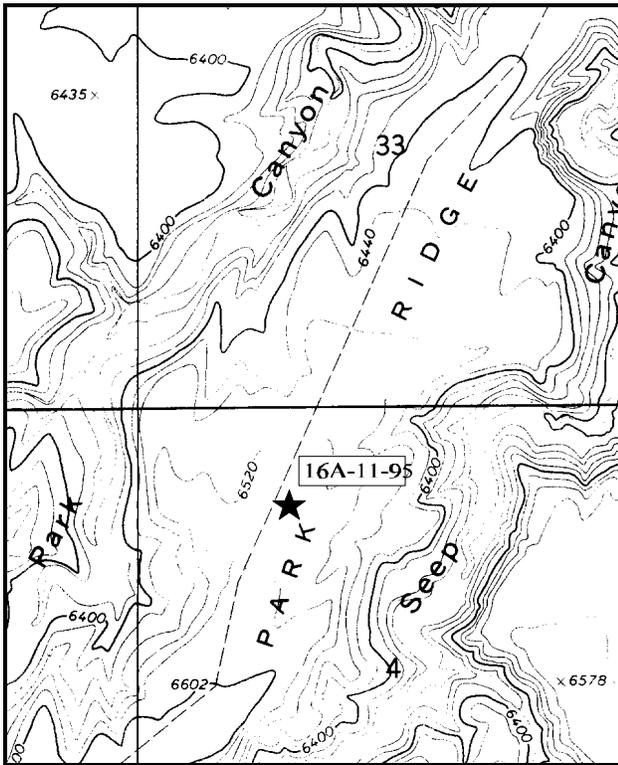
Study site name: Park Ridge. Range type: Fourwing Saltbush.

Compass bearing: frequency baseline 171 degrees.

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

LOCATION DESCRIPTION

From the Seep Ridge Road, 0.1 miles south of the Pine Spring turnoff, turn left by an old cattleguard onto a jeep trail. Go down this road 2.75 miles to a bend to the right by a stockpond. Continue straight past the stockpond on a faint road, and 1.1 miles down the ridge to a fence. Bear right and follow the road along the fence. Turn left through the gate and continue down the fence 1.2 miles. Stop by a small, isolated group of pinyon pine trees on the right side of the road. From here, walk SE into the flat approximately 120 feet to the 0-foot baseline stake. The study is marked by short, green fenceposts.



Map Name: Cooper Canyon

Diagrammatic Sketch

Township 14S, Range 23E, Section 4 UTM COOR. 6-41-522E 12 43-88-474N

## DISCUSSION

### Trend Study No. 16A-11

The Park Ridge trend study is located on critical mule deer winter range. The prevalent vegetation in the flats is four-wing saltbush and winterfat, with an increasing population of Wyoming big sagebrush. These flats are surrounded by mature pinyon-juniper woodland. On this site, little sign of deer was found in the large open parks, so the study was located more closely to the edge where there was evidence of deer use. Very few elk pellet groups were found, but still observed more than that of deer. Cattle graze this BLM land on a three-year rest-rotation system during the spring or fall.

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

On this Upland silt loam site, the dominant soil is a moderately deep, well-drained silt loam with a hardpan or layer of lime accumulation at approximately 10-12 inches. There are inclusions of a shallow, channery sandy loam which support small communities of black and big sagebrush. These small areas have pavement concentrations and more bare soil than the area as a whole. The hazard of water erosion is slight.

The key browse species on the site consist of fourwing saltbush and winterfat, with an increasing population of Wyoming big sagebrush. Winterfat is the most abundant shrub with an estimated density of 17,000 plants/ acre in 1988 and 8,440 by 1995. In 1995, winterfat provided 54% of the browse cover. This change in density is more related to the much larger sample size and greatly enhanced sample design giving a greatly improved population estimate for species that are clumped and/or discontinuous in their distribution. Twenty-seven percent of the winterfat sampled in 1988 were classified as heavily hedged. Current use is much lighter with only 1% heavily hedged. However, the rapidly growing four-wing saltbush and winterfat do not as readily assume a hedged form or appearance. Their potential for exceptional annual growth is demonstrated by the few protected and unavailable plants.

The fourwing saltbush was the dominant overstory shrub in 1988, but now Wyoming big sagebrush is somewhat larger in stature than fourwing saltbush in 1995. Density plot estimates from 1988 indicate 267 mature plants/acre with a canopy cover estimated at 5%. During the 1995 reading fourwing numbered 380 plants/acre, 47% of which are decadent. Canopy cover was estimated at just over 1%. Although the mature plants produce a large quantity of seed, no seedling or young plants were found. Few seedling winterfat were encountered, but there are abundant seedlings of the increasers broom snakeweed and fringed sage.

With the lengthened baseline used in 1995, a number of Wyoming big sagebrush were picked up in the sample. There are an estimated 1,120 plants/acre with a reproductive potential (proportion of seedlings to its density) of 63% and a large proportion of young plants (57%). Utilization of the sagebrush is light with a few preferred individuals displaying heavier use.

Grasses provide 61% of the vegetative cover while forbs provide an additional 18% cover. Dominant perennial grasses include thickspike wheatgrass, needle-and-thread, and blue grama. Annual Cheatgrass is the most abundant however, providing 55% of the grass cover. Annual and perennial forbs combine to produce nearly 7% cover. Scarlet globemallow is by far the most numerous, providing 80% of the total forb cover.

### 1988 APPARENT TREND ASSESSMENT

Due to the rocky nature of the soil, there was a fairly high amount of pavement cover (13%). Overall, vegetative and litter cover is good, totaling 57%. Percent bare ground occupied 22.5% of the surface feature. Soil trend appears stable due to the vegetative and litter cover combined with the gentle terrain. Browse trend for the key species, fourwing saltbush and winterfat, is currently stable for fourwing and up for winterfat. Lack of recruitment for fourwing is a concern, but plants are currently large and vigorous. Winterfat is abundant with abundant young plants, low decadency and good vigor. Without considering annuals, the herbaceous understory is not particularly abundant. The two most abundant grasses, thickspike wheatgrass and squirreltail, have quadrat frequencies of 46% and 50% respectively. Only five perennial forb species were encountered.

### 1995 TREND ASSESSMENT

Soil trend appears stable. Percent bare ground is similar to that of 1988. Litter declined with the extended drought, but erosion is not a problem due to the gentle terrain. Trend for browse is mixed. Fourwing has become increasingly decadent (0 to 47%) with no recruitment to replace decadent shrubs. This pattern was also noted on the last site which is most likely weather related with the combination of extended severe drought with the severe winter of 1992-93. In addition, height/crown measurements of mature shrubs are nearly twice as low as those observed in 1988. Another problem this species has is that it is a rather short-lived species, under ideal conditions it will only live about 20 to 30 years. Winterfat density has declined, but almost all of the difference would be due to the larger sample taken this year for there were no indications of heavy use and/or increased decadency to explain this large change in 1995. Percent decadency is lower and moderate to heavy use has decreased from 82% down to 7% with no dead plants observed in 1995. Wyoming big sagebrush appears to have an increasing population with a majority of the population consisting of seedlings and young. Weighing all these factors, overall trend for browse is considered stable until more data on the trend of fourwing saltbush is available in the year 2000. The herbaceous understory is in poor condition and dominated by annuals, almost 50% of the herbaceous cover. Of the five perennial grasses observed in 1988, only one, needle-and-thread, increased in nested frequency. The other four decreased significantly. Sum of nested frequency of perennial forbs increased slightly, but scarlet globemallow is the only abundant perennial forb. Cheatgrass accounts for 55% of the grass cover while annual forbs makeup 11% of the forb cover. Trend for the herbaceous understory is considered slightly down.

#### TREND ASSESSMENT

soil - stable

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

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

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 11

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	144	*98	46	34	2.90
G	Bouteloua gracilis	76	*65	31	29	2.98
G	Bromus tectorum	-	307	-	92	12.47
G	Oryzopsis hymenoides	68	*58	33	25	.52
G	Poa fendleriana	-	6	-	2	.06
G	Poa secunda	-	6	-	2	.30
G	Sitanion hystrix	107	*49	50	23	.77
G	Stipa comata	62	84	27	34	2.67
Total for Grasses		457	673	187	241	22.68
F	Astragalus spp.	9	-	4	-	-
F	Calochortus nuttallii	-	3	-	1	.00
F	Cryptantha spp.	-	*14	-	6	.03
F	Descurainia pinnata	17	24	7	15	.17
F	Draba rectifruca	-	67	-	28	.14
F	Erigeron pumilus	63	*38	32	19	.36
F	Fritillaria pudica	-	*10	-	5	.05
F	Gilia pinnatifida	1	*34	1	19	.09
F	Lappula occidentalis	-	33	-	16	.37
F	Phlox longifolia	-	1	-	1	.00
F	Sphaeralcea coccinea	144	*213	59	78	5.44
F	Tragopogon dubius	22	*12	14	4	.02
F	Unknown forb-annual	-	20	-	8	.06
Total for Forbs		256	469	117	200	6.76
B	Artemisia frigida	25	51	17	23	.89
B	Artemisia tridentata wyomingensis	21	16	9	8	.66
B	Atriplex canescens	19	22	7	12	1.11
B	Ceratoides lanata	108	*98	48	47	4.20
B	Echinocactus spp.	3	-	1	-	-
B	Gutierrezia sarothrae	94	*79	48	37	.70
B	Opuntia spp.	5	7	2	3	.16
Total for Browse		275	273	132	130	7.73

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

BASIC COVER --

Herd unit 16A, Study no: 11

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	363	8.50	41.96
Rock	216	2.25	1.23
Pavement	321	12.75	4.54
Litter	385	48.75	35.29
Cryptograms	220	5.25	6.42
Bare Ground	336	22.50	25.77

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 11

Type	Quadrat Frequency '95
Rabbit	4
Elk	5
Deer	3
Cattle	2

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 11

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	88	38	-	-	1	-	-	-	-	-	39	-	-	-	2600		39	
	95	47	-	-	-	-	-	-	-	-	47	-	-	-	940		47	
Y	88	24	1	-	1	-	-	-	-	-	26	-	-	-	1733		26	
	95	21	-	-	3	-	-	-	-	-	24	-	-	-	480		24	
M	88	13	1	-	1	-	-	-	-	-	15	-	-	-	1000	7	5	15
	95	146	-	-	-	-	-	-	-	-	146	-	-	-	2920	13	9	146
D	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	2799	Dec:	2%			
												'95	3400		0%			
<i>Artemisia tridentata wyomingensis</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	30	-	-	5	-	-	-	-	-	35	-	-	-	700		35	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	32	-	-	-	-	-	-	-	-	32	-	-	-	640		32	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	23	-	1	-	-	-	-	-	-	24	-	-	-	480	20	36	24
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	1120		-			

A G E	YR	Form Class (No. of 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	88	3	1	-	-	-	-	-	-	-	4	-	-	-	266	40	44	4
	95	6	4	-	-	-	-	-	-	-	10	-	-	-	200	22	25	10
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	6	-	1	2	-	-	-	-	-	7	-	-	2	180			9
X	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	40			2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	0%			
												'95	380		47%			
<i>Ceratoides lanata</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	40			2	
Y	88	24	39	2	1	-	-	-	-	-	66	-	-	4400			66	
	95	19	-	-	-	-	-	-	-	-	19	-	-	380			19	
M	88	15	96	62	2	1	-	1	-	-	177	-	-	11800	10	9	177	
	95	369	17	4	2	-	-	-	-	-	392	-	-	7840	8	9	392	
D	88	2	5	5	-	-	-	-	-	-	12	-	-	800			12	
	95	3	7	1	-	-	-	-	-	-	2	-	-	220			11	
Total Plants/Acre (excluding Dead & Seedlings)												'88	17000	Dec:	4%			
												'95	8440		2%			
<i>Gutierrezia sarothrae</i>																		
S	88	104	-	-	-	-	-	-	-	-	104	-	-	6933			104	
	95	147	-	-	1	-	-	-	-	-	148	-	-	2960			148	
Y	88	26	-	-	-	-	-	-	-	-	26	-	-	1733			26	
	95	25	-	-	1	-	-	-	-	-	26	-	-	520			26	
M	88	42	-	-	-	-	-	-	-	-	42	-	-	2800	6	6	42	
	95	57	-	-	-	-	-	-	-	-	57	-	-	1140	7	7	57	
D	88	-	-	1	-	-	-	-	-	-	1	-	-	66			1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	4599	Dec:	1%			
												'95	1660		0%			
<i>Opuntia spp.</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
M	88	1	-	-	-	-	-	-	-	-	1	-	-	66	4	12	1	
	95	7	-	-	-	-	-	-	-	-	7	-	-	140	2	9	7	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	2	-	-	-	-	-	-	-	-	-	-	2	40			2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	0%			
												'95	200		20%			

PERCENT BROWSE COMPOSITION--  
 Herd unit 16A, Study no: 11

Species	Percent of Total	
	'88	'95
<i>Artemisia frigida</i>	11	22
<i>Artemisia tridentata</i> <i>wyomingensis</i>	0	7
<i>Atriplex canescens</i>	1	3
<i>Ceratoides lanata</i>	69	56
<i>Gutierrezia sarothrae</i>	19	11
<i>Opuntia</i> spp.	.26	1

TREND STUDY 16A-12-95

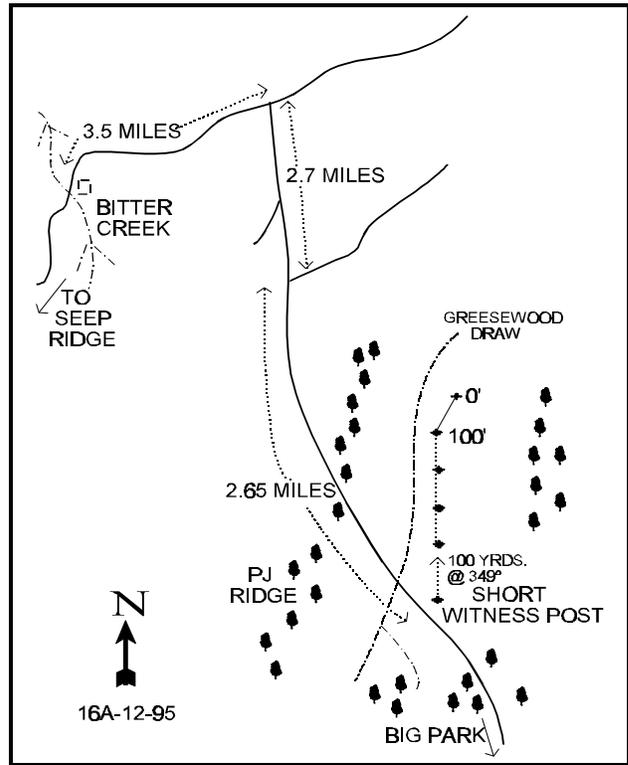
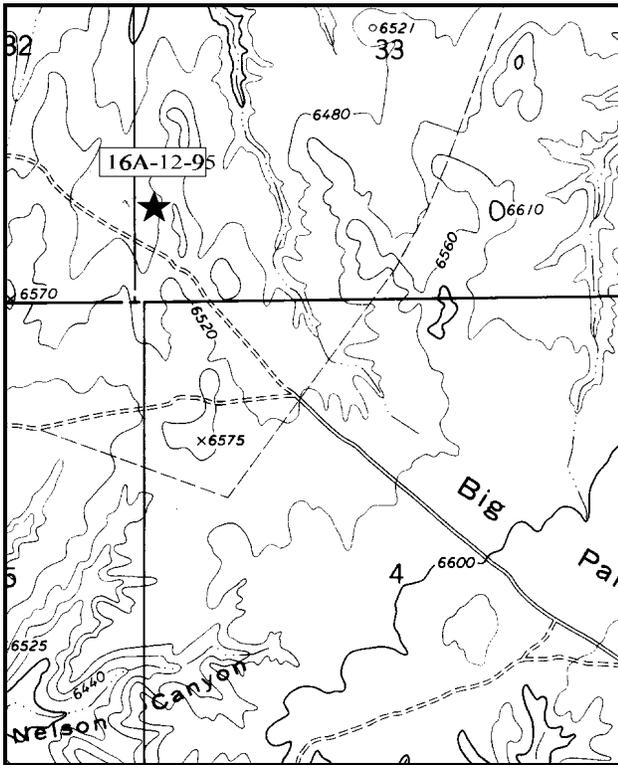
Study site name: Wolf Den. Range type: Big Sagebrush.

Compass bearing: frequency baseline 182 degrees.

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

LOCATION DESCRIPTION

From the Seep Ridge Road, about 10 miles north of Pine Spring, turn onto the Bitter Creek Road near McCoy Reservoir. Drive easterly on this road for 2.4 miles to a cattleguard. Continue 5.4 miles to a corral in the bottom of Bitter Creek. Drive up out of the Bitter Creek canyon 3.5 miles. Where the road tops out, turn right off the main road. Go 2.7 miles to a minor fork. Continue straight on the main road for 2.65 miles to the east edge of a sagebrush/greasewood draw. There is a short witness post 15 feet off the north side of the road to mark the study location. Walk 45 paces bearing 349° to the 400 ft. baseline stake. The 0-foot baseline stake, tagged #9098, is 400 feet north.



Map Name: Burnt Timber Canyon.

Diagrammatic Sketch

Township 12S, Range 24E, Section 3 UTM COOR. 6-50-397E 12 43-90-017N

## DISCUSSION

### TREND STUDY 16A-12

This trend study is located in a very dense stand of Wyoming big sagebrush along a wide swale between low ridges of pinyon and juniper. The area, near Big Park, is considered critical deer winter range with some light use by elk. More pellet groups were found on this study site than any other sampled on the herd unit. In 1995, quadrat frequency for deer pellet groups was 52%, while elk pellet group frequency was only 3%. This area is used by cattle on a rotational deferment system anytime from November through April, depending on amounts of snow and other management considerations.

The study site slopes gently to the north at an elevation of 6,500 feet. The trend study is located on the east side of the swale, so the site slopes very gradually to the west. The drainage basin is sufficiently small at the head that there are no gully patterns resulting from excessive runoff. Although the dense brush provides excellent canopy cover, the understory is very limited (makes up less than 5% of total vegetative cover) and the low amounts of litter are easily displaced. There is a significant covering of pavement and rock (>20%). The soil is moderately deep and loosely compacted. It has a sandy loam texture.

This study is located on a site dominated by Wyoming big sagebrush. Shadscale is found on the upper, more shallow portions of the swale, while greasewood grows along the lower reaches of the depression. The sagebrush on the site is so dense that it is difficult to travel through it, confirming the high estimate of 32% sagebrush cover. Shrub density estimates for 1988 indicated a population of 18,133 plants/acre, while in 1995 they were estimated at only 7,580 plants/acre in 1995. Due to the relatively small number of dead plants sampled in 1995, the difference in population estimates is primarily the result of the increased sample size and better sampling distribution used in 1995. These modifications give much better estimates for shrubs with discontinuous and/or clumped distributions. This old sagebrush stand currently contains 78% mature and 18% decadent individuals for a moderately long-lived species, with occasional seedling and young plants underneath. Vigor has improved (10% vs 3%), with typical minimal leader growth and fair seed production. However, many of the older plants show signs of reduced vigor probably due more to intraspecific competition and extended drought. There has been an increase in the percentage of plants receiving moderate to heavy use which has increased from 30% in 1988 to 72% in 1995. Only 6% of the sagebrush displayed a heavily hedged growth form in 1988. This has increased to 20% in 1995.

The high sagebrush density and associated cover severely limits understory plants. Only four species of perennial grass were found in 1988, five species in 1995. Total grass cover is less than one half of one percent. Only one perennial forb was encountered during either reading. Grasses and forbs combined, including annuals, accounts for just over 2% cover. Without some sort of thinning of the sagebrush, the herbaceous understory will continue to be extremely poor.

### 1988 APPARENT TREND ASSESSMENT

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

1995 TREND ASSESSMENT

The soil is adequately covered by sagebrush canopy to protect it from high intensity summer storm impacts, but there is little protection of the soil from erosion caused the associated runoff. However, due to the gentle slope, erosion does not appear to be a major problem. Trend is considered stable, yet in poor condition. Browse trend is stable and fairly stagnant. There is a change in the proportion of individuals in the younger age classes which has declined, yet there are not an inordinately large number of dead plants in the population. Utilization is heavier with 20% of the sagebrush displaying heavy use. Percent decadency has declined and vigor is good on all but 18% of the decadent plants. There may be some fluctuations in population density in the future associated with prolong drought, but the sagebrush will continue to dominate this site without some sort of mechanical or chemical manipulation. The herbaceous understory is nearly non existent at this time. This will remain the case until the sagebrush canopy is reduced. Trend for the herbaceous understory is stable, but very poor condition.

TREND ASSESSMENT

soil - stable but in poor condition

browse - stable, stagnant, mature sagebrush stand

herbaceous understory - stable but nearly non existent

VEGETATIVE TRENDS --

Herd unit 16A, Study no: 12

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
G	Agropyron dasystachyum	59	*35	26	15	.22
G	Bromus tectorum	-	3	-	2	.01
G	Oryzopsis hymenoides	3	2	1	1	.03
G	Poa fendleriana	-	3	-	1	.00
G	Poa secunda	1	-	1	-	-
G	Sitanion hystrix	24	*52	12	24	.18
Total for Grasses		87	95	40	43	0.44
F	Chenopodium leptophyllum	-	84	-	33	.34
F	Cryptantha spp.	1	2	1	1	.00
F	Descurainia pinnata	-	148	-	66	1.46
F	Lappula occidentalis	-	11	-	4	.07
F	Unknown forb-annual	-	4	-	3	.01
Total for Forbs		1	249	1	107	1.89
B	Artemisia frigida	25	46	11	20	1.85
B	Artemisia tridentata wyomingensis	169	*157	76	69	32.26
B	Atriplex confertifolia	5	17	2	7	1.69
B	Ceratoides lanata	1	-	1	-	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'88	'95	'88	'95	
B	Gutierrezia sarothrae	1	4	1	2	.01
B	Juniperus osteosperma	2	-	2	-	.15
B	Opuntia spp.	4	-	2	-	-
B	Pinus edulis	2	-	1	-	-
B	Sarcobatus vermiculatus	4	*18	3	8	5.27
Total for Browse		213	242	99	106	41.25

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

BASIC COVER --

Herd unit 16A, Study no: 12

Cover Type	Nested Frequency '95	Average Cover %	
		'88	'95
Vegetation	284	5.75	43.86
Rock	80	.75	.74
Pavement	267	32.25	19.73
Litter	385	49.50	43.14
Cryptograms	175	5.00	6.84
Bare Ground	207	6.75	8.53

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 12

Type	Quadrat Frequency '95
Rabbit	7
Elk	3
Deer	52

BROWSE CHARACTERISTICS --  
Herd unit 16A, Study no: 12

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	88	2	-	-	3	-	6	2	-	-	13	-	-	-	866		13	
	95	24	-	-	6	-	-	-	-	-	30	-	-	-	600		30	
Y	88	7	-	-	1	-	2	-	-	-	10	-	-	-	666		10	
	95	15	-	-	5	-	-	-	-	-	20	-	-	-	400		20	
M	88	29	3	-	18	-	5	1	-	-	56	-	-	-	3733	7	5	56
	95	61	-	-	21	-	-	-	-	-	82	-	-	-	1640	11	11	82
D	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)											'88	4532	Dec:	2%				
											'95	2040		0%				
<i>Artemisia tridentata wyomingensis</i>																		
S	88	-	-	-	3	-	-	13	-	-	16	-	-	-	1066		16	
	95	10	-	-	2	-	-	-	-	-	12	-	-	-	240		12	
Y	88	9	1	-	10	-	-	3	-	-	21	-	2	-	1533		23	
	95	10	2	-	-	-	-	-	-	-	12	-	-	-	240		12	
M	88	104	47	11	13	-	-	2	-	-	171	4	2	-	11800	21	16	177
	95	38	191	67	-	-	-	-	-	-	296	-	-	-	5920	27	32	296
D	88	43	19	4	5	-	-	1	-	-	49	-	13	10	4800		72	
	95	9	52	10	-	-	-	-	-	-	58	-	-	13	1420		71	
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1080		54	
Total Plants/Acre (excluding Dead & Seedlings)											'88	18133	Dec:	26%				
											'95	7580		18%				
<i>Atriplex canescens</i>																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	43	22	0
D	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)											'88	0	Dec:	0%				
											'95	20		100%				
<i>Atriplex confertifolia</i>																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	22	18	4
	95	14	-	-	-	-	-	-	-	-	14	-	-	-	280	20	23	14
D	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)											'88	465	Dec:	14%				
											'95	380		15%				

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
S	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	9	-	-	-	-	-	-	-	-	9	-	-	-	180		9	
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	4	-	-	5	-	-	-	-	-	9	-	-	-	600	7 6	9	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	12 8	3	
Total Plants/Acre (excluding Dead & Seedlings)												'88	866	Dec:	-			
												'95	60		-			
<i>Opuntia spp.</i>																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	88	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	3 4	4	
Total Plants/Acre (excluding Dead & Seedlings)												'88	66	Dec:	-			
												'95	80		-			
<i>Pinus edulis</i>																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'88	0	Dec:	-			
												'95	0		-			
<i>Sarcobatus vermiculatus</i>																		
M	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266	33 26	4	
	95	40	-	-	-	-	-	-	-	-	40	-	-	-	800	37 50	40	
D	88	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'88	266	Dec:	0%			
												'95	840		4%			

PERCENT BROWSE COMPOSITION--

Herd unit 16A, Study no: 12

Species	Percent of Total	
	'88	'95
<i>Artemisia frigida</i>	19	19
<i>Artemisia tridentata</i> <i>wyomingensis</i>	75	69
<i>Atriplex canescens</i>	0	.18
<i>Atriplex</i> <i>confertifolia</i>	2	3
<i>Gutierrezia sarothrae</i>	4	.54
<i>Opuntia spp.</i>	.27	.72
<i>Pinus edulis</i>	0	0
<i>Sarcobatus</i> <i>vermiculatus</i>	1	8

TREND STUDY 16A-13-95

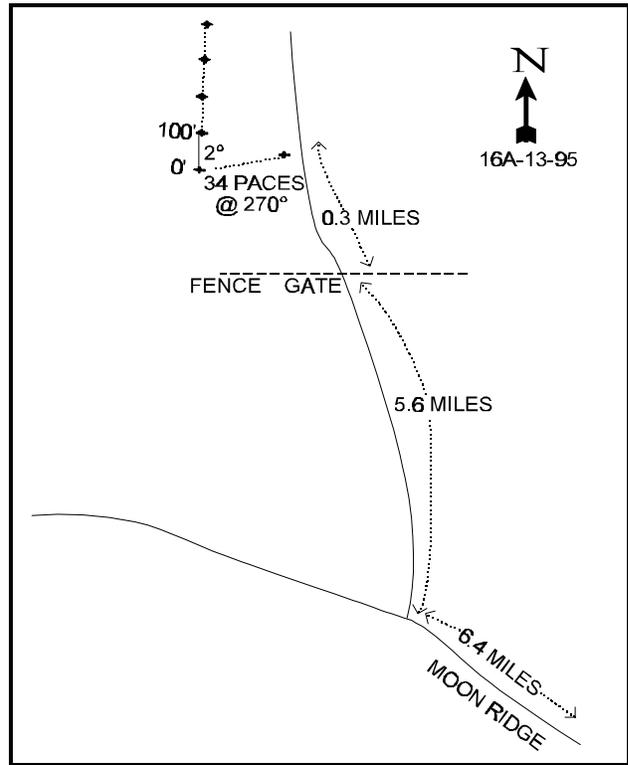
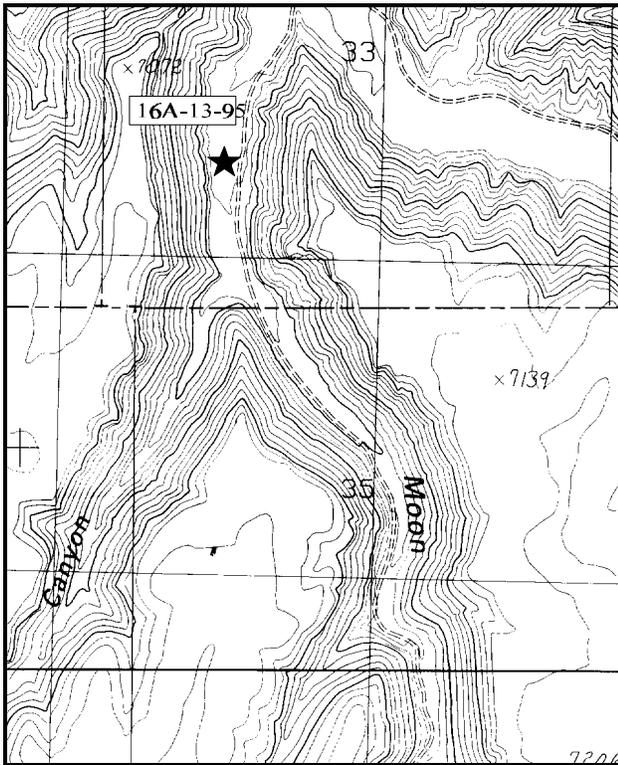
Study site name:  Moon Ridge Burn . Range type:  Burned Black Greasewood .

Compass bearing: frequency baseline  2°M  degrees.

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

LOCATION DESCRIPTION

Travel 6.4 miles up Moon Ridge to Moon Ridge Canyon. Turn right and travel north down Moon Ridge canyon 5.6 miles to a gate. From the gate travel 0.3 miles to a witness post on the left hand side of the road. From the witness post, walk 34 paces at 270°/ M. to the 0 ft. baseline stake. The baseline runs north at 2/ M.



Map Name:  Tenmile Canyon North .

Diagrammatic Sketch

Township  15S , Range  21E , Section  33

## DISCUSSION

### TREND STUDY 16A-13

This is a new study established in 1995 to monitor a burn and herbicide treatment of a greasewood dominated draw in Ten Mile Canyon. The area is administered by the Division of Wildlife Resources. It was burned in 1994, then later sprayed as the greasewood resprouted. This treatment was done to enhance habitat for elk in the area.

Terrain at the site is a nearly level canyon bottom. Soils are moderately deep and alluvially deposited. Rocks and pavement are scarce on the surface. There is a considerable amount of bare ground (49%), but erosion is not a serious problem at this time due to the level terrain and abundant herbaceous vegetation and well dispersed litter cover.

Browse is not abundant on the site due to the treatment. Small numbers of fringed sagebrush, basin big sagebrush, rubber rabbitbrush, and seeded prostate kochia were encountered on the site. Surviving greasewood numbered 20 seedling, 160 young, and 480 mature plants/acre. Average height of mature plants is 14 inches. An estimated 3,960 dead plants/acre were also estimated. Percent kill of greasewood on the north end of the transect was more complete than on the south end.

The herbaceous understory is still developing. One native and three seeded species of grass were encountered. The native Great Basin wildrye provides over 2% cover while crested wheatgrass and smooth brome provide cover of 1.4% and 1% respectively. Total cover of grasses is 5.6%. This will increase with time as more grasses become established, for it has only been one year since the treatment. Total forb cover is 23%. Dominant species are early successional annuals and short lived perennials; Fremont goosefoot, tansymustard, coyote tobacco, and Russian thistle. Seeded forbs, alfalfa and small burnet, were found in small numbers.

### 1995 APPARENT TREND ASSESSMENT

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

#### TREND ASSESSMENT

soil - stable

browse - reestablishing, but density of resprouting greasewood should be watched closely

herbaceous understory - developing, but currently dominated by weedy forbs

VEGETATIVE TRENDS --  
Herd unit 16A, Study no: 13

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron cristatum	88	35	1.41
G	Agropyron dasystachyum	1	1	.03
G	Agropyron repens	32	12	.91
G	Bromus inermis	39	15	1.00
G	Elymus cinereus	37	19	2.26
Total for Grasses		197	82	5.63
F	Chenopodium fremontii	339	95	18.03
F	Chorispora tenella	2	1	.03
F	Descurainia pinnata	82	41	2.94
F	Kochia scoparia	34	17	1.31
F	Lappula occidentalis	17	8	.29
F	Medicago sativa	33	14	.24
F	Nicotiana attenuata	14	5	.12
F	Salsola iberica	5	3	.21
F	Sanguisorba minor	17	7	.06
F	Unknown forb-annual	5	1	.15
F	Wyethia amplexicaulis	20	9	.31
Total for Forbs		568	201	23.71
B	Artemisia frigida	21	8	.18
B	Artemisia tridentata tridentata	4	1	.00
B	Chrysothamnus nauseosus	9	5	.02
B	Kochia scoparia	5	2	.18
B	Sarcobatus vermiculatus	16	7	1.18
Total for Browse		55	23	1.57

BASIC COVER --

Herd unit 16A, Study no: 13

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	382	31.79
Rock	25	.72
Pavement	9	.06
Litter	465	22.21
Cryptograms	5	.00
Bare Ground	454	49.30

PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 13

Type	Quadrat Frequency '95
Elk	1

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 13

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia frigida</i>																		
S	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
M	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	9	10	7
Total Plants/Acre (excluding Dead & Seedlings)												'95	340	Dec:	-			
<i>Artemisia tridentata tridentata</i>																		
Y	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7	
Total Plants/Acre (excluding Dead & Seedlings)												'95	20	Dec:	-			
<i>Chrysothamnus nauseosus</i>																		
Y	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'95	80	Dec:	-			
<i>Kochia prostrata</i>																		
M	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	11	9	5
Total Plants/Acre (excluding Dead & Seedlings)												'95	100	Dec:	-			
<i>Sarcobatus vermiculatus</i>																		
S	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	95	22	-	-	2	-	-	-	-	-	24	-	-	-	480	14	15	24
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	3960		198	
Total Plants/Acre (excluding Dead & Seedlings)												'95	640	Dec:	-			

PERCENT BROWSE COMPOSITION--  
Herd unit 16A, Study no: 13

Species	Percent of Total '95
<i>Artemisia frigida</i>	29
<i>Artemisia tridentata</i> <i>tridentata</i>	2
<i>Chrysothamnus</i> <i>nauseosus</i>	7
<i>Kochia prostrata</i>	8
<i>Sarcobatus</i> <i>vermiculatus</i>	54

## SUMMARY

### DEER HERD UNIT - 16A - NORTH BOOKCLIFFS

Thirteen range trend studies were read on the North Book Cliffs deer herd unit during the 1995 season. Five studies were rereads of studies originally established in 1982 and read again in 1988. Seven additional trend studies were located in 1988 to sample important deer and elk winter and year-round range on state and BLM lands. One study was established in 1995 to monitor a greasewood eradication treatment.

Five study sites; Indian Ridge (16A-1), McCook Ridge Exclosure (16A-2), Agency Draw (16A-9), Sunday School (16A-10), and Park Ridge (16A-11) sample a desert shrub type. This type is usually in association with fourwing saltbush. Soil trends on these sites are stable to improving, mostly due to the influence of cheatgrass in the understory. Herbaceous trends are improving on McCook Ridge Exclosure and Agency Draw. These herbaceous understories are in poor to very poor condition with unsatisfactory compositions. This is due primarily to dominance of cheatgrass and annual forbs in the understory composition. Herbaceous trend at Sunday School and Indian Ridge is down due to the dominance of cheatgrass and annual forbs combined with a decline in sum of nested frequency for perennial grasses. Park Ridge has a slightly down herbaceous trend due to a significant decline in the nested frequencies of all major perennial grass species. Browse trends for this type are improved for all sites except Sunday School and Park Ridge. The key browse, fourwing saltbush, on these two sites appears to be in a state of decline.

The study site at Wolf Den (16A-12) samples a very dense Wyoming big sagebrush population. All trends are currently stable, but soil condition and the herbaceous understory are poor due to the dense sagebrush cover (32%).

Chained and seeded pinyon-juniper sites were read at McCook Ridge Chaining (16A-2), Little Jim Canyon (16A-6), and Cherry Mesa (16A-7). Soil trends on these chainings are stable. Herbaceous trends are improving at McCook Ridge, stable at Cherry Mesa, and down for Little Jim Canyon. McCook Ridge and Little Jim Canyon both have significant growth of pinyon and juniper trees. Browse trends are improving on McCook Ridge and Cherry Mesa, but the increases in browse on Cherry Mesa appears to be negatively effecting the herbaceous understory. Browse trend at Little Jim Canyon is slightly down.

The Burn and herbicide treatment on Moon Ridge (16A-13) effectively killed most of the greasewood on the site. Soil trend appears stable with a limited, but developing herbaceous understory and browse population.

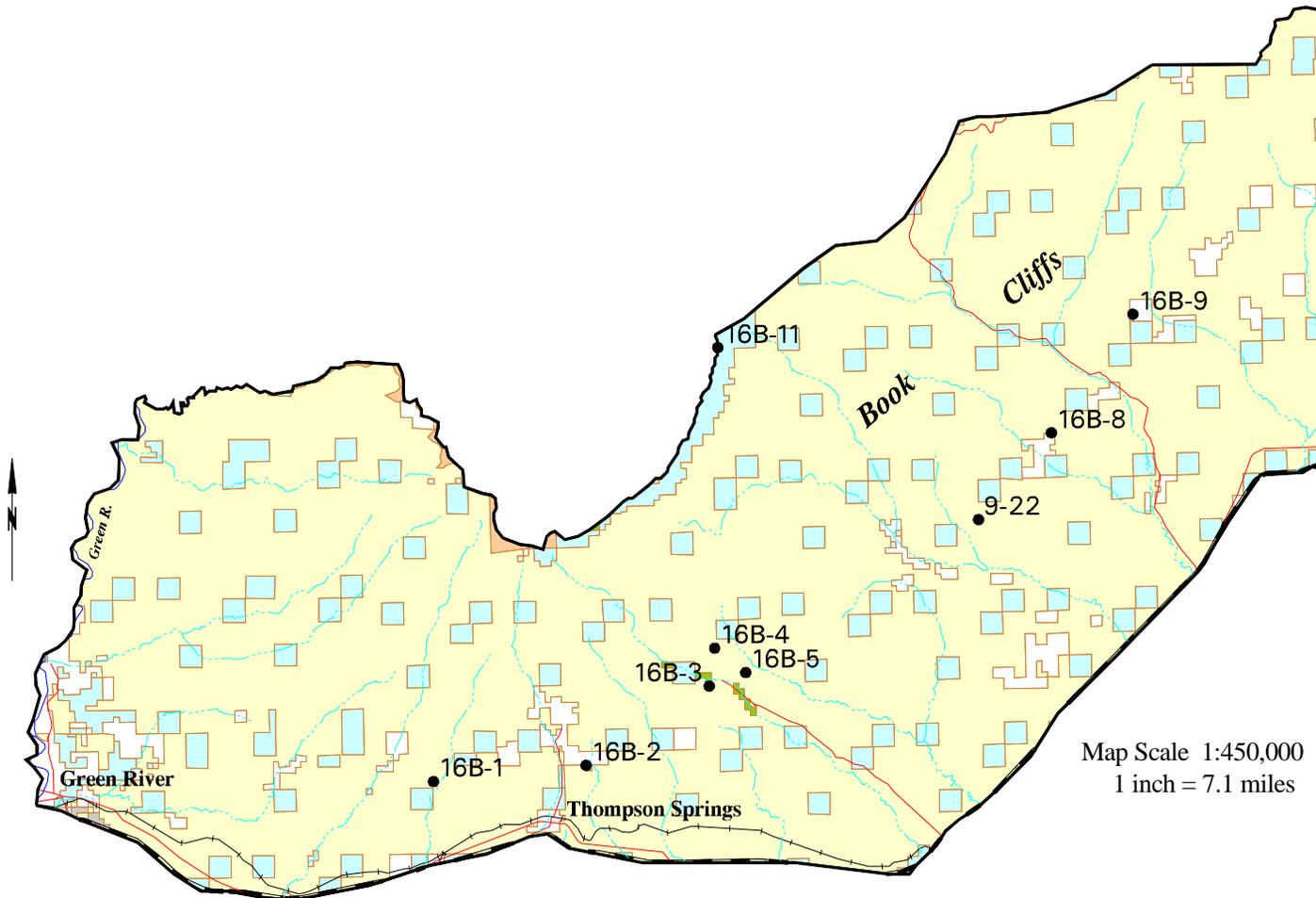
Summer range is sampled by Willow Flat (16A-5), Wirefence Point (16A-4) and Black Horse (16A-8). Both Willow Flat and Wirefence Point are mountain big sagebrush sites which were sprayed to enhance herbaceous vegetation. These sites display stable soil and herbaceous trends. Frequency of grasses declined at Willow Flat while frequency of forbs increased. Browse are not the most important vegetational aspects of this summer range. Browse trends are up however, at Willow Flat. Continuing increases in browse will eventually cause a downward herbaceous trend. Browse trend at Wirefence Point is stable.

The study on Black Horse (16A-8) samples a mixed mountain brush stand. Soil trend at this site is stable to improving. Herbaceous trend is stable while the browse trend is improving.

Big game use has been light overall. Frequency of elk pellet groups was highest on the McCook Ridge Chaining (24%), McCook Ridge Exclosure (18%) and Willow Flat (14%) and below 5% on all other sites. Pellet group frequency of Deer was

highest at Wolf Den (52%). Other sites which showed moderately high frequency of deer pellet groups included McCook Ridge Exclosure (18%), McCook Ridge Chaining (24%), and Willow Flat (14%).

# Deer Management Unit 16B –1995 Transect Locations



Map Scale 1:450,000  
1 inch = 7.1 miles

## LEGEND

- |                 |                                |                     |
|-----------------|--------------------------------|---------------------|
| BLM             | Military                       | Railroad            |
| State of Utah   | State Wildlife Res./Mgmt. Area | Perennial Stream    |
| Native American | Transect Location              | Intermittent Stream |
| Private Land    | Road                           |                     |

## MAP LOCATION



DEER HERD UNIT 16B - SOUTH BOOK CLIFFS

BOUNDARY DESCRIPTION

Grand County - Boundary begins at Interstate 70 and the Green River; then north along this river to the Ute Indian Reservation boundary; east along this boundary to the North-South Bookcliffs drainage divide; northeast along this divide to the Colorado State line; south along the state line to Interstate 70; west on Interstate 70 to the Green River and beginning point.

Herd Unit Description

Deer herd Unit 16B is located south of the summit of the Book Cliffs (Colorado-Green River drainage divide) and is dominated by the Roan and Book Cliffs. The primary drainage of the area is the Green River, which forms the unit's western boundary. Secondary drainages include Rattlesnake Canyon, Tusher Canyon, Floy Wash, Thompson Canyon, Diamond Canyon, Cottonwood Canyon, and Westwater Creek. Most of these are comprised of intermittent flows and are often dry, especially at lower elevations. Communities along I-70 on the unit's southern boundary include Green River, Crescent Junction, and Thompson. Following is a table listing approximate acreages by range type and land ownership:

	Summer Range	Winter Range	Non-Range	Total
BLM	46,580	460,320	181,470	688,370
State	11,190	57,430	27,350	95,970
Indian	1,660	470	0	2,130
Private	1,260	14,410	16,930	32,600
Military	0	0	440	440
DWR	50	540	0	590
Total	60,740	533,170	226,190	820,100

Pictographs and petroglyphs found in the unit indicate historically the presence of bighorn sheep, deer, buffalo, and elk in the area before settlement by Europeans. Although large herds of cattle and sheep were brought into the area around Moab in the mid-1870's and the 1890's respectively, livestock use on the South Book Cliffs was limited to local settlers stock. This changed in the 1920's, when Colorado sheepmen began wintering large herds on the South Bookcliffs. During this period, as many as 200,000 sheep were using the range each winter (Carter 1983). Hundreds of wild horses were also present during the early 1900's, however, none remained when the Wild Horse and Burro Act was passed in 1971. In cooperation with local ranchers, the BLM has been working on fences, water developments, and other improvements to encourage more uniform use of the range by livestock (Carter 1983). Oil and gas exploration and development, combined with livestock grazing, are the major land uses. Recreational use is low, with peak use in the fall during the deer and elk hunts.

Deer herd unit 16B is valuable mainly as deer winter range. With a maximum elevation just over 9,000 feet, the unit contains only small amounts of fawning areas and summer range with few deer residing in the unit year-round. However, most of the deer that spend the summer on higher ranges in the adjacent unit 16A,

migrate annually to the winter range in unit 16B. The steep and rugged country in between the higher summer range and lower winter range is used primarily as a travel corridor with limited use as migration occurs in a short period of time. The upper limits of the normal winter range are found normally between 8,000 and 8,500 feet, depending on the slope and exposure. During severe winters the upper limits are usually pushed down by snow to about the 7,000 foot level. The lower limits of the winter range are bordered by the salt desert type at approximately 5,000 feet. There are concentrations of wintering deer at the Horse Pasture, Nash Wash, Cottonwood Ranch, and the Pear Park area. Due to the steep, rough terrain at the upper elevations of the winter range, these lower critical areas have been historically over utilized by livestock and game for a long period of time.

#### Big game trend

Following the liberal hunting regulations of the late 1950's and 1960's, deer numbers were low and recovery has been slow. The buck only (1974-77) and 4-point-or-better (1978-84) restrictions have played a role in increases in deer numbers and hunter success. Between 1986 and 1993, the harvest of bucks has slowly declined from 703 to 241. The extended drought and the harsh winter of 1992-93 have had detrimental effects upon the deer population in the Bookcliffs and throughout the state.

Other big game species residing within the unit boundaries include elk and antelope. Elk hunting has been on a control permit basis and annual harvests between 1973 and 1987 have averaged 27 bulls and 12 antlerless in those years when antlerless permits were issued. Between 1988 and 1994 an average of 56 bulls were harvested from the combined 16A and 16B units. Most of the hunting on the North Book Cliffs unit takes place in the limited mountain brush type (summer range). The existing elk herd management objectives are currently being revised to reflect the changes in Public Land forage reallocation for wildlife.

The Cisco antelope unit is also within deer herd unit 16B. This antelope unit originated from a herd transplanted adjacent to the state line in Colorado. Aerial counts averaged 46 animals between 1978 and 1983, when a supplemental transplant of 150 animals was made. Since that time, counts have averaged well over 200.

At a local interagency meeting in Moab in May 1986, interagency personnel selected 9 big game range trend study sites for the South Book Cliff unit. All of the studies are located on BLM administered land. These transects were established by the DWR Range Crew in June 1986 and were reread in June 1995. A site description, map, trend discussion, and data tables for each of the transects follows.

TREND STUDY 16B-1-95

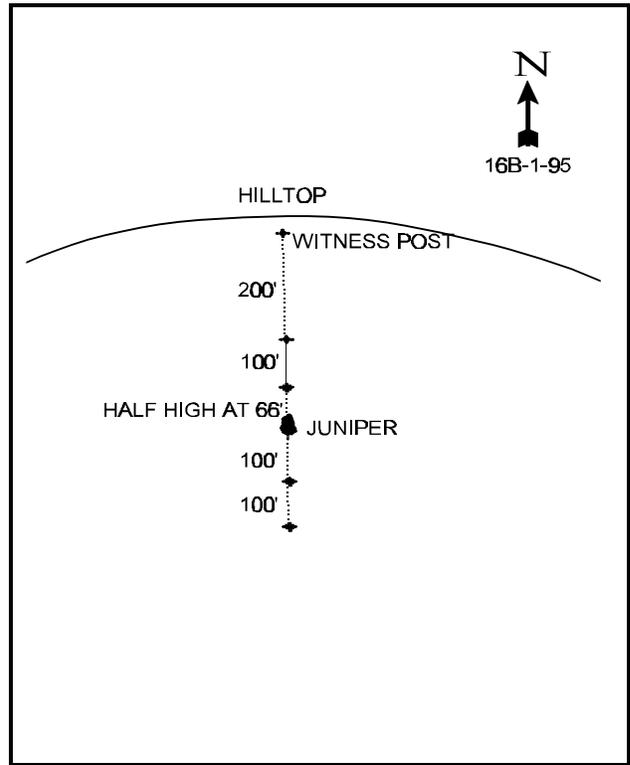
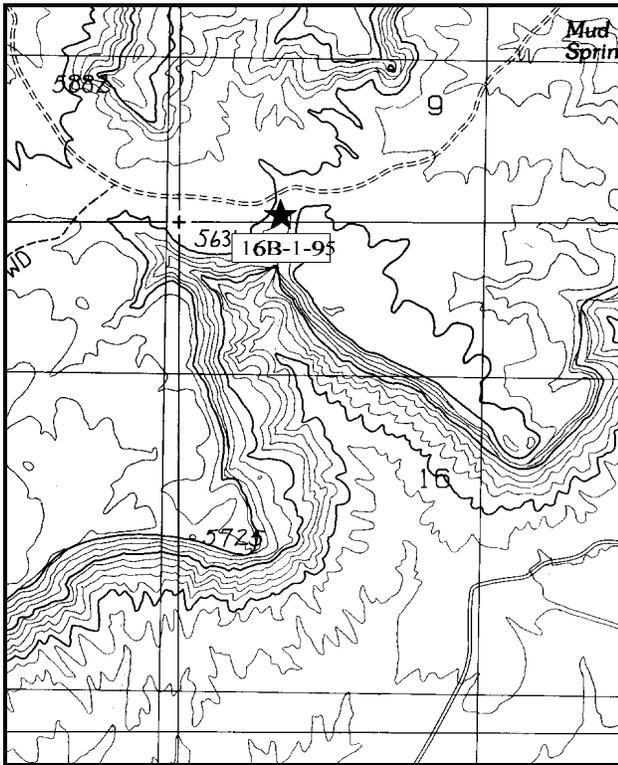
Study site name: East Floy Bench. Range type: Big Sagebrush.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

Go to Crescent Junction, off of I-70 east of Green River. From the railroad crossing east of the gas station and SR 163 junction, cross the east-west running tracks and go north two miles on the main dirt road to a fork. Bear right and go 3.6 miles to a fork on top of a hill. Turn left. Continue .45 miles to the crest of a small hill. There is a rebar witness post 10 feet to the left. The 0-foot baseline stake, marked with a browse tag, is 200 feet south of the witness post.



Map Name: Crescent Junction

Diagrammatic Sketch

Township 21S, Range 19E, Section 9/16 UTM COOR. 6-02-695E 12 43-17-167N

## DISCUSSION

### Trend Study No. 16B-1

This transect is located on a low lying bench running along the south end of the Book Cliffs. The bench has a north aspect with a 3-5% slope and an elevation of 5,600 feet. This sagebrush-pinyon-juniper flat drops off abruptly at the southern edge to the salt desert below. This study is located on BLM administered land in the Floy Creek Allotment. In 1986 it was grazed by 1,208 sheep from mid-November to mid-April. Previous to this time, the average 5 year use was 818 sheep for 5 months. Grazing is currently permitted from late December through the first of May for cows at 958 AUM's. However, the area where the study is located may be grazed anytime during the season. Pellet group quadrat frequencies indicate light to moderate deer use, occasionally light use by elk, and high rabbit use.

The sandy soil is moderately deep, although, there are large areas of exposed and shallow covered sandstone bedrock. There is 39% bare soil cover and 10% cryptogamic crust cover. Some soil movement is evident, but due to the gentle slope and cryptogamic cover, it is slight. Vegetative cover is now estimated at 23% with litter cover at 31%. Rock and pavement cover combine for less than 2% of the ground cover.

Wyoming big sagebrush is the preferred key browse species with an estimated density of 1,060 plants/acre. Mature plants comprise 75% of the population with young plants comprising 23% of the population. Percent decadency has declined from 18% down to only 1%, while the percent of the plants classified as heavily hedged has declined significantly. Grazing intensity is light to moderate with very few plants showing heavy hedging. The population appears to be naturally thinning itself in response to extended drought with one out of every five plants sampled classified as dead.

Due to the larger sample size and better sample distribution used in 1995, considerably more browse species were picked. Some of these shrubs include: broom snakeweed, spiny hopsage, green ephedra, shadscale, rubber rabbitbrush, low rabbitbrush, slenderbush eriogonum, and Opuntia. These shrubs show light utilization and good vigor. Broom snakeweed is the most abundant but doesn't appear to be increasing in density at this time with the majority of the population (98%) now classified as mature. Point center-quarter method estimated a low number (16 trees/acre) of juniper trees on the site.

From 1986 to 1995, there has been a significant decline in sum of nested frequency for galleta, bottlebrush squirreltail, and needle-and-thread grass. Also, sum of nested frequency for perennial grasses has declined by nearly 50% since 1986. The extended drought, as well as the dry summer months in 1995, are the most likely cause for this decrease. The most abundant grass on the site is cheatgrass. It was not included in the sampling procedure in 1986, but was reported as "not being overwhelmingly abundant." It now largely occurs over the whole site as illustrated with a quadrat frequency of 97%, while accounting for 55% of the grass cover or 28% of the total vegetative cover. Another annual, sixweeks fescue, is also present but in low abundance. Salina wildrye, sand dropseed, and red threeawn were sampled in 1995, but not in 1986.

All but one of the forbs sampled in 1995 is an annual species. Most of these are very small and add little forage or ground cover to the site.

### 1986 APPARENT TREND ASSESSMENT

Data and observations indicate a slight downward trend under the current winter sheep grazing regime. The palatable shrubs are moderately to heavily hedged and

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

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable

browse - stable

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

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 1

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Aristida purpurea	-	1	-	1	.03
G	Bromus tectorum	-	318	-	97	6.72
G	Elymus salina	-	*15	-	5	1.10
G	Hilaria jamesii	156	*65	66	27	1.10
G	Oryzopsis hymenoides	36	*37	21	19	1.91
G	Sitanion hystrix	40	*7	17	4	.07
G	Sporobolus cryptandrus	-	5	-	2	.03
G	Stipa comata	92	*40	42	19	.92
G	Vulpia octoflora	-	75	-	27	.21
Total for Grasses		324	563	146	201	12.11
F	Chenopodium leptophyllum	-	2	-	1	.00
F	Descurainia pinnata	-	3	-	1	.00

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	Draba spp.	-	17	-	5	.02
F	Eriogonum cernuum	-	10	-	4	.02
F	Erigeron pumilus	-	0	-	3	.01
F	Lappula occidentalis	-	67	-	24	.12
F	Plantago patagonica	-	42	-	17	.09
F	Tragopogon dubius	3	-	1	-	-
Total for Forbs		3	146	1	55	0.28
B	Artemisia tridentata wyomingensis	6	17	3	9	4.20
B	Atriplex canescens	8	*1	4	1	.56
B	Atriplex confertifolia	-	4	-	1	.03
B	Ceratoides lanata	1	6	1	3	.45
B	Chrysothamnus viscidiflorus stenophyllus	-	1	-	1	.15
B	Eriogonum microthecum	3	3	1	1	.00
B	Grayia spinosa	3	6	1	2	.33
B	Gutierrezia sarothrae	115	*88	56	39	3.82
B	Juniperus osteosperma	-	-	-	-	2.25
B	Opuntia spp.	3	-	2	-	-
Total for Browse		139	126	68	57	11.82

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

BASIC COVER --

Herd unit 16B, Study no: 1

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	337	2.25	23.38
Rock	42	0	1.45
Pavement	66	0	.44
Litter	387	35.75	31.51
Cryptograms	235	2.50	10.39
Bare Ground	335	59.50	39.23

PELLET GROUP FREQUENCY --  
Herd unit 16B, Study no: 1

Type	Quadrat Frequency '95
Sheep	7
Rabbit	58
Elk	5
Deer	20

BROWSE CHARACTERISTICS --  
Herd unit 16B, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
Y	86	21	5	4	-	-	-	-	-	-	29	-	1	-	1000		30	
	95	3	9	-	-	-	-	-	-	-	9	-	-	3	240		12	
M	86	-	11	16	2	3	4	-	-	-	31	1	4	-	1200	15	14	36
	95	16	22	2	-	-	-	-	-	-	37	-	-	3	800	23	39	40
D	86	-	6	7	-	-	2	-	-	-	15	-	-	-	500		15	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	220		11	
Total Plants/Acre (excluding Dead & Seedlings)												'86	2700	Dec:	18%			
												'95	1060		1%			
<i>Atriplex canescens</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	27	37	6
D	86	1	2	4	2	-	1	-	-	-	6	-	2	2	333		10	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	333	Dec:	100%			
												'95	140		0%			
<i>Atriplex confertifolia</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	3	1	-	-	-	-	-	-	5	-	-	-	100	22	32	5
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	100		-			
<i>Ceratoides lanata</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	2	-	2	7	-	-	-	-	12	-	-	-	240	15	17	12
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	260		-			

A G E	YR	Form Class (No. of 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 nauseosus consimilis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	21	20	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	20		100%			
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	2	-	-	-	-	-	5	-	-	-	100	16	34	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	2	-	-	-	-	-	-	-	-	1	-	-	1	40			2
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	200		20%			
<i>Ephedra spp.</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
<i>Ephedra viridis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	63	97	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Eriogonum microthecum</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	4	-	-	-	-	-	6	-	-	-	120	-	-	6
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	140		-			
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60	25	44	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	120		50%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
S	86	10	-	-	-	-	-	-	-	-	10	-	-	-	333		10	
	95	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
Y	86	112	-	-	-	-	-	-	-	-	112	-	-	-	3733		112	
	95	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	86	129	-	-	-	-	-	-	-	-	129	-	-	-	4300	8 7	129	
	95	295	-	-	7	-	-	-	-	-	302	-	-	-	6040	9 11	302	
D	86	5	-	-	-	-	-	-	-	-	5	-	-	-	166		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	8199	Dec:	2%			
												'95	6140		0%			
<i>Juniperus osteosperma</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	71 71	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
<i>Opuntia spp.</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	7 1	1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5 21	1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	-			
												'95	20		-			

PERCENT BROWSE COMPOSITION--

Herd unit 16B, Study no: 1

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	24	13
<i>Atriplex canescens</i>	3	2
<i>Atriplex confertifolia</i>	0	1
<i>Ceratoides lanata</i>	0	3
<i>Chrysothamnus nauseosus consimilis</i>	0	.24
<i>Chrysothamnus viscidiflorus stenophyllus</i>	0	2
<i>Ephedra</i> spp.	0	.24
<i>Ephedra viridis</i>	0	0
<i>Eriogonum microthecum</i>	0	2
<i>Grayia spinosa</i>	0	1
<i>Gutierrezia sarothrae</i>	72	75
<i>Juniperus osteosperma</i>	.58	0
<i>Opuntia</i> spp.	.29	.24

TREND STUDY 16B-2-95

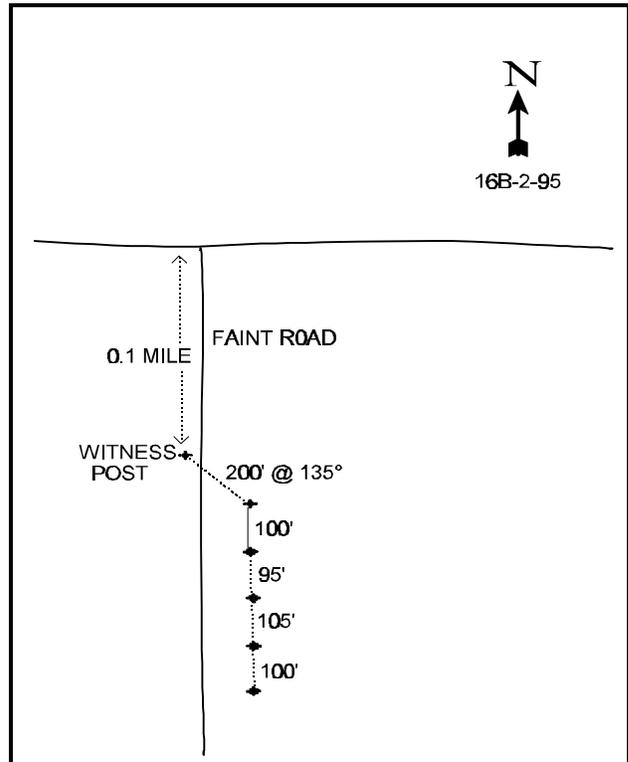
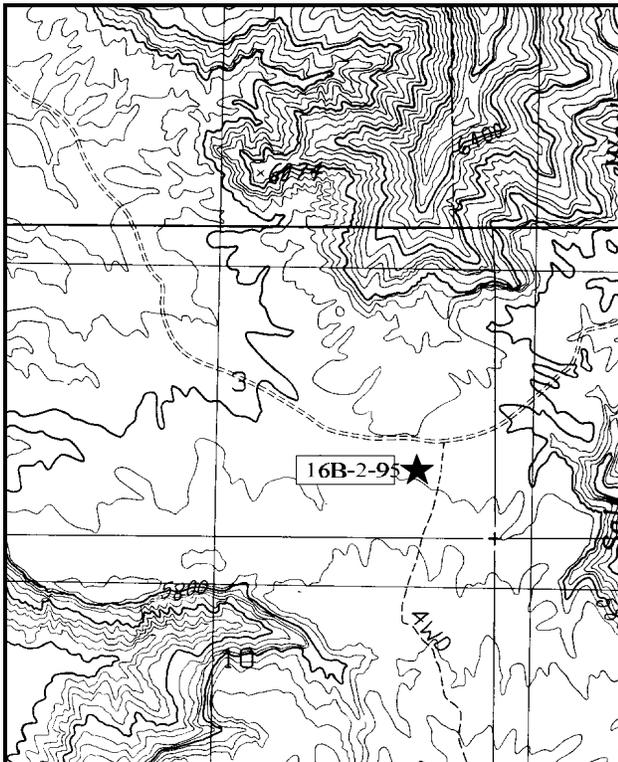
Study site name: East Thompson Bench. Range type: Juniper.

Compass bearing: frequency baseline 180 degrees.

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 railroad crossing in the town of Thompson, travel 1.4 miles north up the main road to a fork. Stay left and go 2.1 miles to the Thompson Canyon pictographs. Continue .35 miles. Make a sharp right turn and go .25 miles past an old house and a railroad cut to a fork. Turn right across a deep gully and go 1.15 miles to a fork. Stay left and continue .55 miles to a very faint road on the right. Turn on this road and go .1 mile to a witness post (a steel rebar) on the right side of the road. The first baseline post is 200 feet at a bearing of 135 degrees true from the witness post.



Map Name: Sego Canyon

Diagrammatic Sketch

Township 21S, Range 20E, Section 3 UTM COOR. 6-13-837E 12 43-18-350N

## DISCUSSION

### Trend Study No. 16B-2

This transect is located on a low lying bench east of Thompson Canyon at an elevation of 5,800 feet. It is a broad flat bench, dominated by junipers and intermixed with small openings of Wyoming big sagebrush. The bench has a gentle slope with a northern aspect. Water is limited in the area, but spring runoff flows through most of the intermittent washes in late winter or early spring. This site was located within the Barley Flat allotment, which has been combined with the Nash Wash Allotment. Now this combined allotment is called the Cisco allotment. It has 4 permittees and is grazed from late October through early May by cows for 1,652 AUM's. Sheep are permitted from early December through early May for 1,707 AUM's. In 1986, the BLM reported 61% use in the area by sheep. In the past, the area was thought to be used heavily by deer, but data from 1995 did not supportive conclusion for there was not much sign of them using the area.

The light reddish-tan, sandy soil is bare of protective cover on 31% of the area with a lightly capped thin crust. There is little soil protection from vegetation and litter in the shrub interspaces. But, due to the gentle slope of the site and the vegetative (27%) and litter (35%) cover, there is little evidence of erosion. Soil movement is most evident on trails or where the soil has been disturbed. Most of the litter and cryptogams are located directly beneath the canopy of the Wyoming big sagebrush. There is less than 1% cover contributed by rock and pavement combined.

Utah juniper predominates and comprises 51% of the vegetative cover with an estimated density of 108 trees/acre. The preferred key browse species is Wyoming big sagebrush with an estimated density of 1,680 plants/acre. In 1986, the small openings were not sampled very well and a lower plant density was estimated. In 1995, the sagebrush height is nearly the same at 1½ feet but the crown measurement has increased to 2½ feet. Fifty-one percent were decadent in 1986, now 41% of the plants are classified as decadent with nearly half of those reported as dying. Over grazing in the past coupled with an extended drought has lead to much of the crown death and is likely the cause for the high decadent and dying numbers. Although the proportion of young plants has decreased, the percentage of seedlings shows excellent biotic potential for 1995. Broom snakeweed density is estimated at 1,160. When combined with juniper, this could inhibit sagebrush production and reproductive success.

Cheatgrass and sixweeks fescue are the dominant grass species on the site, combined they provide 34% of the herbaceous cover. Galleta grass is the most abundant perennial grass followed by bottlebrush squirreltail. In 1986 an Elymus spp. was reported as growing vigorously in density plot number 1, but was not common elsewhere. With the increased sample size used in 1995, Elymus and muttongrass were encountered. These grasses, in addition to Indian ricegrass, occur sporadically throughout the site and are in low abundance.

The most abundant perennial forb, timber poisonvetch, showed signs of use by insects in 1986, yet in 1995 there were no signs of any kind of use. Although considered palatable by all classes of livestock, this plant is in some instances toxic, and in others, a highly nutritious plant (high protein content). Other perennial forbs encountered include: longleaf phlox, low erigeron, Indian paintbrush, and sego lily. Sum of nested frequency for perennial species increased since 1986 with increases in timber poisonvetch and sego lily. Annual species dominate the scant forb understory and provide very little ground cover or forage.

1986 APPARENT TREND ASSESSMENT

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

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable

browse - slightly upward for Wyoming big sagebrush

herbaceous understory - stable, but poor with too many annuals

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 2

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Bromus tectorum	-	190	-	73	1.41
G	Elymus spp.	-	*29	-	11	.63
G	Hilaria jamesii	129	*65	54	25	.74
G	Oryzopsis hymenoides	14	*1	6	1	.03
G	Poa fendleriana	-	*16	-	6	.03
G	Sitanion hystrix	49	52	23	25	.83
G	Vulpia octoflora	-	186	-	58	.44
Total for Grasses		192	539	83	199	4.12
F	Astragalus convallarius	13	21	7	9	.27
F	Astragalus spp.	-	*5	-	3	.01

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	Castilleja linariaefolia	9	8	3	4	.04
F	Carduus nutans	-	*17	-	8	.04
F	Chenopodium fremontii	-	1	-	1	.00
F	Cryptantha spp.	-	14	-	7	.03
F	Descurainia spp.	-	26	-	10	.05
F	Eriogonum cernuum	-	3	-	2	.01
F	Erigeron pumilus	2	6	2	4	.04
F	Euphorbia spp.	-	1	-	1	.00
F	Gilia hutchinifolia	-	72	-	31	.20
F	Lappula occidentalis	-	6	-	3	.01
F	Lepidium densiflorum	-	139	-	47	.51
F	Phlox longifolia	13	*10	5	3	.01
F	Schoenocrambe linifolia	-	2	-	1	.00
F	Sisymbrium altissimum	-	5	-	2	.01
F	Unknown forb-perennial	1	-	1	-	-
Total for Forbs		38	336	18	136	1.28
B	Artemisia tridentata wyomingensis	48	*27	22	16	5.23
B	Ephedra viridis	-	1	-	1	.00
B	Gutierrezia sarothrae	46	*22	22	12	.43
B	Juniperus osteosperma	9	-	3	-	11.85
B	Opuntia spp.	-	2	-	1	.15
Total for Browse		103	52	47	30	17.68

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

BASIC COVER --

Herd unit 16B, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	321	8.25	26.71
Rock	16	0	.68
Pavement	28	0	.10
Litter	382	40.25	34.96
Cryptograms	203	4.25	9.87
Bare Ground	255	47.25	30.85

PELLET GROUP FREQUENCY --  
Herd unit 16B, Study no: 2

Type	Quadrat Frequency '95
Sheep	22
Rabbit	43
Deer	19

BROWSE CHARACTERISTICS --  
Herd unit 16B, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	26	-	-	1	-	-	-	-	-	27	-	-	-	540		27	
Y	86	-	4	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	86	-	2	5	-	-	2	-	-	-	7	2	-	-	300	18	20	
	95	9	17	17	-	-	-	-	-	-	43	-	-	-	860	20	31	
D	86	-	1	8	-	-	5	-	-	-	8	1	1	4	466		14	
	95	13	19	2	-	-	1	-	-	-	19	-	-	16	700		35	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1460		73	
Total Plants/Acre (excluding Dead & Seedlings)												'86	899	Dec:	51%			
												'95	1680		41%			
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	2	-	-	1	-	-	-	-	-	3	-	-	-	60	16	16	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	80		-			
<i>Gutierrezia sarothrae</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	11	-	-	-	-	-	-	-	-	11	-	-	-	366		11	
	95	13	-	-	2	-	-	-	-	-	15	-	-	-	300		15	
M	86	93	-	-	-	-	-	-	-	-	93	-	-	-	3100	8	7	
	95	39	-	-	4	-	-	-	-	-	43	-	-	-	860	8	8	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	3466	Dec:	-			
												'95	1160		-			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Juniperus osteosperma																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100	94	104	3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	200	Dec:	-			
												'95	0		-			
Opuntia spp.																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	7	7	1
	95	1	-	-	-	-	-	1	-	-	2	-	-	-	40	6	12	2
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	-			
												'95	40		-			

PERCENT BROWSE COMPOSITION--

Herd unit 16B, Study no: 2

Species	Percent of Total	
	'86	'95
Artemisia tridentata wyomingensis	20	57
Ephedra viridis	0	3
Gutierrezia sarothrae	75	39
Juniperus osteosperma	4	0
Opuntia spp.	.72	1

TREND STUDY 16B-3-95

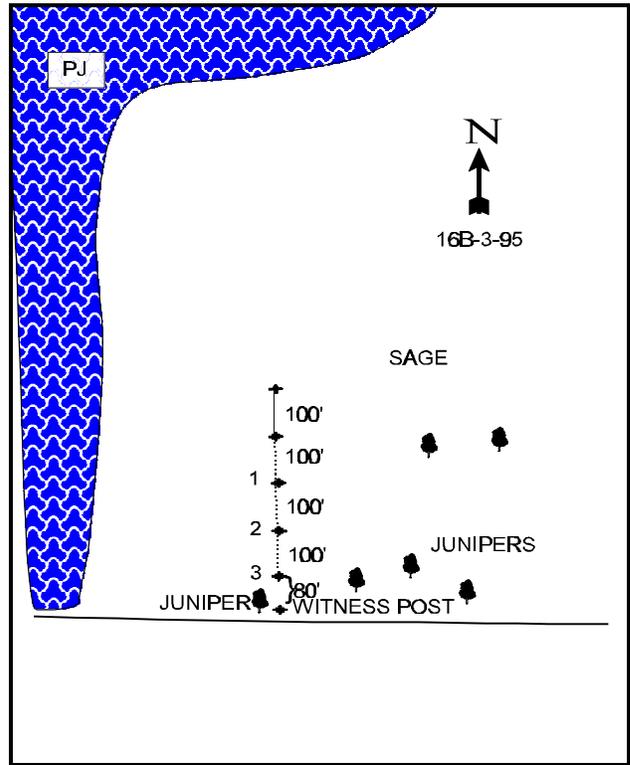
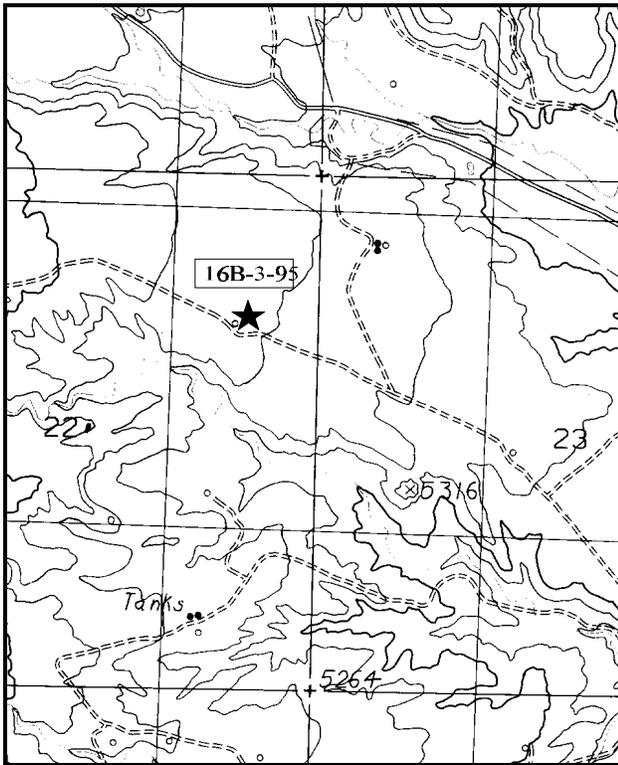
Study site name: West Horse Pasture. Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the western Cisco exit off of I-70, go 1.4 miles towards Cisco. Turn left onto the Nash Draw Road (near mile marker 43). Travel 1.1 miles to the freeway underpass. Continue on this road 10.5 miles to a gate by some corrals. From the gate, proceed up the main road .9 miles. Turn left. Go through a gate (100 yards) and proceed .2 miles to a fork at the top of a hill. Turn left. Go .35 miles to a "T" intersection. Turn right and go 1.5 miles to a well [NP Energy #23-3]. Travel northwest .55 miles to another well [NP Energy #22-1]. Continue northwest for .2 miles to a rebar witness post on the right side of the road next to a small Juniper. Density plot number three is 80 feet due north of the witness post. The frequency baseline starts 400 feet north at a rebar tagged with browse tag #7807.



Map Name: Sego Canyon

Diagrammatic Sketch

Township 20S, Range 21E, Section 22 UTM COOR. 6-22-831E 12 43-24-128N

## DISCUSSION

### Trend Study No. 16B-3

This transect is located south of Nash Wash and samples a critical winter range for deer. It is in a large, open Wyoming big sagebrush flat surrounded by junipers and eroded steep cliffs to the north and west. Elevation at the site is 5,300 feet. Not only is this a critical deer winter concentration area, it also supports many other uses including: cattle and sheep grazing, oil and gas exploration and production with the associated extensive road network, mining, and associated human activity. Pellet group transects located in the Horse Pasture area show an average use of 143 deer days use/hectare between 1981 and 1986 (Jense et al. 1986). From 1986 through 1990, the last time this pellet transect was read, use averaged 95 deer days/hectare (Jense et al. 1991). In 1986, four antler drops were found, but none were found in 1995. Cover for deer is provided by nearby dense, mature Utah Juniper stands. This site is now located within the combined allotment identified as the Cisco allotment. This allotment has 4 permittees and is now grazed from late October through early May by cows for 1,652 AUM's. Sheep are permitted to graze from early December through early May for 1,707 AUM's.

The transect site is basically flat, and is drained to the southeast by a seasonal wash. There is some evidence of surface erosion and an active gully runs between the 300 and 400 foot stake making it necessary to sample line 4 at the 28 foot mark. The soil surface layer is made up of a fine, light brown, semi-desert sandy loam. Vegetative cover is estimated at 36% with a moderate amount of litter cover (46%), although neither is uniformly distributed. The herbaceous cover is concentrated in and immediate vicinity of the sagebrush. The remainder of the vegetative cover comes mainly from Wyoming big sagebrush and broom snakeweed. Consequently, there is a good amount of exposed soil subject to wind and water erosion, especially if disturbed by offroad vehicles or animals.

The key species is Wyoming big sagebrush; a species which has been utilized heavily for many years on this site. The sagebrush average height measurements have increased to 1½ feet with an average crown measurement of 2½ feet. In 1986 forage availability was limited due to severe hedging. This is no longer a problem due to a decrease in the proportion of heavily hedged plants and good leader growth. While 50% of the plants are still heavily hedged, this is an improvement from 1986 when it was estimated that 93% of the plants were heavily hedged. Fifty-five percent of the population were reported as decadent in 1986. This has dropped in 1995 when only 26% of the plants were classified as decadent. Even with these improvements, a high proportion (60%) of the decadent plants were classified as dying in 1995 and 1 out of every 6 plants sampled is dead. Young plants comprise only 2% of the population and no seedlings were found in 1995.

Broom snakeweed comprises 77% of the browse composition and shows no signs of utilization. Although the population appears to be greatly increasing, this is likely not the case. Both the Wyoming big sagebrush and broom snakeweed population estimates increased since 1986, but the browse composition has change only slightly. This change is due primarily to the increased sample size and much better sample distribution used in 1995. The population estimates are much more representative of the actual population densities. Spiny hopsage, which was encountered in 1986, was not sampled in 1995. There are some scattered young junipers throughout the flat, but they do not appear to be encroaching into the area.

As reported in 1986, the grass composition is dominated by annual cheatgrass, with perennial grasses being relatively scarce. The most numerous perennial grass encountered in 1986 was sand dropseed. In 1995, sand dropseed was not sampled, but two additional grasses, galleta and bottlebrush squirreltail,

significantly increased in sum of nested frequency. Indian ricegrass is present but mainly restricted to the protected areas under the sagebrush.

Globemallow occurs throughout the area, along with several species of Astragalus and low fleabane. The most abundant forb is woolly Indianwheat, which is very low growing and of poor forage value or cover. Basically, the herbaceous understory has a poor composition, but is not unusual for this range type.

#### 1986 APPARENT TREND ASSESSMENT

Wyoming big sagebrush on the site is sustaining severe heavy use and data indicates an apparent declining trend in vigor, age structure, and forage production. Ninety-eight percent of the sagebrush population is mature or decadent. The primary management objective should be to promote sagebrush seed production to enhance the opportunity for recruitment, but this is difficult with the high density of competing winter annuals in a very dry summer environment. Plant vigor should improve for seed production to occur. A combination of management practices could take place for this to happen. Grazing pressure on sagebrush must be greatly reduced. A thinning project designed to open up the stand by 40% will serve to reduce intraspecific competition and open up space for seedling establishment. Key browse species should be seeded in conjunction with the thinning treatment.

#### 1995 TREND ASSESSMENT

Although the Wyoming big sagebrush is not as heavily hedged as in the past (95% vs 51%) and percent decadency in the population has decreased (54% vs 26%), 98% of the population still remains classified as mature or decadent. The broom snakeweed density, judging from its composition, appears to be relatively stable, although it is shifting to a more mature age structure. This leads to a stable browse trend, and as mentioned in 1986, management objectives should be to promote sagebrush seed production. Concurrently, the herbaceous understory would benefit if the Wyoming big sagebrush population were thinned, but more importantly there should be fewer winter annuals for the herbaceous species to compete with. Wyoming big sagebrush now contributes over 12% of the vegetative cover. With this high of a cover value from Wyoming big sagebrush, the herbaceous understory production is reduced. Anything more than an annual herbaceous understory should not be expected. The increase in sum of nested frequency for galleta and bottlebrush, which are good to fair forage in the spring, and the increase in sum of nested frequency for perennial forbs, indicates a slightly upward herbaceous understory trend. Although this trend is slightly upward, this is still a poor composition and is nonetheless dominated by annual species. An active gully is located in the center of the study site, but shows some signs of healing. Elsewhere on the site, there is not much evidence of erosion, mostly due to the dense cheatgrass and Wyoming big sagebrush cover. Soil trend for this site is stable for now and the gully should be monitored in the future for further activity.

#### TREND ASSESSMENT

soil - stable

browse - stable, but poor composition for Wyoming big sagebrush (biotic potential and percent young are very low)

herbaceous understory - slightly upward but poor composition

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 3

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Bromus tectorum	-	374	-	100	12.08
G	Hilaria jamesii	2	*50	2	19	1.25
G	Oryzopsis hymenoides	1	3	1	1	.15
G	Sitanion hystrix	3	*42	2	23	.44
G	Sporobolus cryptandrus	12	*-	5	-	-
G	Vulpia octoflora	-	10	-	3	.01
Total for Grasses		18	479	10	146	13.94
F	Astragalus convallarius	5	12	3	6	.17
F	Astragalus moencopensis	1	-	1	-	-
F	Astragalus spp.	3	*28	2	11	.05
F	Castilleja linariaefolia	-	-	-	-	.00
F	Carduus nutans	-	3	-	1	.00
F	Castilleja spp.	-	*6	-	3	.16
F	Descurainia spp.	-	11	-	4	.02
F	Draba spp.	-	1	-	1	.00
F	Erigeron pumilus	1	-	1	-	-
F	Gilia hutchinifolia	-	8	-	4	.02
F	Holosteum umbellatum	-	21	-	13	.06
F	Lappula occidentalis	-	31	-	11	.05
F	Leucelene ericoides	-	1	-	1	.00
F	Lepidium spp.	-	51	-	23	.11
F	Oenothera spp.	-	5	-	2	.01
F	Phlox longifolia	-	*19	-	9	.04
F	Plantago patagonica	-	129	-	50	.30
F	Sphaeralcea coccinea	20	28	10	12	.16
F	Unknown forb-perennial	3	-	1	-	-
Total for Forbs		33	354	18	151	1.19
B	Artemisia tridentata wyomingensis	72	*58	32	33	12.32
B	Grayia spinosa	7	-	3	-	-
B	Gutierrezia sarothrae	85	141	41	62	7.67
B	Opuntia spp.	-	-	-	-	.00
Total for Browse		164	199	76	95	20.01

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

BASIC COVER --

Herd unit 16B, Study no: 3

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	382	24.50	36.40
Rock	10	0	.07
Pavement	-	0	0
Litter	393	48.00	45.56
Cryptograms	139	0	1.89
Bare Ground	311	27.50	29.78

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 3

Type	Quadrat Frequency	
	'86	'95
Rabbit	-	49
Deer	-	44

BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 3

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
Y	86	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	3	-	-	-	-	-	-	-	4	-	1	-	100		5	
M	86	-	-	11	1	-	6	-	-	-	17	-	1	-	1200	12 14	18	
	95	12	59	65	-	4	13	-	-	-	153	-	-	-	3060	17 30	153	
D	86	-	-	17	-	1	5	-	-	-	15	-	6	2	1533		23	
	95	1	26	20	-	1	9	-	-	-	23	-	-	34	1140		57	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	760		38	
Total Plants/Acre (excluding Dead & Seedlings)												'86	2799	Dec:	54%			
												'95	4300		26%			
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	1	-	-	-	1	-	-	-	66	13 17	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10 20	0	
D	86	-	-	-	-	-	3	-	-	-	2	-	1	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	266	Dec:	75%			
												'95	0		0%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Gutierrezia sarothrae</i>																		
S	86	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
Y	86	60	-	-	-	-	-	-	-	-	60	-	-	-	4000		60	
	95	262	-	-	2	-	-	-	-	-	264	-	-	-	5280		264	
M	86	47	-	-	-	-	-	-	-	-	47	-	-	-	3133	10 7	47	
	95	481	-	-	10	-	-	-	-	-	491	-	-	-	9820	12 13	491	
D	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	7533	Dec:	5%			
												'95	15140		0%			
<i>Opuntia spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200	6 18	10	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	200		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 16B, Study no: 3

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	26	22
<i>Grayia spinosa</i>	3	0
<i>Gutierrezia sarothrae</i>	71	77
<i>Opuntia spp.</i>	0	1

TREND STUDY 16B-4-95

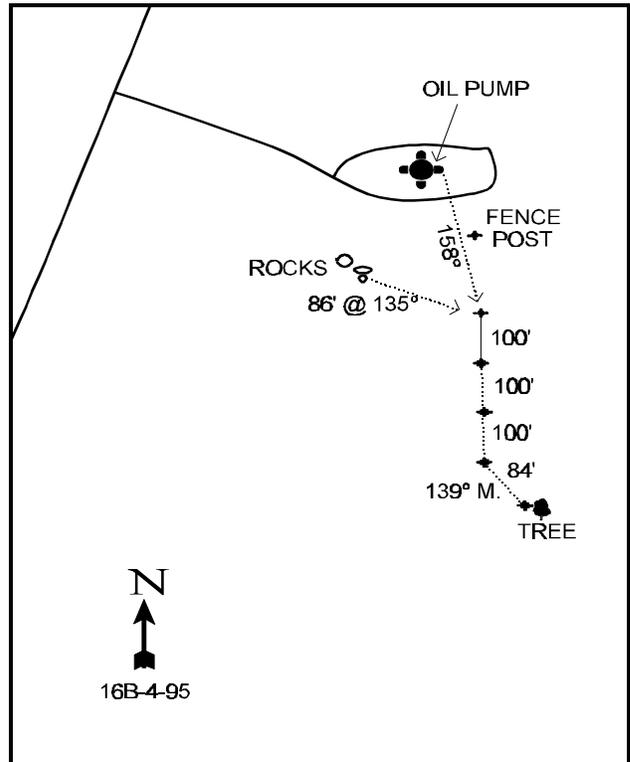
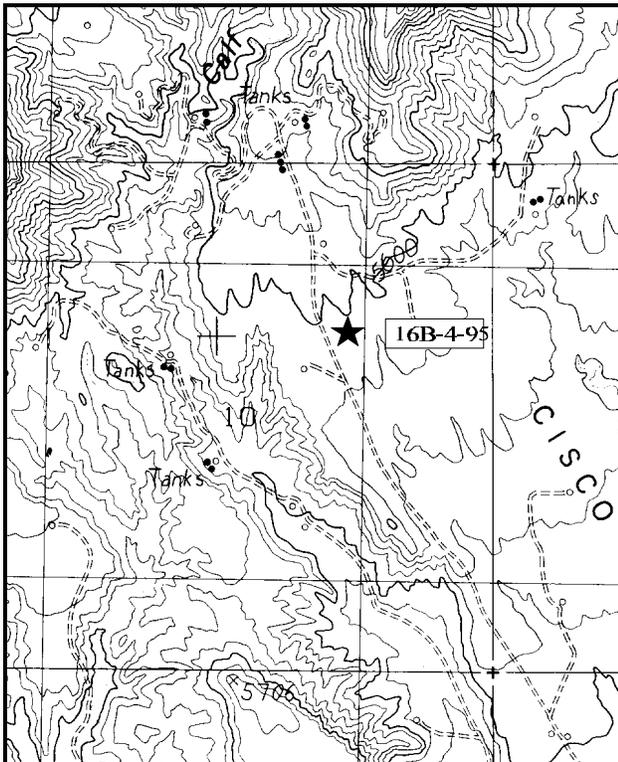
Study site name: East Calf Canyon. Range type: Big Sagebrush.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the western most Cisco exit on I-70, go 1.4 miles on the frontage road towards Cisco to the Nash Draw Road. Turn left and go 1.1 miles to the I-70 underpass. Continue on the gravel road 10.4 miles to a ranch gate. Go through the gate and continue on the main road 1 mile to another gate. Go .2 miles further on the main road, then turn right and pass through a pipe gate. Go .4 miles to a fork. Bear right and go up and along the bench for .8 miles to a fork. Just beyond NP Energy Well #14-1. Stay left at the fork and continue 1 mile. Turn right and go .2 miles. Turn right and proceed another .2 miles to a well numbered Cisco Federal #1. The first baseline stake is approximately 100 feet southeast of the road in the sagebrush opening.



Map Name: Sego Canyon

Diagrammatic Sketch

Township 20S, Range 21E, Section 10 UTM COOR. 6-23-220E 12 43-26-894E

## DISCUSSION

### Trend Study No. 16B-4

The East Calf Canyon transect is located in a sagebrush clearing on a mixed pinyon-juniper-sagebrush bench at the base of the Book Cliffs. The study is located north of Horse Pasture and Nash Wash at an elevation of 5,500 feet with a slight southeastern exposure. This Wyoming big sagebrush type is an important wintering area for several hundred deer. The site is now located within the combined allotment identified as the Cisco allotment. This allotment now has 4 permittees. It can now be grazed from late October through early May by cows for 1,652 AUM's. Sheep are permitted to graze from early December through early May for 1,707 AUM's. Prior to 1986, sheep use occurred in the winter months and cattle were present from mid-October to mid-June. A 330 acre chaining project was completed in the fall of 1987 on the area just east and northeast of the study site. The chaining and seeding was an Interagency project coordinated with State Lands, BLM, and DWR. This chaining was done with a light smooth chain to help protect an understory population of decadent cliffrose. Besides its importance as big game and livestock winter range, there is active oil and gas exploration with associated developments and network of roads. At the north end of the clearing is an oil pump and storage tanks.

Soil on the site is a moderately deep, well-drained, fine sandy loam with a bare soil cover value of over 29%. In the interspaces, small gullies and compacted animal trails show the effects of some surface erosion. There is also some evidence of pedestalling in and around the bare interspaces. Litter is built up only under the sagebrush and has an estimated cover value of 39%. Most herbaceous cover is centered under the sagebrush crown, while the shrub interspaces are generally bare.

The dominant browse specie on the site is Wyoming big sagebrush. Overall, the area supports a complex comprised mostly of juniper-pinyon woodland with scattered sagebrush openings. These sagebrush-grass openings provide the majority of the forage for deer, sheep, and cattle. According to earlier BLM studies on the allotment in 1986, sagebrush utilization is heavy to severe. Sagebrush density is now estimated at 5,600 shrubs/acre. Data collected by the range crew in late June 1986 found a high percentage of decadent plants (55%), mature plants (33%) and many plants in the heavily hedged class (57%). In 1995, the percent of decadent plants dropped to 17%, mature plants increased to 62% of the population and hedging is moderate with very few heavily hedged plants. The past heavily hedged appearance of the plants is also not as apparent. It now appears, with the apparent reduction in intensity of grazing, the sagebrush are responding positively. Seedlings, although not as numerous as in the past, can be found clustered around isolated productive individuals. Twenty percent of the plants sampled are young and did not appear to be utilized as much as the mature plants. Vegetative cover from Wyoming big sagebrush is estimated at nearly 18%. With Wyoming big sagebrush cover values this high, herbaceous understory will continue to have a difficult time becoming established and will likely continue to decline.

The two other browse species found on the transect are broom snakeweed and pricklypear cactus. The broom snakeweed appears to be slightly increasing and shifting to a more mature age structure. Utah Juniper surrounds the sagebrush opening and does not appear to be rapidly invading. Mature trees, especially on the edges and in the opening, have been highlined.

The sagebrush interspaces are basically devoid of vegetation except for annual cheatgrass, and even this invader species grows best under the protection of the sagebrush canopy. Forty three percent of the total vegetative cover comes from cheatgrass and it is present in nearly every quadrat (98%). Bottlebrush

squirreltail has significantly increased in sum of nested frequency, but still only occurs sporadically throughout the site. There are a few scattered forbs, the most abundant being longleaf phlox and several Astragalus species that occur in low densities. The disturbed areas along the road and drill pad are a refuge for exotic annual weeds such as Russian thistle, but they have not invaded into the flat.

1986 APPARENT TREND ASSESSMENT

As long as current browsing pressure continues, the long-term vegetative trend is down. The sagebrush cannot sustain current levels of use for many more years and there are not enough young plants to maintain stand density. A drought or severe winter could be deleterious. Soil trend is downward because of the lack of ground cover, subsequent loss of the sandy soil through gully and surface erosion, and lack of establishment of perennial plants in the bare areas.

A combination of reduced grazing pressure and the same treatment suggested for 16B-3-86 would apply to this site also.

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable, but poor condition

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

herbaceous understory - stable but poor composition of mostly annuals

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'86	'95	'86	'95	
G	Bromus tectorum	-	359	-	98	16.90
G	Hilaria jamesii	3	-	1	-	-
G	Poa fendleriana	-	3	-	1	.00
G	Sitanion hystrix	31	*95	14	40	.66
G	Vulpia octoflora	-	37	-	14	.07

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
Total for Grasses		34	494	15	153	17.63
F	Astragalus convallarius	-	-	-	-	.00
F	Astragalus spp.	1	8	1	4	.36
F	Castilleja linariaefolia	-	3	-	1	.03
F	Calochortus nuttallii	2	-	2	-	-
F	Castilleja spp.	-	3	-	1	.03
F	Chenopodium leptophyllum	-	3	-	1	.00
F	Descurainia spp.	-	8	-	3	.01
F	Draba spp.	-	18	-	7	.03
F	Eriogonum spp.	-	2	-	1	.00
F	Erigeron utahensis	1	8	1	5	.06
F	Gilia hutchinifolia	-	17	-	8	.04
F	Lappula occidentalis	-	8	-	4	.02
F	Phlox longifolia	39	*60	16	25	.17
F	Plantago patagonica	-	18	-	7	.03
F	Schoenocrambe linifolia	-	4	-	2	.01
Total for Forbs		43	160	20	69	0.82
B	Artemisia tridentata wyomingensis	75	*96	45	48	17.57
B	Gutierrezia sarothrae	18	50	9	24	1.05
B	Juniperus osteosperma	-	-	-	-	1.85
B	Opuntia spp.	1	3	1	2	.30
Total for Browse		94	149	55	74	20.77

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

BASIC COVER --

Herd unit 16B, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	374	5.50	37.69
Rock	57	.25	.27
Pavement	53	.25	.17
Litter	389	47.00	38.50
Cryptograms	190	2.50	7.52
Bare Ground	284	44.50	29.38

PELLET GROUP FREQUENCY --  
 Herd unit 16B, Study no: 4

Type	Quadrat Frequency '95
Sheep	9
Rabbit	16
Deer	21

BROWSE CHARACTERISTICS --  
 Herd unit 16B, Study no: 4

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	19	-	-	-	-	-	-	-	-	19	-	-	-	1266		19	
	95	35	-	-	-	-	-	-	-	-	35	-	-	-	700		35	
Y	86	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	95	54	3	-	-	-	-	-	-	-	57	-	-	-	1140		57	
M	86	5	1	14	-	-	-	-	-	-	18	-	2	-	1333	12	18	20
	95	4	163	7	-	-	-	-	-	-	174	-	-	-	3480	20	33	174
D	86	13	-	20	-	-	-	-	-	-	29	-	4	-	2200		33	
	95	5	41	3	-	-	-	-	-	-	38	-	-	11	980		49	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	300		15	
Total Plants/Acre (excluding Dead & Seedlings)												'86	3999	Dec:	55%			
												'95	5600		17%			
<i>Gutierrezia sarothrae</i>																		
S	86	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	95	27	-	-	-	-	-	-	-	-	27	-	-	-	540		27	
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	95	99	-	-	-	-	-	-	-	-	99	-	-	-	1980		99	
M	86	19	-	-	-	-	-	-	-	-	19	-	-	-	1266	9	7	19
	95	139	2	-	7	-	-	-	-	-	148	-	-	-	2960	9	9	148
D	86	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
Total Plants/Acre (excluding Dead & Seedlings)												'86	1932	Dec:	13%			
												'95	4940		0%			
<i>Opuntia spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	6	19	5
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	100		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 16B, Study no: 4

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata</i> <i>wyomingensis</i>	67	53
<i>Gutierrezia sarothrae</i>	33	46
<i>Opuntia</i> spp.	0	.93

TREND STUDY 16B-5-95

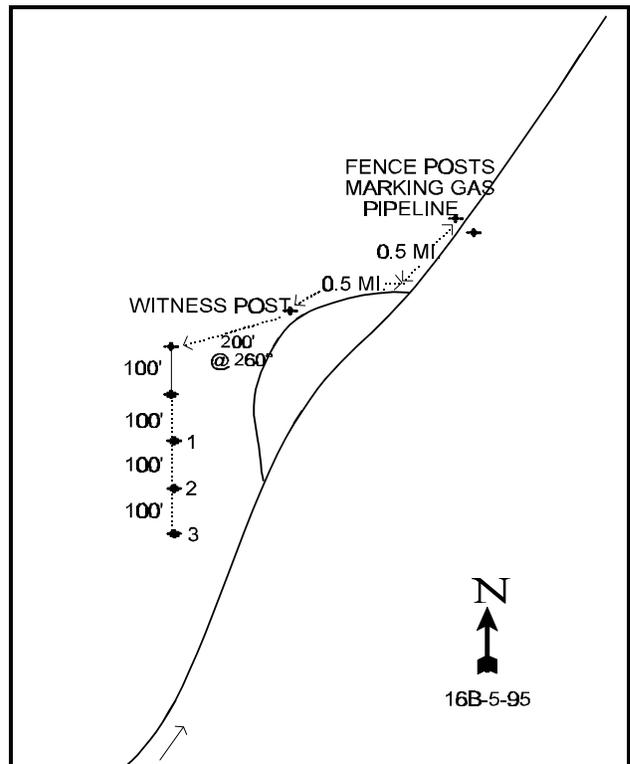
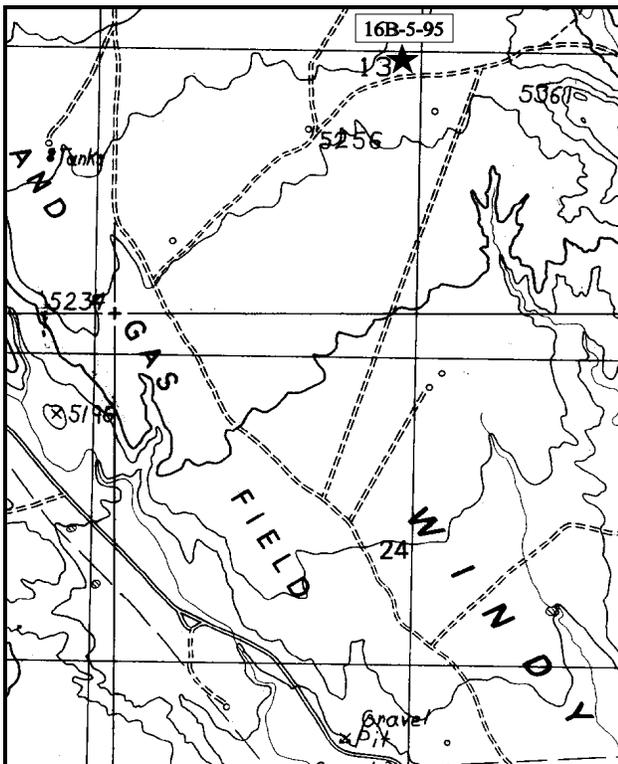
Study site name: East Horse Pasture. Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

Driving on eastbound I-70, take the western most Cisco exit and go toward Cisco on SR-50 to mile marker 43 (1.45 miles). Turn left (north) and passing over the railroad tracks and under the freeway, go 11.5 miles on the Nash Draw road to a fork. Turn right and go .1 miles to a gate. Continue another .65 miles to a fork. Stay left (on main road) and continue .55 miles to another fork. Turn right and go .55 miles to a faint road turning back to the left. Go .05 miles on this faint road to a 2-foot tall rebar witness post on the right. The baseline begins 200 feet west of the witness post on a bearing of 260 degrees. From the first post, the transect runs south at 100 foot intervals.



Map Name: Calf Canyon

Diagrammatic Sketch

Township 20S, Range 21E, Section 13 UTM COOR. 6-25-492E 12 43-25-117N

## DISCUSSION

### Trend Study No. 16B-5

East Horse Pasture is an area of mixed pinyon-juniper and sagebrush flats located to the east of Nash Wash and the Cunningham Ranch at an elevation of 5,300 feet. This site is located within the recently combined allotment identified as the Cisco allotment. This allotment currently has 4 permittees and is grazed from late October through early May by cows for 1,652 AUM's. Sheep are permitted to graze from early December through early May for 1,707 AUM's. The allotment is grazed "in common" by cattle and sheep. In 1986, it was grazed by 247 cattle from mid-October to mid-June and by 1,500 sheep for one month. Horses have also use the area (93 AUMs) in the past, but there was not any horse sign in 1995. This whole general area is managed similarly, for the entire area has very comparable vegetative composition and condition to the other transects in the Nash Wash area. The sagebrush flat where the transect is located has a gentle slope with a south-southeast exposure.

The sandy loam soil is very fine and moderately deep, but in some areas there are large rocks near the surface. The soil has a dry crust formed on the surface which is easily broken and disturbed by animals, but may be impede seedling establishment. Since cover is poor, except for Wyoming big sagebrush and cheatgrass, any soil disturbance could leave the soil subject to wind and water erosion. There are rills and gullies present with evidence of soil loss. Percent bare ground occurs mostly in the interspaces and has an estimated cover value of 28%. Vegetative cover is estimated at over 43% with litter cover estimated at 48%. Most of the litter cover is from annual cheatgrass. The herbaceous understory and litter are generally associated with the Wyoming big sagebrush plants and are found only sporadically in the shrub interspaces.

Wyoming big sagebrush is the key specie on this site. It visually dominates the site with an estimated density of 2,660 plants/acre. The mature plants average just under 2 feet in height with crown measurements averaging nearly 3 feet. In 1986, 90% of the plants showed signs of heavy grazing. This percentage has declined in 1995 to only 14%. Although the proportion of decadent plants has decreased since 1986, the proportion of decadent plants that are classified as dying has increased, but again only 18% are decadent. Similar to 1986, no seedlings or young plants were encountered on the transect and the age structure has shifted from a mostly decadent population to a mostly mature population. The grazing intensity has been reduced, but it may not be enough for the Wyoming big sagebrush population to fully recover with the competition it receives from cheatgrass. Cheatgrass dominates the understory by making up 66% of the total vegetative cover. This competition does not allow the development of seed or the germination and establishment of sagebrush seedlings. It is not evident if the domestic livestock utilize the cheatgrass when they are here. If there is little to no green-up of the cheatgrass in the spring (this is currently the situation with extended drought), then the livestock are forced to utilize the sagebrush. Through this long drought that the state has been experiencing, the livestock have overly utilized the sagebrush causing high rates of decadency and death to the browse populations.

The most numerous shrub is the undesirable broom snakeweed. It is vigorous and the only plant producing seedlings in the shrub interspaces. The broom snakeweed density is estimated at 8,860 plants/acre and appears to be increasing. Other shrubs sampled on the site include: winterfat, spiny hopsage, and a cactus, all of which are in low densities. Junipers appear to be encroaching from the north, but there are none presently on the site. The nearby stand provides fair resting and thermal cover and the older trees are highlined with the younger ones appearing to be only lightly used.

With the exception of cheatgrass, grasses are scarce and selectively grazed. Cheatgrass appears to be particularly abundant this year due to good early spring precipitation. Patches of galleta and a few bottlebrush squirreltail and sand dropseed are the only perennial grasses. There are no really desirable forbs present. Scarlet globemallow is the most common forb, although there are also some longleaf phlox and Utah fleabane scattered throughout. Many of the forbs encountered on the site are annuals that are not usually available for grazing animals. This type of range site is not known for its diversity and abundance of herbaceous vegetation, but this site has definitely suffered the effects of long-term overgrazing.

#### 1986 APPARENT TREND ASSESSMENT

The soil and vegetative trends indicated by current management practices are downward. There is a slow, but continual loss of ground cover and soil movement is ongoing. The key species is severely hedged, becoming more decadent and not recruiting young plants into the population for replacement. Besides these problems found in all three transects in the Nash Wash area, there is a continued loss of habitat due to oil and gas leasing and road building. As a very important deer wintering area, it seems necessary to protect and even improve range conditions. Possible solutions are more restrictive oil and gas leasing regulations, manipulation of livestock classes, their distribution and season of use, antlerless hunts to reduce the deer population and implementation of land treatments (chaining) to increase the carrying capacity for wildlife.

#### 1995 TREND ASSESSMENT

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

#### TREND ASSESSMENT

soil - stable, but only fair condition

browse - slightly upward for Wyoming big sagebrush

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

VEGETATIVE TRENDS --  
Herd unit 16B, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	<i>Bromus tectorum</i>	-	352	-	97	27.40
G	<i>Hilaria jamesii</i>	6	*56	2	23	1.25
G	<i>Oryzopsis hymenoides</i>	-	2	-	1	.00
G	<i>Sitanion hystrix</i>	4	*19	2	10	.27
G	<i>Sporobolus cryptandrus</i>	-	*14	-	5	.05
G	<i>Stipa comata</i>	-	3	-	2	.03
G	<i>Vulpia octoflora</i>	-	28	-	13	.06
Total for Grasses		10	474	4	151	29.09
F	<i>Descurainia</i> spp.	-	7	-	4	.02
F	<i>Erigeron utahensis</i>	7	4	3	1	.00
F	<i>Lappula occidentalis</i>	-	30	-	11	.08
F	<i>Lactuca serriola</i>	-	3	-	1	.00
F	<i>Leucelene ericoides</i>	-	*9	-	3	.06
F	<i>Lepidium perfoliatum</i>	-	31	-	12	.06
F	<i>Machaeranthera</i> spp	-	2	-	1	.00
F	<i>Orobancha corymbosa</i>	3	-	3	-	-
F	<i>Phlox longifolia</i>	6	4	3	2	.01
F	<i>Plantago patagonica</i>	-	145	-	52	.28
F	<i>Schoenocrambe linifolia</i>	-	2	-	1	.00
F	<i>Sisymbrium altissimum</i>	-	30	-	16	.18
F	<i>Sphaeralcea coccinea</i>	15	*27	7	11	.68
F	Unknown forb-perennial	1	-	1	-	-
Total for Forbs		32	294	17	115	1.41
B	<i>Artemisia tridentata wyomingensis</i>	38	69	21	30	8.57
B	<i>Grayia spinosa</i>	2	-	1	-	.00
B	<i>Gutierrezia sarothrae</i>	33	68	17	30	2.53
B	<i>Opuntia</i> spp.	5	-	2	-	.00
Total for Browse		78	137	41	60	11.12

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

BASIC COVER --

Herd unit 16B, Study no: 5

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	374	8.25	43.52
Rock	41	0	.15
Pavement	53	.25	.12
Litter	397	56.50	48.29
Cryptograms	104	1.75	2.11
Bare Ground	268	33.25	28.83

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 5

Type	Quadrat Frequency '95
Rabbit	22
Elk	1
Deer	17
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
Y	86	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	4	38	-	-	-	42	-	-	-	1400	21	23	42
	95	35	54	19	-	1	-	-	-	-	108	-	-	1	2180	22	34	109
D	86	-	-	-	-	4	64	-	-	1	58	-	-	11	2300			69
	95	12	12	-	-	-	-	-	-	-	15	-	-	9	480			24
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	520			26
Total Plants/Acre (excluding Dead & Seedlings)												'86	3833	Dec:	60%			
												'95	2660		18%			
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	43	65	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Ceratoides lanata</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	6	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	7	0
D	86	-	-	-	-	-	1	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	1	-	-	-	-	-	1	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	100%			
												'95	20		100%			
<i>Gutierrezia sarothrae</i>																		
S	86	10	-	-	-	-	-	-	-	-	10	-	-	-	333			10
	95	32	-	-	-	-	-	-	-	-	32	-	-	-	640			32
Y	86	52	-	-	-	-	-	-	-	-	52	-	-	-	1733			52
	95	167	-	-	4	-	-	-	-	-	171	-	-	-	3420			171
M	86	95	-	-	-	-	-	-	-	-	95	-	-	-	3166	9	6	95
	95	272	-	-	-	-	-	-	-	-	272	-	-	-	5440	12	12	272
D	86	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'86	5065	Dec:	3%			
												'95	8860		0%			
<i>Opuntia spp.</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	5	4	2
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	14	4
D	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'86	199	Dec:	50%			
												'95	100		0%			

PERCENT BROWSE COMPOSITION--  
Herd unit 16B, Study no: 5

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	42	23
<i>Atriplex canescens</i>	0	0
<i>Ceratoides lanata</i>	0	.17
<i>Grayia spinosa</i>	.36	.17
<i>Gutierrezia sarothrae</i>	55	76
<i>Opuntia spp.</i>	2	.85



## DISCUSSION

### Trend Study No. 16B-6

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

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

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

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

### 1986 APPARENT TREND ASSESSMENT

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

slope. The best that can be done for soil stability is to increase perennial vegetative cover.

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable, but fair condition

browse - declining, key species at low densities

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

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 6

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Aristida longiseta	-	*8	-	5	.22
G	Bromus tectorum	-	381	-	99	19.80
G	Oryzopsis hymenoides	3	3	1	1	.15
G	Poa fendleriana	-	6	-	2	.01
G	Sitanion hystrix	3	5	1	2	.03
G	Sporobolus cryptandrus	14	*133	7	56	1.50
G	Stipa comata	-	*9	-	4	.12
Total for Grasses		20	545	9	169	21.84
F	Astragalus spp.	-	*15	-	7	.03
F	Draba spp.	-	29	-	13	.06
F	Erodium cicutarium	-	156	-	56	.77
F	Lepidium densiflorum	-	73	-	31	.15
F	Plantago patagonica	-	25	-	11	.08
Total for Forbs		0	298	0	118	1.11

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
B	<i>Artemisia tridentata wyomingensis</i>	1	6	1	2	.38
B	<i>Atriplex confertifolia</i>	8	2	5	2	1.50
B	<i>Ephedra viridis</i>	1	1	1	1	1.00
B	<i>Gutierrezia sarothrae</i>	1	*50	1	28	2.02
B	<i>Juniperus osteosperma</i>	2	-	1	-	.53
B	<i>Opuntia spp.</i>	2	8	1	4	.19
Total for Browse		15	67	10	37	5.64

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

BASIC COVER --

Herd unit 16B, Study no: 6

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	390	17.00	32.59
Rock	303	19.25	23.39
Pavement	148	5.25	1.41
Litter	392	48.25	39.48
Cryptograms	136	.50	3.07
Bare Ground	180	9.75	5.51

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 6

Type	Quadrat Frequency '95
Sheep	25
Rabbit	10
Deer	7

BROWSE CHARACTERISTICS --  
Herd unit 16B, Study no: 6

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	86	-	1	4	-	-	-	-	-	-	5	-	-	-	166	13	20	5
	95	2	-	-	-	-	1	-	-	-	3	-	-	-	60	16	26	3
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'86	166	Dec:	-			
												'95	60		-			
<i>Atriplex confertifolia</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	3	-	-	-	-	-	-	-	-	2	1	-	-	100		3	
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	86	3	5	-	-	-	-	-	-	-	3	3	1	1	266	11	9	8
	95	13	-	-	-	-	-	-	-	-	13	-	-	-	260	18	32	13
D	86	6	3	-	-	-	-	-	-	-	1	4	4	-	300		9	
	95	7	-	-	-	-	-	-	-	-	4	-	-	3	140		7	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	666	Dec:	45%			
												'95	500		28%			
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	1	-	1	-	-	-	-	-	-	2	-	-	-	66	28	33	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	43	69	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	20		-			
<i>Gutierrezia sarothrae</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	45	-	-	-	-	-	-	-	-	45	-	-	-	900		45	
Y	86	5	1	-	-	-	-	-	-	-	6	-	-	-	200		6	
	95	12	-	-	-	-	-	-	-	-	12	-	-	-	240		12	
M	86	12	9	-	-	-	-	-	-	-	20	-	1	-	700	6	6	21
	95	93	-	-	-	-	-	-	-	-	91	-	2	-	1860	11	14	93
D	86	4	1	-	-	-	-	-	-	-	3	-	2	-	166		5	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	1066	Dec:	15%			
												'95	2120		0%			

A G E	YR	Form Class (No. of 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																		
M	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100	72	89	3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	100	Dec:	-			
												'95	0		-			
Opuntia spp.																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	0				0
	95	-	-	-	1	-	-	-	-	-	-	-	1	20				1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-		0
	95	3	-	-	-	-	-	-	-	-	3	-	-	60	6	21		3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	0				0
	95	3	-	-	-	-	-	-	-	-	2	-	-	60				3
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	140		42%			
Yucca angustissima																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-		0
	95	4	-	-	-	-	-	-	-	-	4	-	-	80	12	17		4
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	80		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 16B, Study no: 6

Species	Percent of Total	
	'86	'95
Artemisia tridentata wyomingensis	8	2
Atriplex confertifolia	32	17
Ephedra viridis	3	.68
Gutierrezia sarothrae	52	73
Juniperus osteosperma	5	0
Opuntia spp.	0	5
Yucca angustissima	0	3

TREND STUDY 16B-7-95

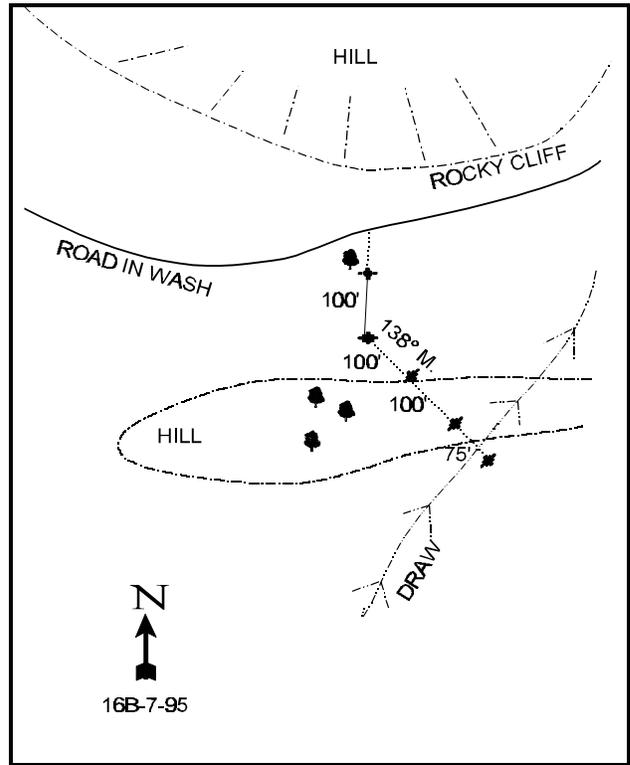
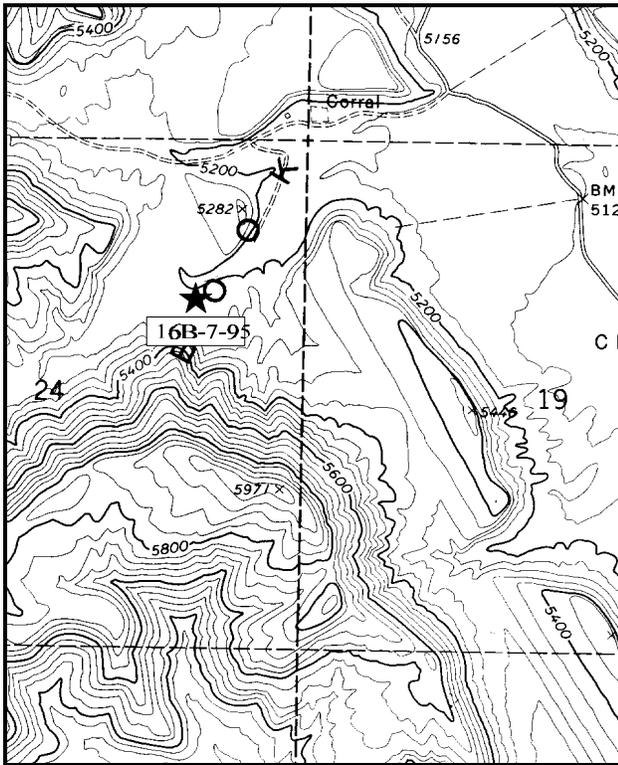
Study site name: Upper Cottonwood. Range type: Black Greasewood and Juniper.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From I-70, take the east Cisco exit, go north 12.25 miles to a gate and fork. Turn left Just before the gate. Go .4 miles and turn left, going down across a wash and out again. Continue .4 miles up the canyon to just past a large rocky cliff on your right. Park in the wash (road is in the wash at this point) near where a small draw comes in from the north. Walk up the hill to the left (south) to an open greasewood-cheatgrass bench. The frequency baseline 0-foot stake is 70 feet south of the wash.



Map Name: Flume Canyon

Diagrammatic Sketch

wnship 19S, Range 22E, Section 24

## DISCUSSION

### Trend Study No. 16B-7

This is the only transect in deer herd unit 16B to sample the common black greasewood habitat type. It samples a mixed vegetation type located at the foot of the Book Cliffs at the mouth of Coal Canyon. Elevation at the study site is 5,200 feet with a mainly northern exposure and a slight slope down to a deep intermittent wash. When this study was established, the lower part of the transect was located in more of an alkali flat dominated by black greasewood and cheatgrass. The density plots were located on a slope with rockier soil where juniper and sagebrush were more prevalent. For a better sample size and to get a better distribution within the same type (more homogeneous sample), the last three belts were moved from the hillside and now sample the lower flat.

This area currently receives sheep use from the first of December through mid-May as part of the Cisco Mesa allotment plan for 2,628 AUM's. Due to a nearby temporary sheep shearing camp, the area may receive concentrated use at certain times. Deer use is light in this area.

This alkaline-saline flat receives sedimentation from the eroding hillsides. Overall, the soil is sandy and rather poor. In places it appears quite deep, but in others there are large rocks near the surface. Rock and pavement combine for a cover value just over 6%. Vegetation accounts for 44% of the ground cover with litter cover slightly higher at 46%. Percent bare ground appears to have remained about the same as when sampled in 1986 at 21%.

The Wyoming big sagebrush has an estimated density of 520 plants/acre. Fifty five percent of the population was reported as decadent in 1986. Now the population has shifted to where only 3% are classified as decadent. These plants exhibit better vigor and less utilization. Shadscale is found scattered over the area at an estimated density of 280 plants/acre. One out of seven shadscale plants are classified as dead, but the decadency rate has declined to 14% of the population. The most numerous plant sampled is broom snakeweed at an estimated density of 880 plants/acre. This population appears to have a stable density and is shifting to a more mature age composition. The black greasewood density is low, but the mature plants sampled measured nearly 5 feet in height with a 5 foot crown. Juniper is prevalent on the surrounding hillsides and can also be found along the washes below the site. The juniper on the slope are not utilized and provide some thermal and escape cover. The winterfat density is estimated at 140 plants/acre and shows no signs of utilization. Also scattered throughout the site in low densities are spiny hopsage, rubber rabbitbrush, sticky leaf rabbitbrush, and four-wing saltbush, all of which show no utilization.

Grasses on the site include large bunches of Salina wildrye, bottlebrush squirreltail, sand dropseed, Indian ricegrass, and muttongrass. These are found scattered throughout the area with most associated with the protective cover of shrubs. Salina wildrye has significantly increased in sum of nested frequency value since 1986. This grass grows well on alluvial fans which receive soil continued deposition. It produces abundant, low palatability forage. Indian ricegrass, bottlebrush squirreltail, and sand dropseed have all decreased significantly in sum of nested frequency values. A very dense stand of cheatgrass occurs throughout the flat under the shrubs, as well as in the interspaces. The cheatgrass is extremely dense, contributing 75% of the total vegetative cover. Perennial forbs provide little forage value. Scarlet globemallow, which was thought to be increasing in 1986, has since significantly decreased. Sego lily, longleaf phlox, and Astragalus were also sampled and are in low densities. Common annual forbs are woolly Indianwheat, tumbled mustard, and bur buttercup.

1986 APPARENT TREND ASSESSMENT

This site appears to receive lighter grazing pressure than other study sites in herd unit 16B. The browse species are in better condition, there is more diversity in both the browse and herbaceous component and generally more ground cover. Although the browse looks better, the vegetative trend is stable to possibly down due to the composition and age class distribution of the key species. Red ant hills are common. The soil trend is stable with no recent gullies or detectable soil movement over most of the area. There will always be some erosion and sedimentation from the hillside.

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable

browse - stable to slightly downward

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

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 7

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Bromus tectorum	-	376	-	97	32.71
G	Elymus cinereus	7	-	2	-	-
G	Elymus salina	-	*53	-	21	2.45
G	Oryzopsis hymenoides	22	*18	16	11	.26
G	Poa fendleriana	1	6	1	2	.01
G	Sitanion hystrix	12	*9	5	3	.19
G	Sporobolus cryptandrus	48	*31	21	14	.22

Type	Species	Nestled Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	<i>Stipa comata</i>	-	4	-	2	.15
Total for Grasses		90	497	45	150	36.00
F	<i>Astragalus</i> spp.	-	4	-	2	.03
F	<i>Carduus nutans</i>	-	2	-	2	.01
F	<i>Calochortus nuttallii</i>	2	-	1	-	-
F	<i>Erodium cicutarium</i>	-	3	-	1	.00
F	<i>Erigeron</i> spp	-	5	-	3	.04
F	<i>Lepidium perfoliatum</i>	-	2	-	1	.00
F	<i>Phlox longifolia</i>	-	*11	-	5	.02
F	<i>Plantago patagonica</i>	-	81	-	33	.19
F	<i>Ranunculus testiculatus</i>	-	5	-	2	.01
F	<i>Sisymbrium altissimum</i>	-	14	-	6	.03
F	<i>Sphaeralcea coccinea</i>	23	5	10	3	.04
F	<i>Tragopogon dubius</i>	1	-	1	-	-
F	Unknown forb-perennial	1	-	1	-	-
Total for Forbs		27	132	13	58	0.38
B	<i>Artemisia tridentata wyomingensis</i>	5	11	2	5	.80
B	<i>Atriplex canescens</i>	1	1	1	1	.03
B	<i>Atriplex confertifolia</i>	10	*1	5	1	.74
B	<i>Ceratoides lanata</i>	-	*4	-	3	.57
B	<i>Chrysothamnus viscidiflorus</i>	1	-	1	-	-
B	<i>Grayia spinosa</i>	-	1	-	1	.63
B	<i>Gutierrezia sarothrae</i>	5	11	2	6	.45
B	<i>Juniperus osteosperma</i>	-	-	-	-	.03
B	<i>Sarcobatus vermiculatus</i>	3	10	1	6	4.07
Total for Browse		25	39	12	23	7.34

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 16B, Study no: 7

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	386	32.25	44.45
Rock	119	0	4.74
Pavement	21	0	1.55
Litter	393	46.50	45.71
Cryptograms	34	0	.25
Bare Ground	251	21.25	21.18

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 7

Type	Quadrat Frequency '95
Sheep	31
Rabbit	5
Deer	4

BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 7

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	1	3	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	86	3	5	1	-	-	-	-	-	-	8	-	1	-	300	16	15	9
	95	4	13	1	2	1	-	-	-	-	21	-	-	-	420	34	38	21
D	86	5	7	2	1	-	-	-	-	-	14	-	-	1	500		15	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	900	Dec:	55%			
												'95	520		3%			
<i>Atriplex canescens</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17	19	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Atriplex confertifolia</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	1	-	-	3	-	-	-	-	-	4	-	-	-	80		4	
M	86	5	-	-	-	-	-	-	-	-	5	-	-	-	166	14 18	5	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160	15 30	8	
D	86	3	1	1	-	-	-	-	-	-	4	-	1	-	166		5	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	432	Dec:	38%			
												'95	280		14%			
<i>Ceratoides lanata</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120	17 22	6	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	-			
												'95	140		-			
<i>Chrysothamnus nauseosus</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	34 77	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Chrysothamnus viscidiflorus</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	15 11	1	
	95	1	2	-	-	-	-	-	-	-	3	-	-	-	60	18 26	3	
D	86	4	1	-	-	-	-	-	-	-	5	-	-	-	166		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
Total Plants/Acre (excluding Dead & Seedlings)												'86	199	Dec:	83%			
												'95	60		0%			
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	21 51	0	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	20		100%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Gutierrezia sarothrae</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	86	3	-	-	-	-	-	-	-	3	-	-	-	100	8	3	3	
	95	38	-	-	-	-	-	-	-	38	-	-	-	760	14	18	38	
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:		-		
												'95	880			-		
<i>Juniperus osteosperma</i>																		
Y	86	1	-	-	-	-	-	-	-	1	-	-	-	33			1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	86	2	-	-	-	-	-	-	-	2	-	-	-	66	67	79	2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	99	Dec:		-		
												'95	0			-		
<i>Opuntia spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	6	19	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:		-		
												'95	0			-		
<i>Sarcobatus vermiculatus</i>																		
Y	86	1	-	-	-	-	-	-	-	1	-	-	-	33			1	
	95	1	-	-	-	-	-	-	-	1	-	-	-	20			1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	11	-	-	1	-	-	-	-	12	-	-	-	240	55	60	12	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	60			3	
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:		-		
												'95	260			-		

PERCENT BROWSE COMPOSITION--  
 Herd unit 16B, Study no: 7

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata</i> <i>wyomingensis</i>	49	24
<i>Atriplex canescens</i>	0	.91
<i>Atriplex</i> <i>confertifolia</i>	24	13
<i>Ceratoides lanata</i>	2	6
<i>Chrysothamnus</i> <i>nauseosus</i>	0	0
<i>Chrysothamnus</i> <i>viscidiflorus</i>	11	3
<i>Grayia spinosa</i>	0	.91
<i>Gutierrezia sarothrae</i>	7	40
<i>Juniperus osteosperma</i>	5	0
<i>Opuntia</i> spp.	0	0
<i>Sarcobatus</i> <i>vermiculatus</i>	2	12

TREND STUDY 16B-8-95

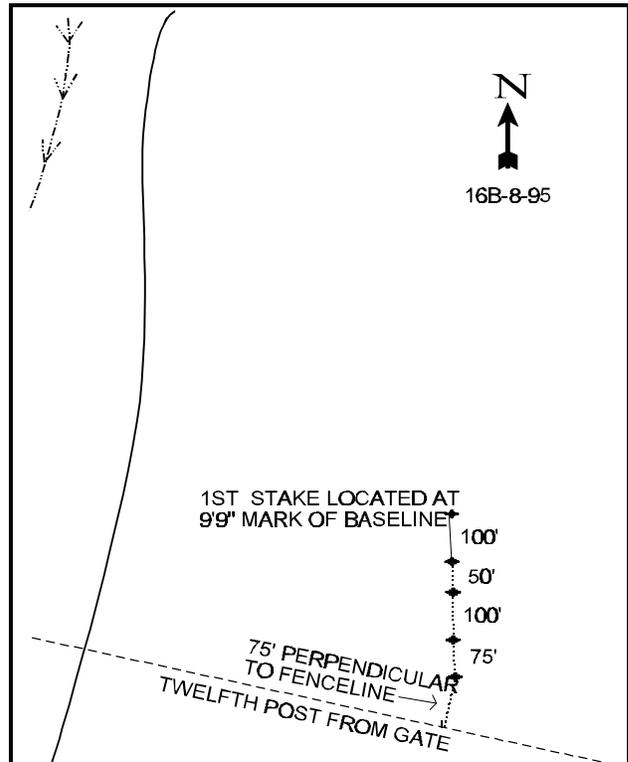
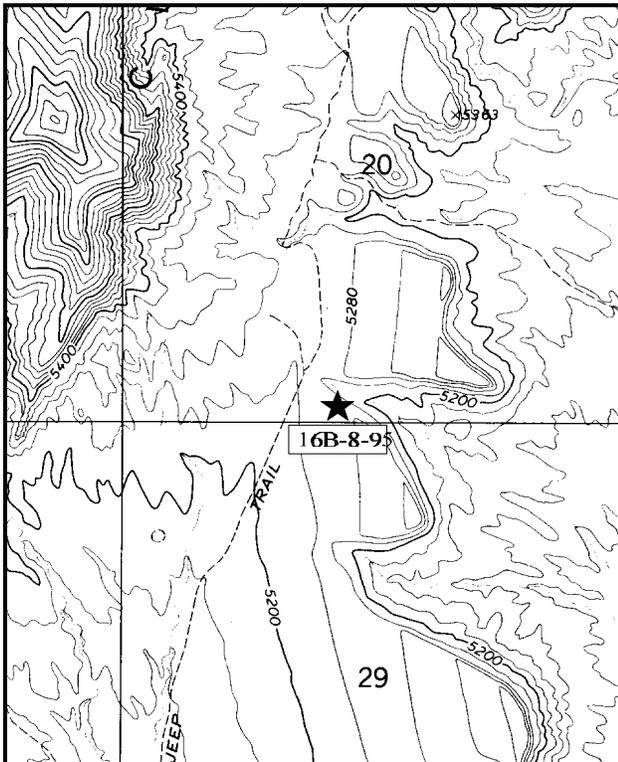
Study site name: East Sulphur Bench. Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

Take exit #220 east of Cisco on I-70. Beyond the freeway fence turn left at a fork and go northwest toward the Book Cliffs for 2.15 miles to a fork. Turn right. Go 6.5 miles and turn left at another fork. Go 1.85 miles to the ranch in Sulfur Creek. Make a sharp right turn Just before the ranch gate and proceed up the hill .25 miles to a gate. Pass through this gate and go .9 miles to another gate. Stop here. Walk east along the fence to the twelfth wooden post. The fourth baseline stake is 75 feet to the north. The 0-foot end of the baseline is 325 feet north of the fourth baseline stake, but is not marked by a visible stake. There is a 3-foot tall rebar and rock cairn 9 feet 9 inches south of the actual starting place of the frequency baseline. All plots are marked with rebar stakes and a rebar spike at ground level.



Map Name: Antone Canyon

Diagrammatic Sketch

Township 18S, Range 24E, Section 20 UTM COOR. 6-47-807E 12 43-42-606N

## DISCUSSION

### Trend Study No. 16B-8

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

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

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

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

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

#### 1986 APPARENT TREND ASSESSMENT

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

#### 1995 TREND ASSESSMENT

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

#### TREND ASSESSMENT

soil - stable, but only fair condition

browse - downward

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

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

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Bromus tectorum	-	381	-	100	15.27
G	Oryzopsis hymenoides	-	4	-	1	.15
G	Poa fendleriana	-	1	-	1	.00
G	Sitanion hystrix	-	*11	-	4	.07
G	Vulpia octoflora	-	3	-	1	.00
Total for Grasses		0	400	0	107	15.50
F	Astragalus spp.	-	2	-	1	.00
F	Draba spp.	-	29	-	10	.05
F	Erodium cicutarium	-	11	-	4	.02
F	Gilia hutchinifolia	-	2	-	1	.00
F	Lappula occidentalis	-	29	-	13	.06
F	Lepidium densiflorum	-	226	-	75	.80
F	Phlox longifolia	-	*10	-	6	.03
F	Plantago patagonica	-	89	-	38	.24
F	Sphaeralcea coccinea	6	*29	3	11	.10
Total for Forbs		6	427	3	159	1.32
B	Artemisia tridentata wyomingensis	34	*62	19	32	8.23
B	Atriplex canescens	3	-	1	-	-
B	Atriplex confertifolia	4	6	1	3	.98
B	Gutierrezia sarothrae	98	*116	46	52	3.07
B	Juniperus osteosperma	-	-	-	-	.78
B	Opuntia spp.	4	4	2	1	.03
Total for Browse		143	188	69	88	13.10

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

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

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	384	8.50	32.43
Rock	210	2.50	5.35
Pavement	114	2.00	1.53
Litter	393	55.00	36.30
Cryptograms	65	15.00	.42
Bare Ground	323	17.00	28.28

PELLET GROUP FREQUENCY --  
Herd unit 16B, Study no: 8

Type	Quadrat Frequency '95
Rabbit	15
Deer	26

BROWSE CHARACTERISTICS --  
Herd unit 16B, Study no: 8

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	28	-	-	-	-	-	-	-	-	28	-	-	-	560			28
Y	86	41	14	1	1	-	-	-	-	-	54	3	-	-	3800			57
	95	21	1	-	-	-	-	-	-	-	22	-	-	-	440			22
M	86	1	10	3	-	1	14	-	-	-	11	17	1	-	1933	16	17	29
	95	11	44	41	-	5	7	-	-	-	100	-	8	-	2160	14	24	108
D	86	-	2	1	-	1	-	-	-	-	3	1	-	-	266			4
	95	-	14	9	-	-	2	-	-	-	11	-	4	10	500			25
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	460			23
Total Plants/Acre (excluding Dead & Seedlings)												'86	5999	Dec:	4%			
												'95	3100		16%			
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	1	-	-	-	-	-	-	-	3	-	-	-	60	19	30	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	2	-	-	-	-	-	-	-	-	-	-	2	40			2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	100		40%			
<i>Atriplex confertifolia</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	1	-	-	-	-	-	1	-	-	-	66	15	19	1
	95	7	8	-	2	-	-	-	-	-	17	-	-	-	340	14	26	17
D	86	6	1	-	5	1	-	-	-	-	11	-	-	2	866			13
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'86	1132	Dec:	76%			
												'95	340		0%			
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
D	86	2	-	-	-	-	-	-	-	-	-	-	-	2	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	100%			
												'95	0		0%			

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Grayia spinosa																		
D	86	-	-	-	2	-	-	-	-	-	-	-	2	133			2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	100%			
												'95	0		0%			
Gutierrezia sarothrae																		
S	86	13	-	-	-	-	-	-	-	-	-	-	13	866			13	
	95	208	-	-	-	-	-	-	-	-	-	-	208	4160			208	
Y	86	103	-	-	-	-	-	-	-	-	-	-	103	6866			103	
	95	91	-	-	-	-	-	-	-	-	-	-	91	1820			91	
M	86	104	-	-	-	-	-	-	-	-	-	-	104	6933	9	6	104	
	95	280	-	-	-	-	-	-	-	-	-	-	280	5600	10	11	280	
D	86	11	-	-	-	-	-	-	-	-	-	-	10	733			11	
	95	3	-	-	-	-	-	-	-	-	-	-	2	60			3	
Total Plants/Acre (excluding Dead & Seedlings)												'86	14532	Dec:	5%			
												'95	7480		0%			
Opuntia spp.																		
M	86	1	-	-	-	-	-	-	-	-	-	-	1	66	4	8	1	
	95	6	-	-	-	-	-	-	-	-	-	-	6	120	5	31	6	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	120		-			

PERCENT BROWSE COMPOSITION--

Herd unit 16B, Study no: 8

Species	Percent of Total	
	'86	'95
Artemisia tridentata wyomingensis	27	28
Atriplex canescens	0	.89
Atriplex confertifolia	5	3
Chrysothamnus viscidiflorus stenophyllus	.60	0
Grayia spinosa	.60	0
Gutierrezia sarothrae	66	67
Opuntia spp.	.30	1

TREND STUDY 16B-9-95

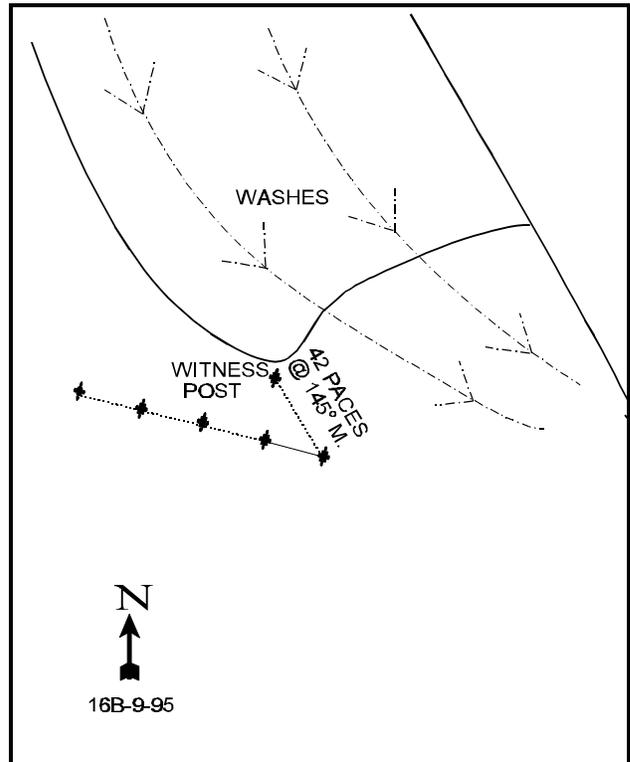
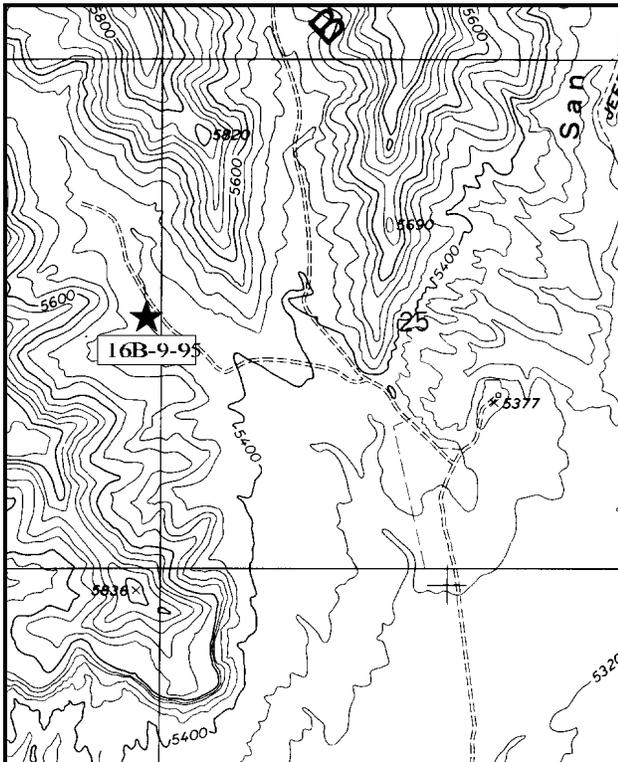
Study site name: Bryson Draw. Range type: Big Sagebrush.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

Take I-70 to the Westwater exit near mile marker 225. Go north .2 miles to a "T" intersection and Book Cliff Ridge sign. Turn right and follow an old paved road parallel to the freeway for 2.1 miles to a left turn at a sign to Hay Canyon, East Canyon, PR Springs. Turn left. After 1.85 miles, there is a minor fork to the right, stay on main road. Continue 3.75 miles to a major fork. Turn right and go 2.65 miles to a fork. Stay to the left and go 1.55 miles to another fork. Stay to the left. Go .2 miles to the point of a hill past a fenceline. Just beyond the old fenceline, turn left on a faint old road. Go .25 miles. The transect is Just past the second wash, where there is a witness post in the sage flat on the left. The 0-foot baseline stake, a rebar tagged #7892, is 42 paces at 145/ M. from the witness post.



Map Name: Bryson Canyon

Diagrammatic Sketch

Township 17S, Range 24E, Section 26 UTM COOR. 6-53-757E 12 43-51-243N

## DISCUSSION

### Trend Study No. 16B-9

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

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

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

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

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

of the species not providing much cover or forage.

1986 APPARENT TREND ASSESSMENT

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

1995 TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable but fair condition

browse - slightly upward

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

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 9

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Bromus tectorum	-	368	-	100	17.26
G	Hilaria jamesii	112	*70	43	28	.53
G	Oryzopsis hymenoides	10	*3	5	2	.01
G	Poa fendleriana	55	91	28	34	.81
G	Sitanion hystrix	-	1	-	1	.01
G	Stipa comata	17	13	8	5	.07
G	Vulpia octoflora	-	171	-	58	.80
Total for Grasses		194	717	84	228	19.50
F	Astragalus spp.	1	-	1	-	-
F	Cryptantha spp.	-	3	-	2	.01
F	Descurainia spp.	-	25	-	10	.07
F	Eriogonum spp.	-	2	-	1	.00
F	Gilia hutchinifolia	-	12	-	5	.02
F	Lappula occidentalis	-	7	-	3	.01
F	Lepidium densiflorum	-	29	-	12	.06

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	Lygodesmia spp.	-	3	-	1	.00
F	Onobrychis viciaefolia	-	3	-	1	.03
F	Phlox longifolia	6	8	4	4	.02
F	Plantago patagonica	-	136	-	48	.39
F	Sisymbrium altissimum	-	12	-	4	.02
F	Sphaeralcea coccinea	3	5	1	2	.01
F	Townsendia incana	-	1	-	1	.00
F	Unknown forb-perennial	8	-	3	-	-
Total for Forbs		18	246	9	94	0.67
B	Artemisia tridentata wyomingensis	72	*40	35	21	10.94
B	Atriplex canescens	-	-	-	-	.00
B	Grayia spinosa	3	4	1	2	.18
B	Gutierrezia sarothrae	18	52	11	23	1.58
B	Opuntia spp.	1	6	1	3	.04
Total for Browse		94	102	48	49	12.76

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

BASIC COVER --

Herd unit 16B, Study no: 9

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	383	8.00	35.93
Rock	51	0	.68
Pavement	43	0	.15
Litter	393	38.25	38.48
Cryptograms	213	14.75	9.37
Bare Ground	284	39.00	30.86

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 9

Type	Quadrat Frequency '95
Sheep	44
Rabbit	43

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

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	8	3	1	-	-	-	-	-	-	10	2	-	-	800		12	
	95	52	-	-	4	-	-	-	-	-	56	-	-	-	1120		56	
M	86	3	8	1	1	-	-	-	-	-	3	10	-	-	866	14	15	
	95	134	35	32	1	-	-	-	-	-	199	-	3	-	4040	23	36	
D	86	3	4	9	-	-	-	-	-	-	12	4	-	-	1066		16	
	95	14	2	10	-	-	-	-	-	-	10	-	2	14	520		26	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	340		17	
Total Plants/Acre (excluding Dead & Seedlings)												'86	2732	Dec:	39%			
												'95	5680		9%			
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	38	48	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
<i>Grayia spinosa</i>																		
M	86	2	-	1	-	-	1	-	-	-	4	-	-	-	266	20	19	
	95	-	1	2	-	-	2	-	-	-	5	-	-	-	100	24	33	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	1	1	-	-	3	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'86	266	Dec:	0%			
												'95	160		37%			
<i>Gutierrezia sarothrae</i>																		
S	86	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	95	20	-	-	-	-	-	-	2	-	22	-	-	-	440		22	
Y	86	38	-	-	-	-	-	-	-	-	38	-	-	-	2533		38	
	95	25	-	-	-	-	-	-	-	-	25	-	-	-	500		25	
M	86	13	-	-	-	-	-	-	-	-	13	-	-	-	866	9	7	
	95	85	-	-	2	-	-	-	-	-	87	-	-	-	1740	11	12	
Total Plants/Acre (excluding Dead & Seedlings)												'86	3399	Dec:	-			
												'95	2240		-			
<i>Opuntia spp.</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7	9	
	95	5	-	-	-	-	-	3	-	-	8	-	-	-	160	5	16	
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	-			
												'95	180		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 16B, Study no: 9

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	42	69
<i>Atriplex canescens</i>	0	.24
<i>Grayia spinosa</i>	4	2
<i>Gutierrezia sarothrae</i>	52	27
<i>Opuntia spp.</i>	2	2

TREND STUDY 16B-10-95(28A-14)

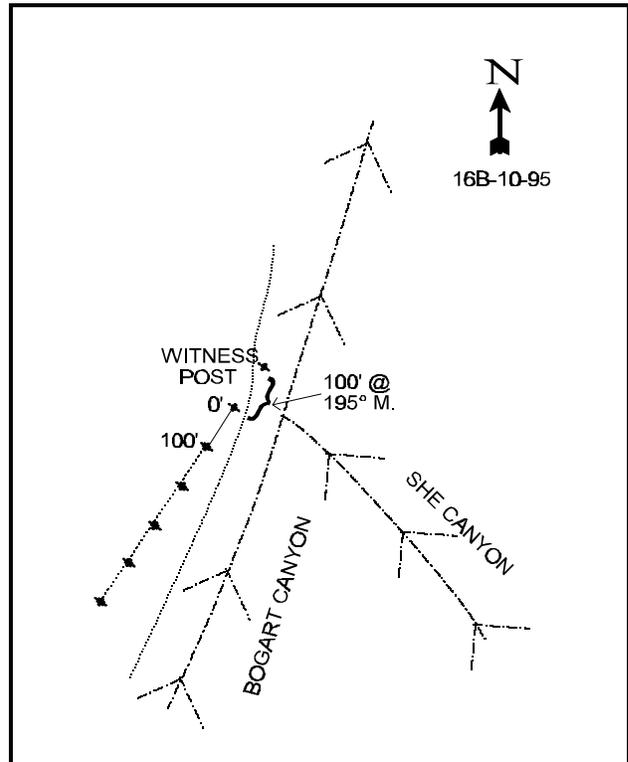
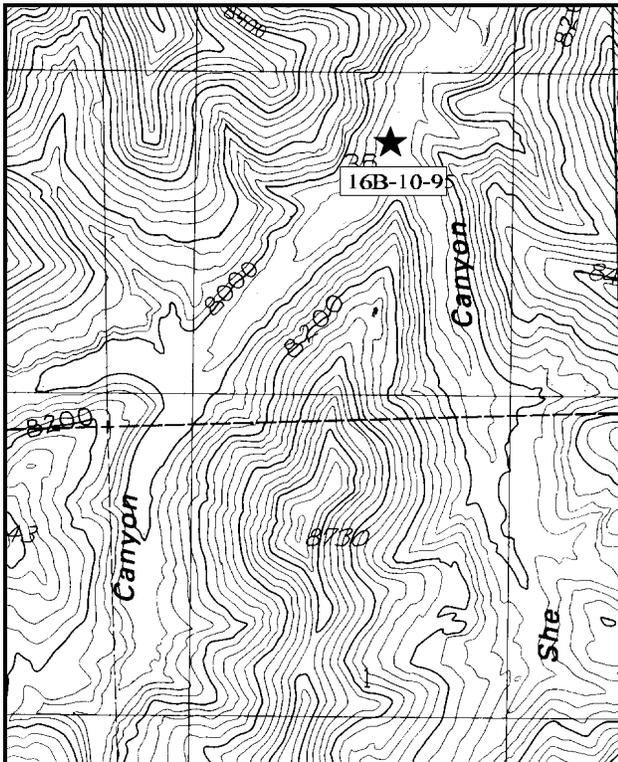
Study site name: Bogart-She. Range type: Meadow.

Compass bearing: frequency baseline 195/ degrees.

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

LOCATION DESCRIPTION

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



Map Name: Bogart Canyon.

Diagrammatic Sketch

Township 18S, Range 20E, Section 36 UTM COOR. 6-15-485E 12 43-39-744N

## DISCUSSION

### Trend Study No. 16B-10

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

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

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

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

### 1995 APPARENT TREND ASSESSMENT

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

#### TREND ASSESSMENT

soil - stable

browse - none

herbaceous understory - stable

VEGETATIVE TRENDS --  
Herd unit 16B, Study no: 10

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron dasystachyum	227	67	6.09
G	Bouteloua gracilis	28	12	.28
G	Carex spp.	63	16	3.36
G	Juncus balticus	16	5	.59
G	Poa pratensis	444	99	35.61
G	Stipa columbiana	-	-	.00
G	Stipa comata	27	10	.47
Total for Grasses		805	209	46.42
F	Achillea millefolium	33	14	.66
F	Androsace septentrionalis	8	2	.01
F	Artemisia absinthium	-	-	.00
F	Artemisia ludoviciana	31	11	.42
F	Aster spp.	193	56	5.25
F	Chenopodium fremontii	12	5	.05
F	Equisetum spp.	290	88	8.78
F	Erigeron eatonii	3	1	.00
F	Lappula occidentalis	41	18	.34
F	Lepidium spp.	79	29	1.35
F	Lychnis drummondii	1	1	.00
F	Oenothera spp.	5	1	.00
F	Polygonum douglasii	54	20	.95
F	Potentilla gracilis	7	5	.11
F	Taraxacum officinale	127	45	1.54
Total for Forbs		884	296	19.51

BASIC COVER --  
Herd unit 16B, Study no: 10

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	484	65.69
Rock	66	.96
Pavement	104	.47
Litter	479	57.34
Bare Ground	227	8.37

PELLET GROUP FREQUENCY --  
Herd unit 16B, Study no: 10

Type	Quadrat Frequency '95
Horse	5
Elk	16
Deer	2

TREND STUDY 16B-11-95(28A-15)

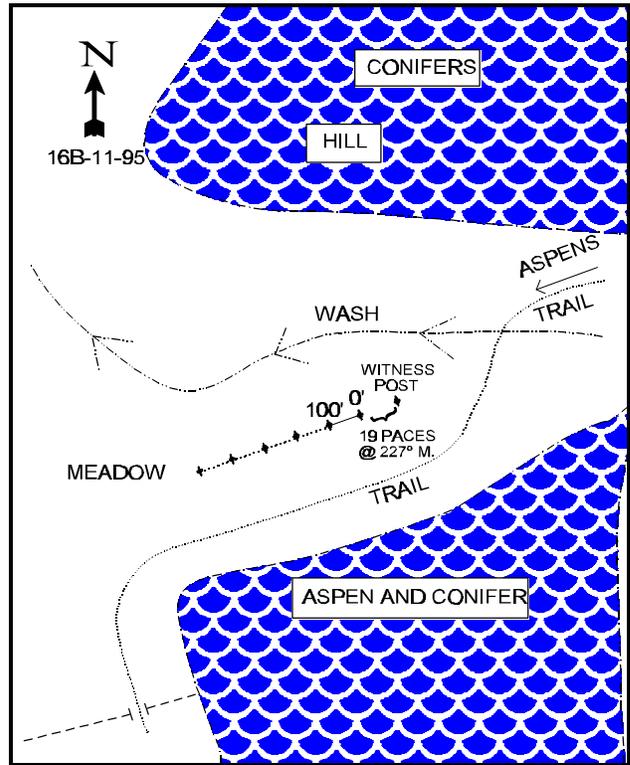
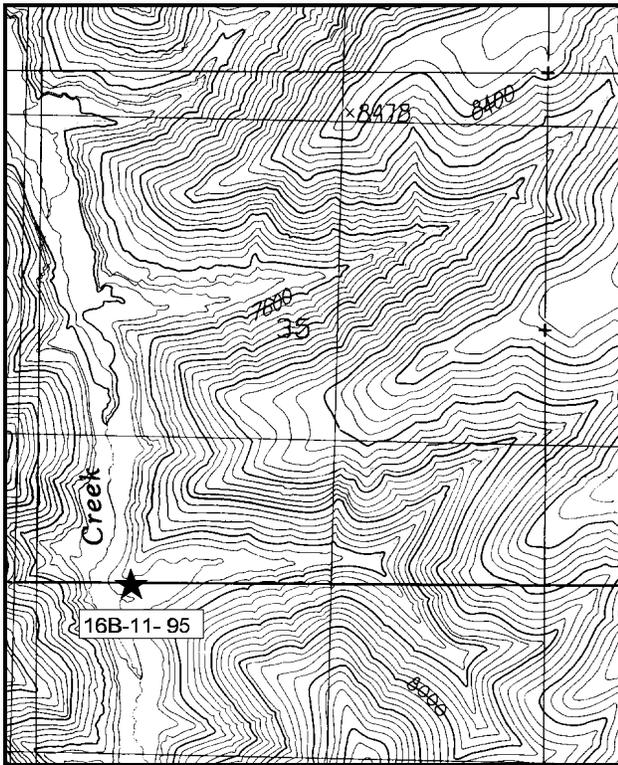
Study site name: Turner Canyon . Range type: Basin Wild Rye .

Compass bearing: frequency baseline 225/ degrees.

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

LOCATION DESCRIPTION

Travel about one half hour south along Diamond Ridge to the Turner Canyon Trail. Turn right on the Turner Canyon Trail. Follow the trail to the bottom of the canyon where you will go through a gate. Continue down the trail until you break out of the aspen into the wider part of the canyon mouth. The transect will be on the south side of the wash in a basin wildrye and grass type. A witness post will be there marking the transect. From the witness post walk 19 paces at 227/ to the 0 ft. baseline stake. The baseline runs 225/ M.



Map Name: Tenmile Canyon South .

Diagrammatic Sketch

Township 18S , Range 21E , Section 2 UTM COOR. 6-23-453E 12 43-48-816N

## DISCUSSION

### Trend Study No. 16B-11

This transect samples an upland type at the mouth of Turner Canyon where it joins East Willow Canyon. Elevation at the site is 7,500 feet with a west-southwest aspect. There is only a slight slope of 1-3% which drains into East Willow Canyon. The slopes of the canyon surrounding the meadow are covered with conifers and aspen. On the north side of the transect is a gully about 15 feet deep. In 1990, it was reported as having little vegetation on the sides with signs of active cutting. In 1995 the gully is healing with vegetation covering the sides and no apparent erosion problems. There has been no livestock grazing since 1990.

The soil is deep with very few rocks showing. Vegetation cover (56%) and litter cover (71%) provide excellent protection to the soil, allowing negligible erosion to occur. Less rock and pavement were encountered in 1995 with a combined cover value of only 3%. Percent bare ground has also declined to only 5% in 1995.

Basically, the only shrub sampled on the site is fringed sagebrush. It has an estimated density of 8,832 plants/acre with 46% of the population classified as young and 54% classified as mature. In 1986 there were nearly as many seedling plants reported as there were young and mature combined. In 1995, the biotic potential declined to 12%, which is still moderately high. These plants do not appear to be utilized and exhibit good vigor with an average height measurement of 15 inches and an average crown measurement of 8 inches. The population may be slightly increasing, but the age structure of mature and young plants are fairly stable. Mountain big sagebrush was also sampled in 1995 on the site and can be found on the other side of the canyon with some apparently moving into the flat.

The dominant grass on the site is Kentucky bluegrass. This grass contributes 28% of the total vegetative cover and is considered good for forage and erosion control. Kentucky bluegrass is an aggressive increaser with moderate to heavy grazing. It is a rhizomatous sod former and is able to out-compete many species of grasses and forbs. Thickspike wheatgrass, Great Basin wildrye, and needle-and-thread grass are also present and all provide nearly the same proportion of vegetative cover. Great Basin wildrye occurs in large clumps and is the most conspicuous species on the site. Other grasses that occur infrequently include: blue grama, cheatgrass, prairie junegrass, and alkali muhly. Overall, the total sum of nested frequency for perennial grasses has increased with several additional species being sampled.

The most abundant forb sampled was slender cinquefoil which accounts for 32% of the total forb cover. This is considered an increaser and grows relatively low to the ground. Other low growing, increaser/invaser forbs encountered on the site include: western yarrow, Rose pussytoes, Pacific aster, and dandelion. The abundance of these forbs would indicate a long history of overgrazing.

### 1995 TREND ASSESSMENT

Fringed sagebrush would not be available as forage in the winter, while in the summer, grasses would be preferred before the fringed sagebrush would be utilized. The abundance of fringed sagebrush is an indication of past overgrazing and misuse of the area. The age structure of the population appears stable and the increase in density is likely due to the increased sample size as well as a better distribution of the sample. Browse trend at this time is stable, although, a different shrub component is likely preferred. Herbaceous understory trend is also stable, but most of the forbs are increasers/invasers. These, along with the abundant Kentucky bluegrass, all indicate past misuse of the area. The gully located on the north side of the transect appears to be

healing and there is no apparent erosion taking place at this time. Percent bare ground has declined from 15% in 1990 to only 5%. Vegetative and litter cover are abundant and contribute to an upward soil trend.

TREND ASSESSMENT

soil - upward

browse - stable

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

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 11

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'90	'95	'90	'95	
G	Agropyron dasystachyum	251	245	84	81	7.64
G	Bouteloua gracilis	7	4	4	2	.01
G	Bromus tectorum	-	2	-	1	.03
G	Elymus cinereus	52	*56	26	22	8.48
G	Koeleria cristata	-	*6	-	3	.18
G	Muhlenbergia asperifolia	-	*11	-	5	.05
G	Poa pratensis	318	324	89	92	16.29
G	Stipa comata	116	121	42	40	6.26
Total for Grasses		744	769	245	246	38.96
F	Achillea millefolium	22	73	11	29	1.66
F	Antennaria rosea	9	*20	3	7	1.03
F	Androsace septentrionalis	-	25	-	9	.04
F	Arabis spp.	-	20	-	8	.23
F	Arabis drummondii	-	*49	-	20	1.80
F	Aster chilensis	32	32	10	11	1.00
F	Chenopodium leptophyllum	-	30	-	14	.49
F	Crepis acuminata	17	*-	6	-	-
F	Cryptantha spp.	67	-	32	-	-
F	Descurainia pinnata	-	9	-	4	.02
F	Erigeron flagellaris	21	*11	8	5	.22
F	Lappula occidentalis	-	11	-	5	.05
F	Lithospermum ruderale	17	*-	10	-	-
F	Microsteris gracilis	-	4	-	3	.21
F	Oenothera pallida	115	*86	52	37	1.37
F	Penstemon spp.	28	*-	13	-	-
F	Phlox longifolia	27	*-	12	-	-
F	Potentilla anersina	12	*-	4	-	-

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'90	'95	'90	'95	
F	Polygonum douglasii	-	25	-	12	.11
F	Potentilla gracilis	145	158	64	67	4.29
F	Taraxacum officinale	176	*100	71	47	.58
F	Tragopogon dubius	4	*9	3	5	.10
F	Vicia americana	-	*8	-	3	.04
Total for Forbs		692	670	299	286	13.28
B	Artemisia frigida	97	*183	42	74	6.01
Total for Browse		97	183	42	74	6.01

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 16B, Study no: 11

Cover Type	Nested Frequency '95	Average Cover %	
		'90	'95
Vegetation	390	32.50	56.31
Rock	91	.25	.32
Pavement	196	11.25	2.94
Litter	399	41.00	71.51
Cryptograms	22	0	.50
Bare Ground	181	15.00	5.01

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 11

Type	Quadrat Frequency '95
Rabbit	3
Horse	1
Elk	17
Deer	3
Cattle	1

BROWSE CHARACTERISTICS --  
 Herd unit 16B, Study no: 11

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia frigida																		
S	90	76	-	-	-	-	-	-	-	-	76	-	-	-	5066		76	
	95	46	-	-	5	-	-	-	-	-	51	-	-	-	1020		51	
Y	90	40	7	2	-	-	-	-	-	-	47	-	2	-	3266		49	
	95	155	-	-	48	-	-	-	-	-	203	-	-	-	4060		203	
M	90	18	16	5	-	-	-	-	-	-	37	-	1	1	2600	0	1	39
	95	823	-	-	69	-	-	-	-	-	892	-	-	-	4732	15	8	892
D	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'90	5866	Dec:	0%			
												'95	8832		0%			
Artemisia tridentata vaseyana																		
M	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	18	1
Total Plants/Acre (excluding Dead & Seedlings)												'90	0	Dec:	-			
												'95	20		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 16B, Study no: 11

Species	Percent of Total	
	'90	'95
Artemisia frigida	100	100
Artemisia tridentata vaseyana	0	.09

TREND STUDY 16B-12-95(28A-16)

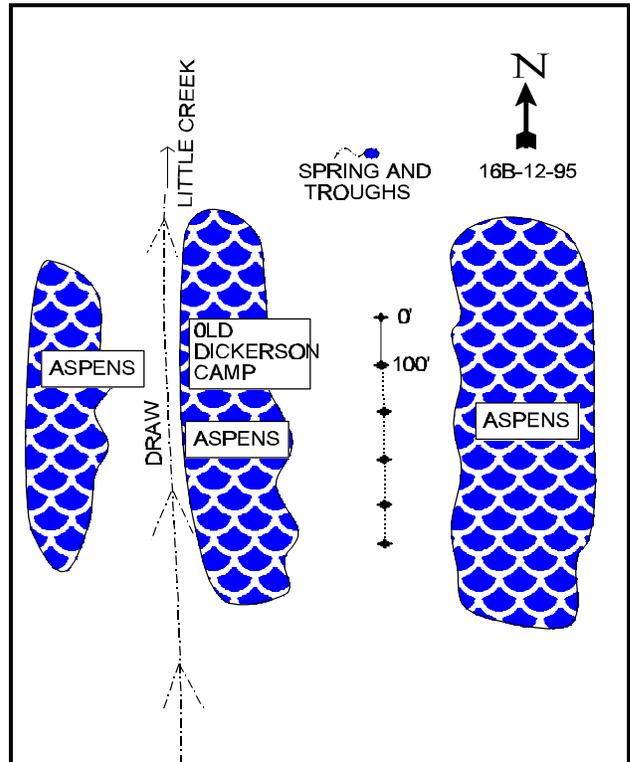
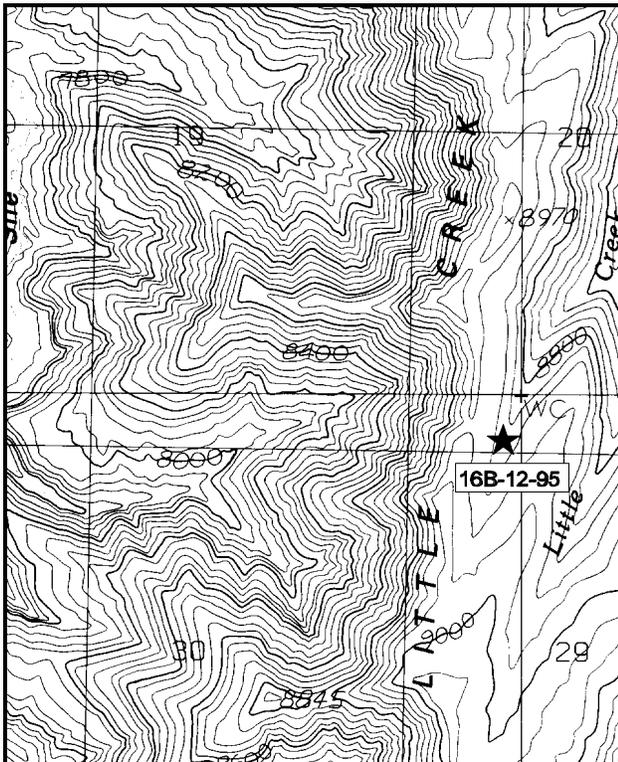
Study site name: Little Ridge. Range type: Meadow.

Compass bearing: frequency baseline 189 degrees.

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

LOCATION DESCRIPTION

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



Map Name: Bogart Canyon.

Diagrammatic Sketch

Township 18S, Range 21E, Section 20

## DISCUSSION

### Trend Study No. 16B-12

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

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

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

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

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

### 1995 APPARENT TREND ASSESSMENT

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

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

VEGETATIVE TRENDS --

Herd unit 16B, Study no: 12

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
G	Agropyron dasystachyum	11	3	.19
G	Bromus marginatus	8	3	.71
G	Carex spp.	83	26	1.64
G	Koeleria cristata	24	11	.22
G	Poa fendleriana	28	10	.22
G	Poa pratensis	243	73	5.70
G	Sitanion hystrix	9	3	.04
G	Stipa columbiana	33	10	.51
G	Stipa comata	328	94	17.22
G	Stipa lettermani	71	23	1.59
Total for Grasses		838	256	28.08
F	Achillea millefolium	136	54	2.47
F	Arabis spp.	2	1	.00
F	Carduus nutans	1	1	.00
F	Chenopodium leptophyllum	22	10	.05
F	Cirsium spp.	62	29	.72
F	Collomia linearis	23	10	.05
F	Collinsia parviflora	4	1	.00
F	Erigeron eatonii	65	29	.27
F	Erigeron flagellaris	10	5	.08
F	Gayophytum ramosissimum	7	3	.01
F	Lathyrus lanszwertii	151	57	6.49
F	Lepidium spp.	11	5	.08
F	Lychnis drummondii	27	12	.58
F	Microsteris gracilis	6	3	.04
F	Polygonum douglasii	168	60	1.69
F	Senecio spp.	20	11	.12
F	Taraxacum officinale	138	60	1.33
F	Tragopogon dubius	1	1	.00
Total for Forbs		854	352	14.03

Type	Species	Nested Frequency '95	Quadrat Frequency '95	Average Cover % '95
B	<i>Artemisia tridentata vaseyana</i>	14	7	.45
B	<i>Populus tremuloides</i>	1	1	.00
B	<i>Symphoricarpos oreophilus</i>	12	4	2.07
Total for Browse		27	12	2.53

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

BASIC COVER --

Herd unit 16B, Study no: 12

Cover Type	Nested Frequency '95	Average Cover % '95
Vegetation	466	50.47
Rock	166	.99
Pavement	205	.70
Litter	489	63.77
Cryptograms	13	.13
Bare Ground	259	11.02

PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 12

Type	Quadrat Frequency '95
Elk	21
Deer	2

BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 12

AGE	YR	Form Class (No. of 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	95	17	-	-	106	-	-	-	-	-	123	-	-	-	2460		123
Y	95	17	-	-	11	-	-	-	-	-	28	-	-	-	560		28
M	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	28 36	7
X	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3
Total Plants/Acre (excluding Dead & Seedlings)											'95		700	Dec:		-	
<i>Populus tremuloides</i>																	
Y	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Total Plants/Acre (excluding Dead & Seedlings)											'95		60	Dec:		-	

A G E	YR	Form Class (No. of 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	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
Y	95	2	-	-	2	-	-	-	-	-	4	-	-	-	80		4	
M	95	3	1	-	1	5	-	-	-	-	10	-	-	-	200	17	33	10
Total Plants/Acre (excluding Dead & Seedlings)												'95	280	Dec:	-			

PERCENT BROWSE COMPOSITION--  
Herd unit 16B, Study no: 12

Species	Percent of Total '95
Artemisia tridentata vaseyana	67
Populus tremuloides	6
Symphoricarpos oreophilus	27

## SUMMARY

### DEER HERD UNIT - 16B - SOUTH BOOKCLIFFS

Seven sites in deer herd unit 16B sample Wyoming big sagebrush populations. These sites include: (#1) East Floy Bench, (#2) East Thompson Bench, (#3) West Horse Pasture, (#4) East Calf Pasture, (#5) East Horse Pasture, (#8) East Sulfur Bench, and (#9) Bryson Draw. The soil trend on these sites were all stable mostly due to adequate vegetative and litter cover and the slight slope that they are located on. Even though they may have adequate vegetative cover, most of the cover generally comes from cheatgrass. East Floy Bench has a downward herbaceous understory trend with the sum of nested frequency for perennial grass decreasing dramatically. East Thompson Bench, East Calf Pasture, and Bryson Draw have stable herbaceous understory trends. A slightly upward trend, due to increased sum of nested frequency for grasses and forbs, was seen on West Horse Pasture, East Horse Pasture, and East Sulfur Bench. All of these sites have more than 34% cheatgrass for total vegetative cover. All sites, with the exception of East Sulfur bench, show signs of decreased utilization of the Wyoming big sagebrush and a slightly upward or stable browse trend and now have the possibility of improving with proper climatic patterns. East Sulfur Bench appears to have more utilization which is increasing the decadency rate and reducing the vigor.

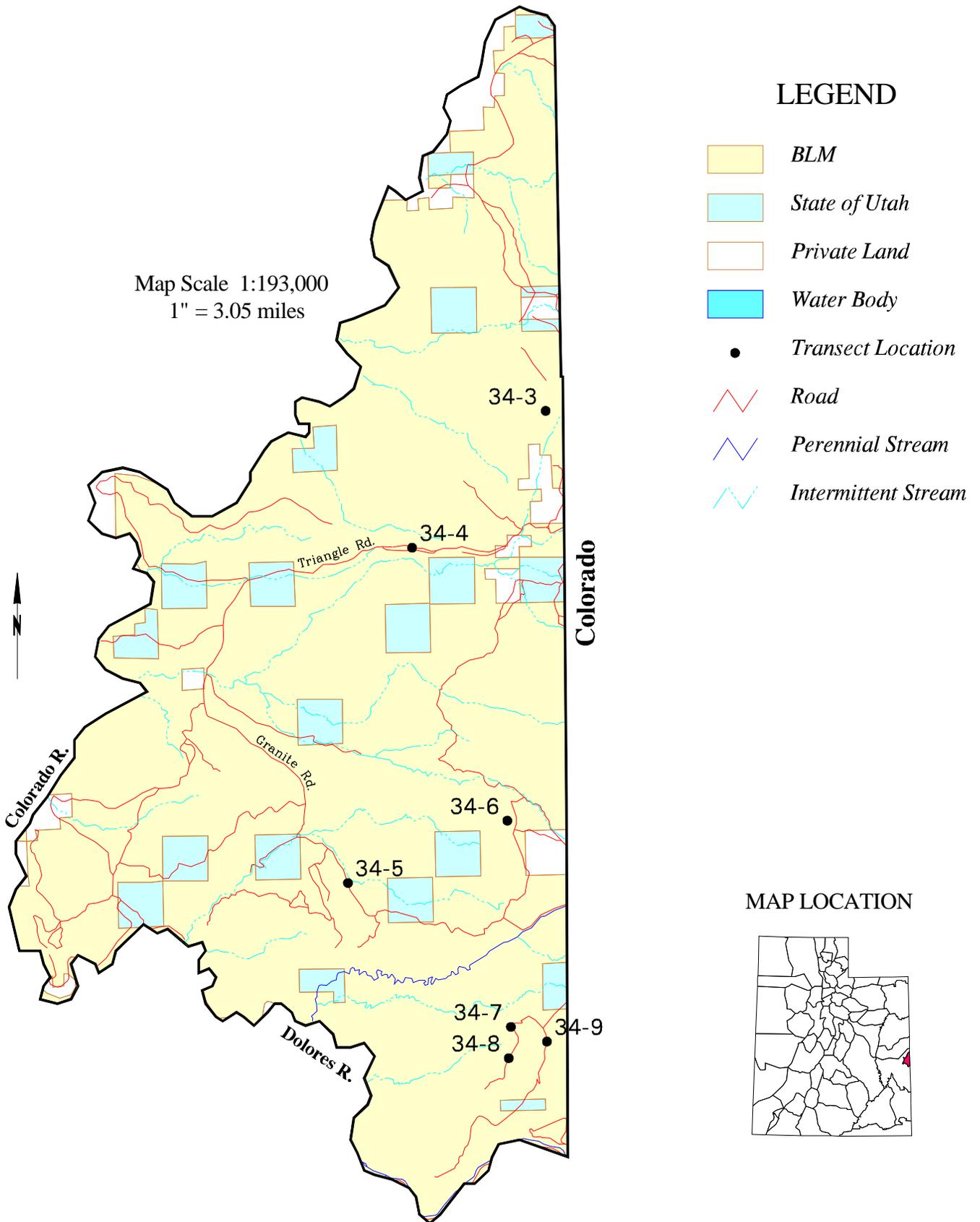
Site #7, Upper Cottonwood samples a black greasewood flat with greasewood averaging nearly 5 feet tall and 5 feet wide. The browse trend is slightly downward with a reduction in palatable shrubs. Cheatgrass dominates this site, not allowing more preferred shrub seedlings to become established. The soil trend is stable with adequate vegetative and litter cover.

Lower Cottonwood (#6) samples an area with a variety of shrubs in low densities. The most common is broom snakeweed and this shrub does not appear to be increasing at this time. Sixty nine percent of the vegetative cover is contributed by cheatgrass which reduces the ability of plants to establish due to competition for soil moisture. Herbaceous understory is stable with an increase in sum of nested frequency for both grasses and forbs. Soil trend is stable with no erosion reported.

The major concern regarding the communities that have about 50% or more of the herbaceous understory made up of cheatgrass is that these communities could experience a very destructive wildfire that could make the community a monoculture of cheatgrass. Thus, making the possibility of future fires even more destructive to the plant community.

Sites at Bogart-She (#10), Turner Canyon (#11), and Little Creek Ridge (#12) sample dry grassy meadows or uplands. Bogart-She and Little Creek Ridge both appear to have stable soil and herbaceous understory trends at this time as there is abundant vegetation and litter. Kentucky bluegrass is the dominant grass at Bogart-She while needle-and-thread grass is the dominant grass on Little Creek Ridge. Bogart-She does not have any browse and mountain big sagebrush is the dominant at Little Creek Ridge but in a very low density. Turner Canyon has two years of data that shows an upward soil trend with a gully near the site starting to heal. Basically, the only browse on this site is fringed sagebrush which shows no use and does not appear to be increasing at this time. The herbaceous understory is stable with Kentucky bluegrass comprising 28% of the total vegetative cover.

# Deer Management Unit 34 –1995 Transect Locations



## DEER HERD UNIT 34-LASAL DOLORES

### BOUNDARY DESCRIPTION

Grand County - Boundary begins at the Colorado River and Utah-Colorado state line; then southwest along the Colorado River to the Dolores River; east along the Dolores River to the state line; north along the state line to the Colorado River and beginning point.

### Herd Unit Description

The Dolores Triangle unit is formed by the Colorado River, the Dolores River, the Colorado-Utah state line, and a strip of land north of the Colorado River up to I-70 and Highway 128. Topography is varied with relatively flat mesas above 7,000 feet, large rocky rough canyons and broken country at the middle elevations, with low desert along the Colorado River. Four drainages dominate the area. Granite Creek flows into the Dolores River; Ryan Creek, Coates Creek, and Little Dolores River empty into the Colorado River. There are ranches scattered throughout the area, while Fruita and Grand Junction, Colorado are the closest municipalities. Access to the unit is through Colorado via Glade Park or by fording the Dolores River near its confluence with the Colorado River at Dewey. Fluctuating water levels and undulating bottom contours can make crossing treacherous. The unit is comprised of 98,100 acres of winter range and 17,520 acres are classified as non-range. There is no summer range in the herd unit. The Bureau of Land Management manages 87% (85,320 acres) of the herd unit. The State of Utah owns 9% (8,970 acres) of the winter range and 4% (3,810 acres) is privately owned.

The LaSal-Dolores unit serves as winter range for deer which spend the remainder of the year in Colorado's Pinon Mesa area. Few deer reside in the unit year-round. Concentration areas for deer during normal winters are Steamboat Mesa, Lower Steamboat Mesa, Fish Park, Big Triangle, and the Ryan and Granite Park areas. Only during severe winters with abnormally heavy snowfall are deer forced to scatter into the lower range where forage is poor. Severe winter range and normal winter range are not separated into different categories. However, much of the land to the east is too high for winter range, so the whole unit could be considered critical. The many scattered ranches with agricultural land throughout the herd unit offer valuable forage to the deer in the spring and fall.

Coles and Pederson (1968) identified and described 5 vegetation types which make up the winter range on herd unit 34. The desert shrub type is dominated by blackbrush and occupies the lower portions of this winter range. This type is most important during severe winters although few desirable forage species are found. The grass type is found in the Granite Park and Steamboat Mesa areas. These were once large sagebrush parks, but due to excessive use have undergone a conversion. Formerly, these were very important deer wintering areas which now receive increasing use by elk. The sagebrush type is found above the desert shrub and up to and within the pinyon-juniper areas. It provides important browse to both deer and livestock. The pinyon-juniper type, like the grass type, has undergone significant changes due to competition with the mature trees and some years of excessive winter use in the past. A productive understory of cliffrose and black sagebrush has largely died out and is the least productive vegetative type on the unit. The pinyon-juniper type is common on the slopes and higher mesas. The pinyon-juniper-sagebrush type occupies the upper portions of the winter range and provides important cover and forage for wildlife.

Livestock grazing is the single-most important land use in the area. Winter sheep use began in the early 1900's. Now, most of the 7,561 AUM's the BLM allocates for livestock use is for cattle, although some winter sheep use still

occurs. Pinyon-juniper's evolving dominance along with excessive use by livestock and big game has led to deteriorating range conditions until both livestock and deer numbers were reduced to improve the range. Although some problems still exist, range conditions appear to be slowly improving (Jense et al. 1986).

This unit presents some unique deer and elk management problems. Since this unit functions primarily as winter range for big game which spend the remainder of the year in Colorado, any effective management requires coordinated efforts with Colorado's Department of Game and Fish. Also, since deer and elk are present mostly in the winter when snow depth may complicate access to the area, obtaining population data is often difficult. Because the presence of deer and elk depends on weather conditions prior to and during the hunt, hunting as a management tool is not always effective. If heavy snows have driven the deer onto the unit, hunter access is usually a problem. Thus, the number of deer harvested and percent hunter success is often more related to weather conditions than to deer abundance.

#### Big Game Trends

Beginning in 1969, the deer herd unit showed a significant drop in bucks harvested. Between 1969 and 1975, either-sex general season and control hunts accounted for an average yearly harvest of 403 bucks and 207 does. Previously, from 1955 through 1968, the buck harvest averaged near 1,500 bucks/year. Under buck only hunting regulations between 1976 and 1985, the average harvest was 89 bucks/year. In 1983, control hunts for does were implemented and have accounted for an average of 122 does/year through 1990. Antlerless permits have not been utilized since 1990. The buck harvest dropped again in 1987 and in 1990 the herd unit was made a draw unit with 26-27 hunters afield and an average of 22 bucks/year harvested through 1995. Current management objectives are 100 bucks/year with an antlerless harvest as needed.

The elk herd unit number for this area is 27. Elk that winter in this area come from Colorado's unit 40, which is managed for quality hunting. There have been minimal numbers of elk harvested by Utah hunters in this field. Basically, Colorado would like to gradually increase these elk numbers from an estimated 1,700 animals now to 3,000 animals sometime in the distant future. About 50% of the elk population use Utah as winter range and are expected to continue to do so. The current management objectives are to maintain an optimum elk herd population while not degrading the health of the range and hopefully complement Colorado's management goals.

Nine interagency range trend studies were established during June 1986. The study sites were selected the previous month by local interagency personnel. The studies were read again in May of 1995.

TREND STUDY 34-1-95

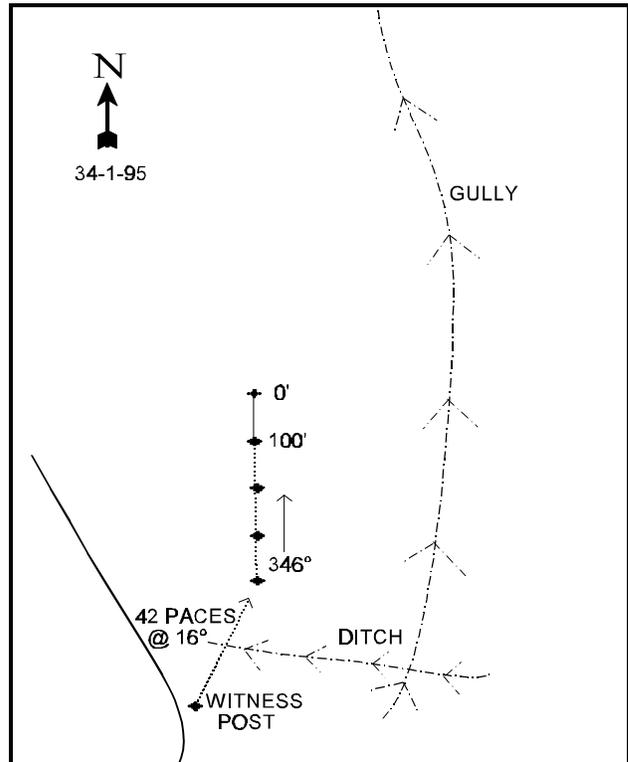
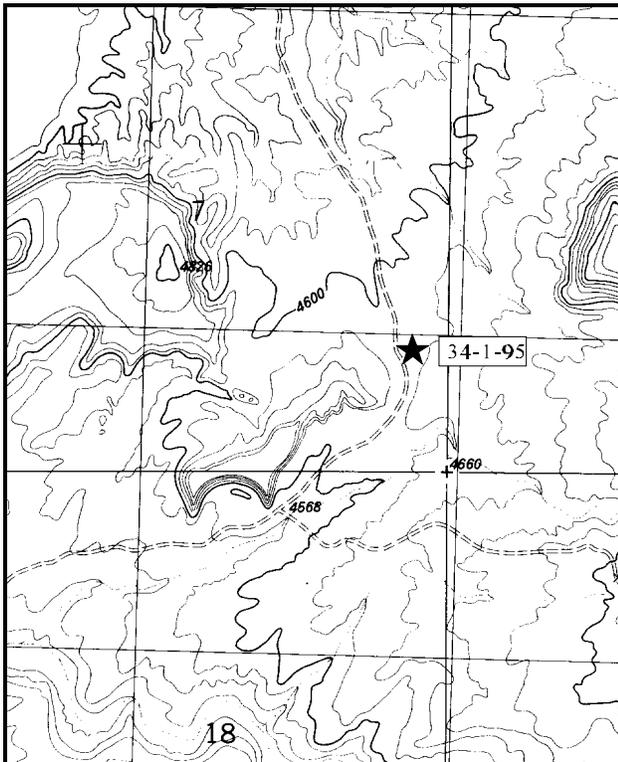
Study site name: Lower Westwater Dolores. Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 166M degrees.

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

LOCATION DESCRIPTION

From the intersection of the DS Road and A 2/10 Road west of Glade Park, Colorado, go down A 2/10 Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles along the fence to another gate (permission and key necessary to get through gates). Continue 5.6 miles to the state line. Go another .4 miles to a cabin. Turn right along the edge of a field and go .2 miles to a wire gate and another .05 to a pipe gate. Go 3.3 miles to transect 34-2-86. Continue .5 miles to a fork near a sheep corral. Keep right. Continue 1.25 miles to a wire gate, then another .85 miles to the fencepost witness stake six feet off the right side of the road on top of the road cut. From the witness post, walk 42 paces at 16/(M) to the 400' stake. The 0' stake is 400 feet at 346°(M).



Map Name: Westwater 4SE

Diagrammatic Sketch

Township 20S, Range 26E, Section 7

## DISCUSSION

### Trend Study No. 34-1

The Lower Westwater-Dolores transect is in a remote area that is basically accessible only through Colorado. The study is in a big sagebrush dominated open valley surrounded by slick rock cliffs and domes of sandstone. It is on a 10% west-facing slope, nearly 2 miles from the Colorado River at an elevation of 4,600 feet. The land is administered by the BLM out of the Grand Junction office in Colorado. The allotment is grazed by cattle and horses from November through May. Deer pellet group quadrat frequency was moderate at 31%, indicating the area receives moderate deer use, depending on the year.

Litter is abundant, mostly coming from annuals, with a cover value estimated at 51%. No rock or pavement was encountered. The vegetation and litter provide good cover for the soil with no apparent erosion problems. The soil has a fine texture on the surface, but is composed mostly of sand. The soil is protected quite well by the combination of vegetation and litter.

The key browse species on this site appears to be a hybrid of Wyoming big sagebrush and basin big sagebrush. The vegetation and browse characteristic tables refer to the population as Wyoming big sagebrush. This stand exhibits a distinctly clumped dispersion pattern with a dense understory of annual species. Some sagebrush display a clubbed appearance and have more character traits of Wyoming sagebrush while others not clubbed, have more traits of basin big sagebrush. The population structure has greatly changed since the last reading. In 1986, 88% of the population were young plants and no mature plants were reported. In 1995, only 1% of the population were young while 66% were mature. The decadency rate has increased from 11% to 32% with no seedlings reported for either year. It is very difficult, to get seedling establishment with the intense competition from the annuals grasses and forbs. At this time, 79% of the decadent population are classified as dying and the number of dead plants in the population (1,920 plants/acre) numbers more than the living. Cover from the Wyoming big sagebrush contributes only 8% of the total vegetative cover. Mature plants average two feet in height with a crown of two and one half feet. Measurements of height and crown were not taken in 1986 because there were no mature plants reported.

Other browse species include broom snakeweed and spiny hopsage which were rarely found. Green ephedra was present in low numbers and heavily hedged in 1986 and appeared to be dying off. None were sampled in 1995. On the opposing slope, there is a vigorous stand of sand sagebrush, a few decadent spiny hopsage and a few scattered juniper.

Annual species, both grasses and forbs, contribute 80% of the total vegetative cover on this site. Cheatgrass alone provides 61% of the total vegetative cover and 86% of the total grass cover. There are very few perennial plants present, which contribute only a small percent of the vegetative cover. The most abundant perennial grass, galleta, has significantly declined in nested frequency since 1988 and now only provides 14% of the total grass cover. Forbs account for 21% of the vegetative cover with most being small annual species.

### 1986 APPARENT TREND ASSESSMENT

The soil trend is stable, although there is signs of some soil movement when the litter and/or cryptogam cover is disturbed. The vegetative condition and trend is somewhat puzzling. There appears to have been a sagebrush die-off in recent years. This was not because of grazing pressure because of only light to moderate use in the past. It was probably more of a response to the excessively wet years of 1983-85. Basin big sagebrush naturally experiences a fairly rapid

turnover in generations, and it seems to be occurring on this site at the present time. There appears to be a sufficient proportion of young plants to maintain shrub density at an acceptable level. Trend is therefore considered to be stable to improving.

1995 TREND ASSESSMENT

Due to abundant soil cover, decrease in percent bare ground, and no apparent erosion problems, soil trend appears stable. Most of the soil cover comes from annual species and litter. Although the abundant cover of annuals protect the soil, it is very detrimental to the health of the community to have such a high amount of fine fuels present. It is just a matter of time before a fire will totally destroy the sagebrush population in the immediate area. Due to the poor age class structure, large numbers of dead plants and high decadence which has almost tripled to 32% since 1986, trend for the key browse species is down. To further aggravate this situation, 79% of the decadent plants are classified as dying. The lack of seedlings in the area is a function of extended drought conditions as well as intense competition with the winter annuals even when there could have been adequate precipitation for establishment. Herbaceous understory, while it does provide ground cover, has the potential to carry a very destructive fire. Therefore, the herbaceous understory trend is down.

TREND ASSESSMENT

soil - stable

browse - down

herbaceous understory - down because it is mostly annuals

VEGETATIVE TRENDS --

Herd unit 34, Study no: 1

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Bromus tectorum	-	384	-	100	12.39
G	Hilaria jamesii	206	*114	71	41	1.99
G	Sitanion hystrix	9	*-	4	-	-
G	Sporobolus cryptandrus	1	-	1	-	-
G	Vulpia octoflora	-	46	-	18	.09
Total for Grasses		216	544	76	159	14.47
F	Astragalus spp.	12	*4	5	2	.01
F	Chaenactis stevioides	-	3	-	1	.00
F	Cryptantha spp.	-	12	-	7	.03
F	Draba nemorosa	-	3	-	1	.00
F	Erodium cicutarium	-	35	-	12	.45
F	Erigeron spp	26	*-	11	-	-
F	Lappula occidentalis	-	1	-	1	.00
F	Lepidium densiflorum	-	120	-	47	.79
F	Leucelene ericoides	-	*56	-	28	1.12
F	Navarretia intertexta	-	61	-	25	.13
F	Oenothera albicaulis	-	*9	-	4	.02

Type	Species	Nestled Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	Plantago patagonica	-	191	-	67	.61
F	Sisymbrium altissimum	-	156	-	68	.93
F	Sphaeralcea munroana	-	7	-	5	.02
Total for Forbs		38	658	16	268	4.16
B	Artemisia tridentata tridentata	39	*14	19	7	1.69
B	Ephedra viridis	2	-	1	-	-
B	Gutierrezia sarothrae	7	*-	4	-	-
Total for Browse		48	14	24	7	1.69

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

BASIC COVER --

Herd unit 34, Study no: 1

Cover Type	Nestled Frequency '95	Average Cover %	
		'86	'95
Vegetation	395	11.50	29.78
Rock	-	0	0
Pavement	-	.25	0
Litter	399	50.50	51.34
Cryptograms	150	18.50	2.17
Bare Ground	285	19.25	17.96

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 1

Type	Quadrat Frequency '95
Rabbit	12
Deer	31
Cattle	3

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 1

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata tridentata																		
Y	86	25	40	1	-	-	-	2	-	-	65	3	-	-	4533		68	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	43	6	-	-	-	-	-	-	-	49	-	-	-	980	24	30	49
D	86	-	1	3	-	5	-	-	-	-	8	1	-	-	600		9	
	95	18	4	2	-	-	-	-	-	-	5	1	-	18	560		28	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	1920			96	
Total Plants/Acre (excluding Dead & Seedlings)												'86	5133	Dec:	11%			
												'95	1560		35%			
Grayia spinosa																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	17	26	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
Gutierrezia sarothrae																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20	12	12	1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	40		-			
Opuntia spp.																		
M	86	1	-	-	-	-	-	-	-	-	-	1	-	66	6	7	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 34, Study no: 1

Species	Percent of Total	
	'86	'95
Artemisia tridentata tridentata	99	98
Grayia spinosa	0	0
Gutierrezia sarothrae	0	3
Opuntia spp.	1	0

TREND STUDY 34-2-95

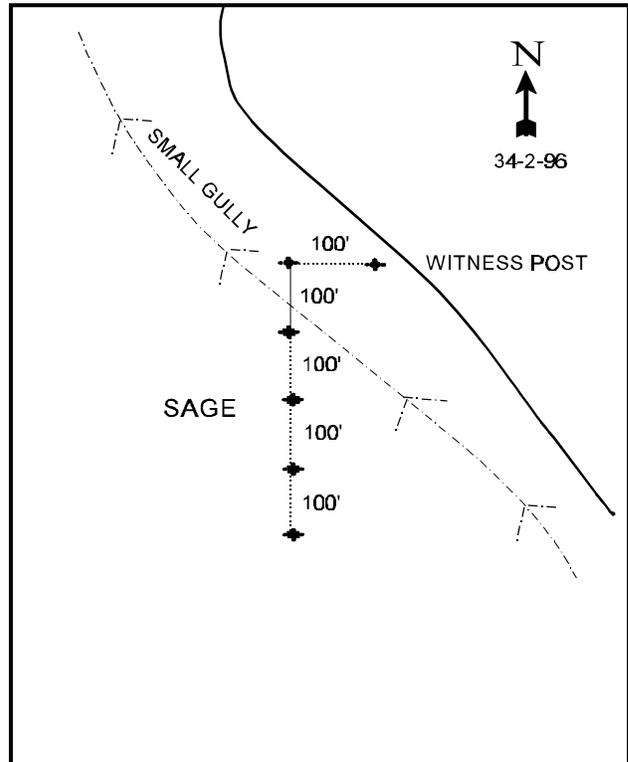
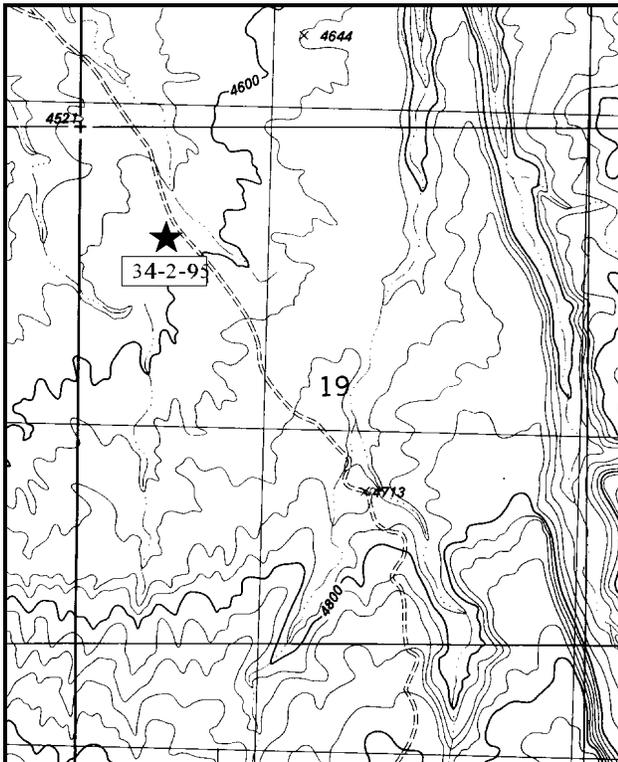
Study site name: Upper Westwater-Dolores. Range type: Big Sagebrush.

Compass bearing: frequency baseline 166M degrees.

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

LOCATION DESCRIPTION

From the intersection of the DS Road and A 2J10 Road west of Glade Park, Colorado, go down A 2/10 Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles to a locked gate (necessary to obtain permission and key). Continue 5.6 miles through the valley to the state line. Proceed .4 miles to a cabin, turn right and go along the edge of a field .2 miles to a wire gate. Go .05 miles to a locked pipe gate, and then 3.3 miles on the main road to the transect. There is a witness post (rebar) off the left side of the road 10-15 feet. The 0-foot baseline stake, a rebar tagged #7957, is 100 feet due west of the witness post.



Map Name: Westwater 4SE

Diagrammatic Sketch

Township 20S, Range 26E, Section 19

## DISCUSSION

### Trend Study No. 34-2

Like transect 34-1, the Upper Westwater study is in the northeast portion of the Dolores Triangle. It samples a big sagebrush flat surrounded by juniper woodland and nearby sandstone cliffs. The Colorado River is approximately 2 miles to the west. The site is at 4,600 feet with a 1-2% slope and a northwest exposure. The area is grazed by cattle in winter and early spring (2,791 AUM's are presently allocated on the allotment). The number of deer pellet groups found at the site are low in number and scattered. Since 1986, the site has burned leaving only a few scattered sagebrush stumps and no living sagebrush plants.

The soil is a reddish, sandy loam, which appears to be moderately deep. Litter cover is abundant (59%), but is essentially contributed by annual species. There is a low amount of bare ground (almost 14%), due to the high amounts of cover from litter and annual vegetation. No rock or pavement was sampled. Cryptogamic crust development is evident, yet only contributes 3% cover.

In the past, basin big sagebrush was the dominate browse species with an estimated density of 2,199 plants/acre. Since then, the sagebrush population has been lost to a wildfire with annual species now dominating the site. The fire appears to have burned very hot leaving very little sign that sagebrush once dominated the site. There is no indication that the sagebrush population is going to return in the near future. Other associated browse species (four-wing saltbush and spiny hopsage) are also gone and do not show any signs of becoming reestablished at this time. Around the periphery of the site, there are still some juniper trees that were singed by the fire, but appear to be recovering.

Annual cheatgrass dominated the understory in 1986. Although dense that year, the cheatgrass appeared to be affected by a fungus that in many areas of the state had greatly reduced seed production during the wet years of 1983-85. Since the destructive wildfire, annual plant species account for 96% of the total vegetative cover on the site. Grasses provide 70% of the vegetative cover, with forbs providing the remaining 30%. The dominate grass is cheatgrass, which accounts for 57% of the total vegetative cover. Sixweeks fescue is also present contributing 11% vegetative cover. These two grasses combined account for two-thirds of the total vegetative cover and provide great quantities of fine fuel. Galleta and purple threeawn are present but in very low numbers. Tumblemustard and woolly indianwheat are the predominant forbs on the site and also contribute to the high fuel loads of the site.

### 1986 APPARENT TREND ASSESSMENT

Vegetative trend was considered stable. The basin big sagebrush is healthy and it has adequate reproduction. An increase in species diversity for shrubs would be desirable to supplement the sagebrush. However, a more palatable species would be severely hedged even though browsing pressure is low on this site. The juniper appear to be increasing, but are not in densities that would form a closed canopy. There is little sign of erosion and the soil trend is stable although an increase in perennial grass species would provide needed diversity and a more reliable ground cover than annual cheatgrass.

### 1995 TREND ASSESSMENT

Annual vegetation and litter provide ample cover to the soil. Although the soil is protected, they also provide abundant fine fuel to carry another destructive fire. Therefore, soil trend is stable but with poor cover composition. The recent fire removed all browse species from the area and there are apparently no seedlings at this time. The browse trend is considered down. Deer will likely

use this area in the spring when the plants are succulent, but can no longer rely on the area as a source for browse species in moderate or severe winters. The herbaceous understory trend is down because of the poor cover composition. Perennial species diversity and abundance need to increase for the site to stabilize which will mitigate the effects of future wildfires.

TREND ASSESSMENT

soil - stable

browse - down, loss of browse to wildfire

herbaceous understory - down, mostly composed of annual species

VEGETATIVE TRENDS --

Herd unit 34, Study no: 2

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Aristida purpurea	-	2	-	1	.03
G	Bromus tectorum	-	371	-	99	16.27
G	Hilaria jamesii	45	40	16	14	.65
G	Vulpia octoflora	-	277	-	89	3.01
Total for Grasses		45	690	16	203	19.98
F	Astragalus spp.	-	*15	-	6	.08
F	Calochortus nuttallii	-	3	-	1	.00
F	Cryptantha spp.	-	1	-	1	.00
F	Eriogonum cernuum	-	2	-	1	.00
F	Erodium cicutarium	-	44	-	19	.14
F	Erigeron spp	-	2	-	1	.00
F	Lepidium densiflorum	-	70	-	31	.15
F	Machaeranthera spp	-	6	-	3	.01
F	Navarretia intertexta	-	51	-	26	.15
F	Plantago patagonica	-	276	-	89	1.93
F	Sisymbrium altissimum	-	307	-	98	5.85
F	Sphaeralcea coccinea	2	*54	1	25	.27
Total for Forbs		2	831	1	301	8.63
B	Artemisia tridentata tridentata	56	*-	30	-	-
Total for Browse		56	0	30	0	0

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

BASIC COVER --

Herd unit 34, Study no: 2

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	393	10.50	47.54
Rock	3	0	.00
Pavement	-	0	0
Litter	399	69.50	59.21
Cryptograms	195	3.50	3.03
Bare Ground	293	16.50	13.90

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 2

Type	Quadrat Frequency '95
Rabbit	9
Deer	10
Cattle	9

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 2

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata tridentata																		
Y	86	10	-	-	-	-	-	-	-	-	10	-	-	-	666		10	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400	28	27	6
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	17	-	-	-	-	-	-	-	-	17	-	-	-	1133		17	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	2199	Dec:	52			
												'95	0		-			

PERCENT BROWSE COMPOSITION--

Herd unit 34, Study no: 2

Species	Percent of Total	
	'86	'95
Artemisia tridentata tridentata	100	0

TREND STUDY 34-3-95

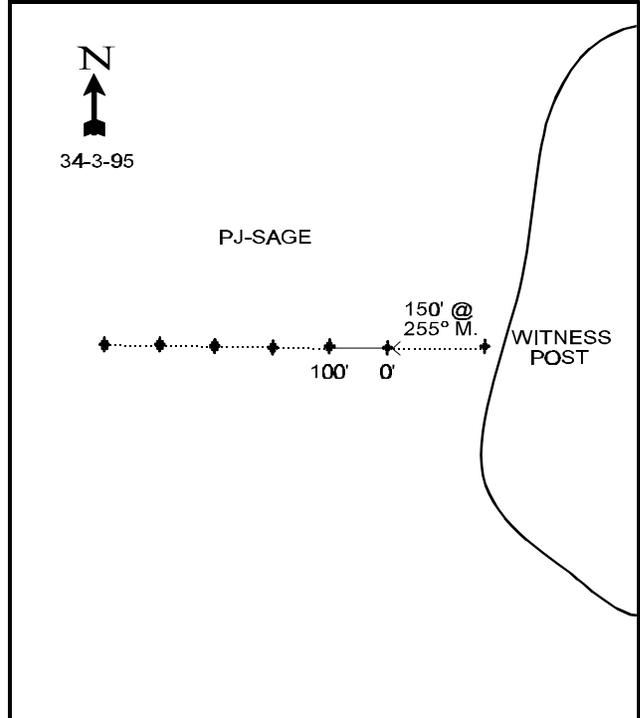
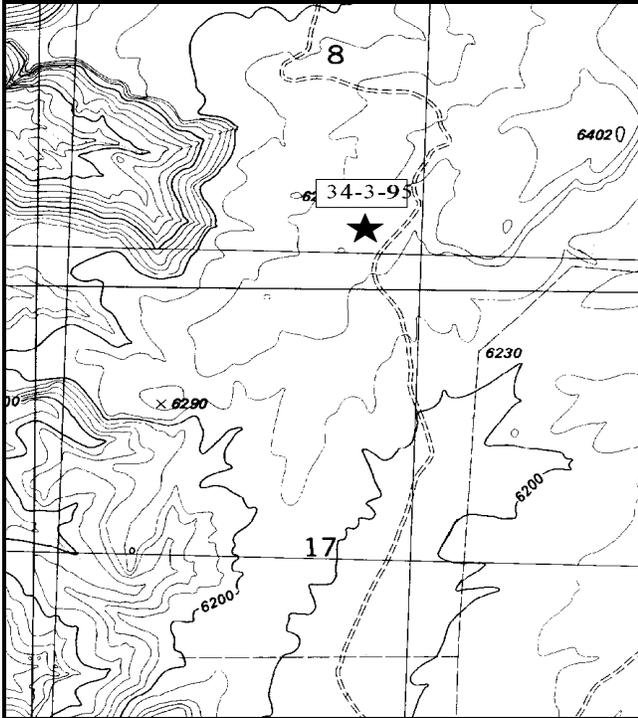
Study site name: Fish Park. Range type: Chained. Cabled-Seeded P-J.

Compass bearing: frequency baseline 270M degrees.

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

LOCATION DESCRIPTION

Starting from the turnoff to the Picture Gallery Ranch (approximately .75 miles west of the Utah-Colorado state line out of Glade Park, CO), turn right off the main road and drive .1 mile to a fork. Take the right (upper) fork, go .12 miles to a ranch. Just past the first house, turn right and proceed northeast towards a hill. You are heading basically north-northwest towards the Juniper-covered hills. At .15 miles beyond the house, B° through a gate and continue north .5 miles to another gate. Go .4 miles to a fence. Bear left around a fenced pasture and go ~3 miles to a gate. Pass through the gate, make an immediate left and continue .3 miles to a gate in the fence. Take the right fork before you go through the fence and go .15 miles. Turn left, go through a gate and parallel the fence for .2 miles. Opposite a gate in this fence, turn right onto a faint road and go 1 mile, gradually climbing onto the hill. At the top, look for a mature Juniper, and 50 yards further along the road, a witness post on the left side of the road. The 0-foot baseline stake, a rebar tagged #7874, is 150 feet west of the witness post.



Map Name: Marble Canyon

Diagrammatic Sketch

Township 21S, Range 26E, Section 8 UTM COOR. 6-67-900E 12 43-17-488N

## DISCUSSION

### Trend Study No. 34-3

The Fish Park study is at an elevation of 6,300 feet on the upper eastern edge of a 2,600 acre BLM chaining and seeding completed in 1968. To the south and east are the pastures and fields in Fish Park. The gentle west-sloping country is cut by intermittent canyons which flow directly into the Colorado River. To accommodate the increased sample size and stay within the same vegetative type, the transect had to be repositioned. The chaining is part of the Fish Park allotment, which is administered by the Grand Junction office. Livestock grazing pressure appears moderately light in the study area. Deer pellet groups were rarely encountered. This coincides with the pellet group trend transect located in Fish Park at an elevation of 6,200 feet. It estimated 27 deer days use/hectare from 1985 through 1995. The average for the herd unit is 37 deer days use/hectare for the same period. Rabbit pellet group quadrat frequency was quite high, which could account for much of the utilization.

The sandy soil is moderately deep over a bedrock of sandstone. The soil surface contains very few rocks or pavement. Vegetative cover is scattered with bare interspaces between clumps of basin big sagebrush and pinyon-juniper trees. In the bare interspaces, erosion doesn't appear to be a problem. Annual plants and slight erosion can be found near the roadside where the soil has been disturbed.

The size of the pinyon-juniper trees have noticeably increased since 1986 as evidenced by comparing photographs from each year. The point-center quarter method estimates 68 juniper and 25 pinyon trees/acre in 1995. These densities are moderately low for a 27 year old chaining. Most of the herbaceous understory on this site appears to be around the drip line of the mature trees.

Basin big sagebrush is the key browse species. Browse seed was provided by the DWR, which included big sagebrush and four-wing saltbush. However, which sagebrush subspecies included in the seed mix is not clear because both Artemisia tridentata tridentata and Artemisia tridentata wyomingensis are present on the site. Basin big sagebrush appears dominant, therefore the data tables refers to all sagebrush as basin big sagebrush. In general, the sagebrush is lightly hedged, and vigorous with good seed production. The age structure has shifted from a young population to a more mature population. Sixty three percent of the plants are now classified as mature, compared to only 24% in 1986. The percentage of plants classified as decadent has decreased as well. Average height has increased to nearly two and one half feet with crown measurements averaging three and one-half feet. Broom snakeweed and cactus are present, yet these populations do not appear to be increasing at this time.

The nested frequency for perennial grasses has decreased since 1986. Crested wheatgrass and galleta are the dominate perennial grasses which made up 50% of the total grass cover in 1995. The decrease in crested wheatgrass is most likely due to extended drought. The annual species, cheatgrass and sixweeks fescue, account for nearly all of the rest of the grass cover at 42%. This is a moderately high cover value for annual grasses, but a destructive wildfire is unlikely because of the amount of perennial plants and bare interspaces. Forbs occur infrequently and account for only a small amount of the total vegetative cover (6%). Alfalfa was reported as large and vigorous in 1986, yet with the extended drought, it was not sampled this year. Other forbs sampled include: timber milkvetch, longleaf phlox, scarlet globemallow, and woolly milkvetch. Nested frequency for all grasses and forbs increased since 1986, but this is due to annual species that were present in 1986, but not included when data was collected.

1986 APPARENT TREND ASSESSMENT

The area is currently in good condition. All signs indicate it will stay that way except for the gradual increase in juniper and pinyon. Selective hedging on the more palatable big sagebrush subspecies, Wyoming big sagebrush, may affect its reproductive potential. The pinyon and juniper are not dense enough to warrant chaining, but other treatments such as selective application of herbicides, roller-chopping, or individual tree cutting are practical alternatives. The whole chaining is in similar condition and treatment should be considered within the next 10 to 20 years. The soil is considered stable to slightly up because of good vegetation and litter cover.

1995 TREND ASSESSMENT

Vegetative cover and litter cover are quite high with each having high nested frequency values indicating good distribution of protective cover, which appears to provide adequate soil protection. In areas where bare interspaces appear, there are no signs of erosion, therefore soil trend is considered stable. The sagebrush community has shifted to a more mature population with good biotic potential and a decreased percentage of decadent plants. These combined factors indicate an upward browse trend. If the sagebrush population continues to expand, when cover starts to exceed 15%, it will begin to significantly affect herbaceous understory. The perennial herbaceous understory nested frequency has decreased with nearly half of the grass cover coming from annuals. Forbs are infrequent and add very little to the herbaceous understory. This leads to a slightly downward herbaceous understory trend. The decrease in perennials is likely due to the extended drought as well as competition with annuals and browse species.

TREND ASSESSMENT

soil - stable

browse - upward

herbaceous understory - slightly down

VEGETATIVE TRENDS --

Herd unit 34, Study no: 3

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'86	'95	'86	'95	
G	Agropyron cristatum	169	*115	57	42	3.70
G	Bromus tectorum	-	278	-	84	4.42
G	Hilaria jamesii	76	*97	27	37	3.12
G	Poa fendleriana	-	*38	-	15	1.05
G	Sitanion hystrix	9	*1	4	1	.00
G	Stipa comata	70	*8	28	5	.02
G	Vulpia octoflora	-	186	-	60	1.23
Total for Grasses		324	723	116	244	13.57
F	Agoseris glauca	-	2	-	1	.00
F	Astragalus convallarius	10	*14	7	6	.44
F	Astragalus mollissimus	-	*13	-	7	.18

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	Castilleja linariaefolia	-	2	-	1	.03
F	Calochortus nuttallii	-	2	-	1	.00
F	Cryptantha fulvocanescens	5	-	2	-	-
F	Cymopterus spp.	-	2	-	1	.00
F	Descurainia pinnata	-	22	-	9	.04
F	Draba nemorosa	-	95	-	36	.20
F	Erigeron pumilus	5	8	2	5	.02
F	Gayophytum ramosissimum	-	31	-	11	.08
F	Gilia hutchinifolia	-	43	-	17	.08
F	Haplopappus acaulis	-	3	-	1	.00
F	Ipomopsis aggregata	-	1	-	1	.03
F	Lappula occidentalis	-	18	-	7	.06
F	Lepidium densiflorum	-	21	-	9	.04
F	Lithospermum spp.	-	6	-	2	.01
F	Lygodesmia spinosa	-	2	-	1	.00
F	Medicago sativa	4	*-	3	-	-
F	Phlox longifolia	87	92	35	36	.33
F	Plantago patagonica	-	114	-	39	.27
F	Polygonum douglasii	-	9	-	4	.02
F	Sisymbrium altissimum	-	8	-	3	.01
F	Sphaeralcea coccinea	23	30	10	14	.27
F	Streptanthus cordatus	-	1	-	1	.00
F	Trifolium spp.	-	3	-	1	.00
Total for Forbs		134	542	59	214	2.17
B	Artemisia tridentata tridentata	42	*39	23	22	11.60
B	Gutierrezia sarothrae	15	*5	8	3	.05
B	Juniperus osteosperma	3	4	2	3	6.21
B	Opuntia spp.	-	4	-	1	.38
B	Pinus edulis	3	1	2	1	2.67
Total for Browse		63	53	35	30	20.93

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

BASIC COVER --

Herd unit 34, Study no: 3

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	370	16.50	37.57
Rock	34	0	.12
Pavement	28	0	.04
Litter	396	68.50	44.53
Cryptograms	182	0	5.65
Bare Ground	294	15.00	24.65

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 3

Type	Quadrat Frequency '95
Rabbit	48
Deer	3
Cattle	5

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 3

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata tridentata</i>																		
S	86	28	-	-	-	-	-	-	-	-	28	-	-	-	933		28	
	95	18	-	-	54	-	-	-	-	-	72	-	-	-	1440		72	
Y	86	48	-	-	-	-	-	-	-	-	47	-	-	1	1600		48	
	95	39	-	-	18	-	-	-	-	-	51	-	6	-	1140		57	
M	86	11	5	-	-	-	-	-	-	-	16	-	-	-	533	24	20	16
	95	98	3	-	1	-	-	-	-	-	102	-	-	-	2040	29	42	102
D	86	4	-	-	-	-	-	-	-	-	3	-	1	-	133		4	
	95	2	-	1	-	-	-	-	-	-	3	-	-	-	60		3	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	2266	Dec:	5%			
												'95	3240		1%			
<i>Gutierrezia sarothrae</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	86	12	-	-	-	-	-	-	-	-	12	-	-	-	400	7	8	12
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140	10	12	7
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	533	Dec:	6%			
												'95	200		0%			

A G E	YR	Form Class (No. of 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																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	61	44	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	-			
												'95	0		-			
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	9	-	-	-	-	-	-	-	-	9	-	-	180	4	18	9	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	1	-	-	-	-	-	-	-	-	-	-	1	20			1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	200		10%			

PERCENT BROWSE COMPOSITION--  
Herd unit 34, Study no: 3

Species	Percent of Total	
	'86	'95
Artemisia tridentata tridentata	80	89
Gutierrezia sarothrae	19	5
Juniperus osteosperma	1	0
Opuntia spp.	0	5

TREND STUDY 34-4-95

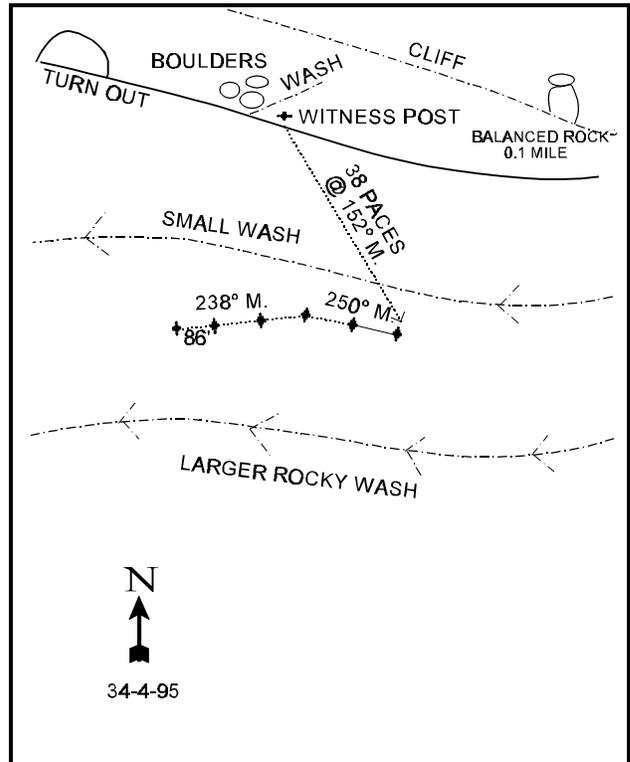
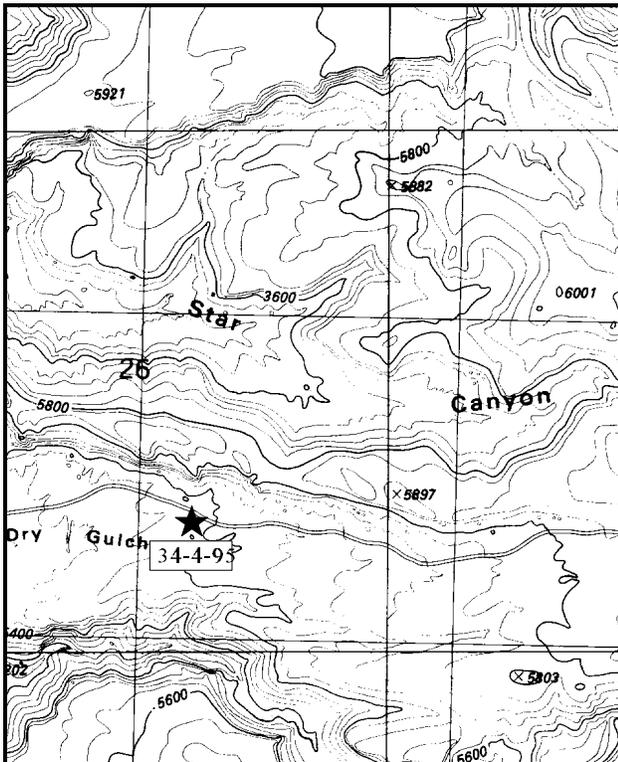
Study site name: Red Cliffs. Range type: Blackbrush.

Compass bearing: frequency baseline 250M degrees at the 200' stake 238M degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (86ft).

LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park, go west 1.7 miles on the Coates Creek Road to a cattleguard. Continue on the main road 2.3 miles to a P-J area bordered on the right by large sandstone cliffs. Here you will find a witness stake (fence post) on the right (north) side of the road. The baseline starts 140 feet south (across the road) from the witness post. A short rebar, tagged #7816, marks the 0-foot end.



Map Name: Marble Canyon

Diagrammatic Sketch

Township 21S, Range 25E, Section 26 UTM COOR. 6-63-128E 12 43-12-591N

## DISCUSSION

### Trend Study No. 34-4

The Red Cliffs transect is located along the Coates Creek Road with an elevation of 5,630 feet. The area is dominated by pinyon-juniper and blackbrush. Steep orange sandstone cliffs and pinnacles are located just north and across the road from the site. The transect samples slightly rolling topography with exposures varying from north to south and west. Overall, the area drains to the west. There is a stock pond down the wash about one-tenth of a mile from the transect, yet livestock do not appear to have been at this site. Deer and rabbit pellet groups are common in the area. To accommodate the increased sample size and stay within the same vegetative type, the position of the transect was slightly altered.

The moderately shallow sandy soil is light orange in color and is composed of very fine particles which is loosely compacted on the surface. Blackish rocks and pavement are scattered throughout the site with an estimated combined cover of about 11%. Half of the vegetative cover is contributed by blackbrush. An additional 33% of the total cover is contributed by annual grasses and forbs. Litter cover, estimated at 23%, is mostly associated with blackbrush. The bare soil interspaces between the blackbrush plants is protected by a few annuals, but a cryptogamic crust offers most of the cover in these interspaces. Some slight erosion, as well as pedestaling under the shrubs, was noted in 1995.

The key browse species on this site is blackbrush which provides 50% of the vegetative cover. Age class structure has changed little since 1986. This is a mature population with few young or decadent plants. There were no seedlings encountered in either year data was collected. Hedging is light to moderate and plants exhibit good vigor. Three percent of the population is classified as decadent compared to 10% in 1986. Several other browse species were present but infrequently encountered. These include; broom snakeweed, Wyoming big sagebrush, cliffrose, prickly pear cactus, spiny hopsage, and green ephedra. Point-center quarter method estimating 32 juniper trees/acre and 22 pinyon trees/acre.

Grasses and forbs combine for 35% of the vegetative cover on the site. Of the four grasses encountered in 1995, cheatgrass provided 90% of the grass cover. It is abundant and found in nearly every quadrat. The remaining grasses include; muttongrass, red threeawn, and needle-and-thread grass. Perennial forbs are rarely found, with an annual Astragalus sp. accounting for 95% of the forb cover.

### 1986 APPARENT TREND ASSESSMENT

The vegetative trend is stable. Because of its abundance, blackbrush is the key browse species on this critical winter range. The browse density and population characteristics represent a healthy stand that appears to be stable. The site has potential to support a diverse perennial grass component. The soil trend appears to be slightly down due to some signs of erosion. Cryptogams are especially important on this site in reducing soil loss on the north-facing slope.

### 1995 TREND ASSESSMENT

The soil trend appears stable at this time, but in poor condition. The interspaces between the shrubs are protected by cryptogamic crusts which hold the soil in place. Although, if these crusts are disturbed, erosion will likely be accelerated. Vegetation and litter are associated mostly with the shrubs and provide some soil cover. Blackbrush has a stable population with increased vigor and decreased decadency. Other browse species don't appear to be expanding, therefore, the browse trend is stable. Perennial species in the interspaces

would be more dependable at stopping erosion by catching sediment that might be moved. Herbaceous understory is almost exclusively annual species. There is not really a concern for destructive fires because the annual species are mostly associated with the shrub crown, leaving the interspaces with little fuel to carry a fire. Cryptogams still provide an important protective ground cover for this blackbrush community. The decrease in nested frequency and the overall lack of perennial species leads to a slightly downward herbaceous understory trend.

TREND ASSESSMENT

soil - stable, but only fair condition

browse - stable

herbaceous understory - slightly downward

VEGETATIVE TRENDS --

Herd unit 34, Study no: 4

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'86	'95	'86	'95	
G	Aristida purpurea	3	3	2	2	.30
G	Bromus tectorum	-	336	-	96	4.56
G	Poa fendleriana	110	*21	39	10	.15
G	Sitanion hystrix	5	-	2	-	-
G	Sporobolus cryptandrus	3	-	1	-	-
G	Stipa comata	-	3	-	1	.03
Total for Grasses		121	363	44	109	5.04
F	Astragalus nuttallianus	-	242	-	80	6.36
F	Cryptantha spp.	-	2	-	1	.00
F	Draba nemorosa	-	12	-	5	.02
F	Erodium cicutarium	-	18	-	9	.19
F	Erigeron spp	-	1	-	1	.00
F	Gilia hutchinifolia	-	14	-	7	.03
F	Lappula occidentalis	-	3	-	2	.01
F	Lepidium perfoliatum	-	12	-	5	.02
F	Machaeranthera glabriusculas	3	-	1	-	-
F	Phlox longifolia	-	*9	-	3	.04
F	Plantago patagonica	-	8	-	3	.01
F	Schoenocrambe linifolia	-	1	-	1	.00
F	Unknown forb-annual	-	2	-	1	.00
Total for Forbs		3	324	1	118	6.73
B	Artemisia tridentata wyomingensis	8	*-	4	-	-
B	Coleogyne ramosissima	62	*91	33	37	16.70

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
B	<i>Ephedra viridis</i>	2	-	1	-	-
B	<i>Gutierrezia sarothrae</i>	-	*7	-	3	.04
B	<i>Juniperus osteosperma</i>	-	5	-	2	4.65
B	<i>Mammillaria</i> spp.	3	-	2	-	-
B	<i>Opuntia</i> spp.	-	1	-	1	.03
B	<i>Pinus edulis</i>	-	-	-	-	.38
Total for Browse		75	104	40	43	21.80

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

BASIC COVER --

Herd unit 34, Study no: 4

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	360	13.75	33.59
Rock	201	16.25	11.28
Pavement	49	3.00	.08
Litter	375	25.00	23.32
Cryptograms	275	23.50	15.57
Bare Ground	297	18.50	25.61

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 4

Type	Quadrat Frequency '95
Rabbit	23
Deer	34

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 4

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata wyomingensis																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	1	-	-	-	-	-	-	-	-	-	-	-	20	26	41	1
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	40		50%			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Chrysothamnus viscidiflorus stenophyllus</i>																		
D	86	2	-	-	-	-	-	-	-	-	2	-	-	133			2	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	100%			
												'95	0		0%			
<i>Coleogyne ramosissima</i>																		
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	400			6	
	95	5	1	-	-	-	-	-	-	-	6	-	-	120			6	
M	86	22	33	2	82	5	-	-	-	-	130	-	14	9600	15	16	144	
	95	138	41	4	28	3	-	-	-	-	214	-	-	4280	16	30	214	
D	86	3	5	6	1	3	-	-	-	-	13	-	5	1200			18	
	95	6	1	-	2	1	-	-	-	-	5	-	1	200			10	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	60			3	
Total Plants/Acre (excluding Dead & Seedlings)												'86	11200	Dec:	10%			
												'95	4600		4%			
<i>Echinocactus spp.</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	66	7	3	1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
<i>Ephedra viridis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	0	36	44	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Gutierrezia sarothrae</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	66	10	5	1	
	95	5	-	-	-	-	-	-	-	-	5	-	-	100	10	12	5	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	100		-			
<i>Mammillaria spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	20	4	3	1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
<i>Opuntia spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	40	5	26	2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	40		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 34, Study no: 4

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	0	.83
<i>Chrysothamnus viscidiflorus stenophyllus</i>	1	0
<i>Coleogyne ramosissima</i>	98	96
<i>Echinocactus</i> spp.	.58	0
<i>Ephedra viridis</i>	0	0
<i>Gutierrezia sarothrae</i>	.58	2
<i>Mammillaria</i> spp.	0	.41
<i>Opuntia</i> spp.	0	.83

TREND STUDY 34-5-95

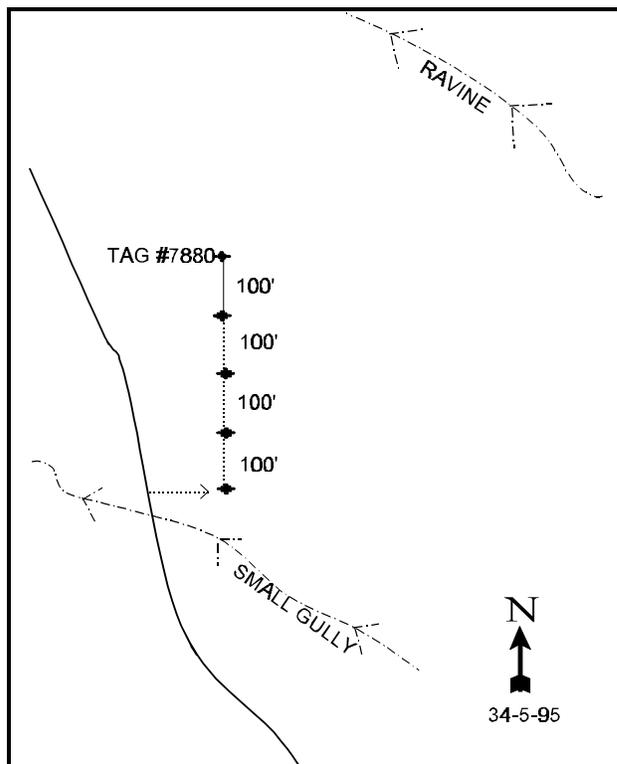
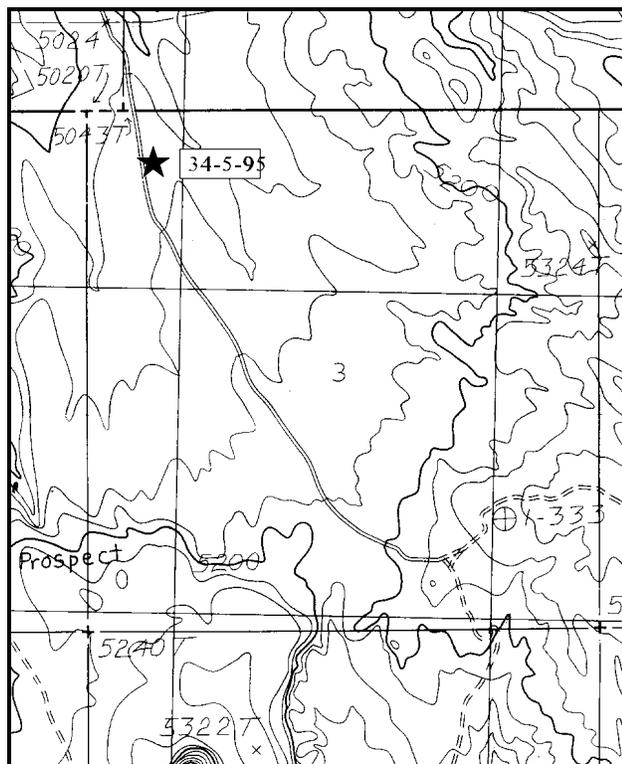
Study site name: Buckhorn Draw. Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park travel 1.7 miles to a cattleguard. Continue west 2.3 miles to the Red Cliffs transect. Continue west on the main road 4 miles to a fork. Stay left and go 2.45 miles to Coates Creek. Cross the creek and continue .6 miles to a fork. Stay left, go 2.45 miles to a cattleguard. Proceed 3.5 miles to another cattleguard. Go .4 miles past the cattleguard and stop. The transect is on the left (east) side of the road. Density plot number 3 is located 100 feet east into the flat. It is marked by a tall green fence post. The 0-foot end of the baseline (found 400 feet north) is also marked by a fence post, tagged #7880. All other plot markers are short rebar stakes.



Map Name: Blue Chief Mesa

Diagrammatic Sketch

Township 23S, Range 25E, Section 3 UTM COOR. 6-60-831E 12 43-00-590N

## DISCUSSION

### Trend Study No. 34-5

The site is a open bench at an elevation of about 5,100 feet. It is gently sloping to the northwest. Deep washes to the east and west intermittently carry water and drain to the north. It is a mixed desert shrub community dominated by broom snakeweed, big sagebrush, spiny hopsage, and perennial grasses with some scattered junipers. The Scarf Mesa allotment is grazed by 12 head of cattle from December through March using 48 AUM's. The BLM has allocated 65 AUM's for deer plus 39 AUM's for elk on this small allotment. Grazing pressure appears to be light. In 1986, the BLM estimated use of sagebrush to be heavy (60%-80%), but much of this could be cow use, because it is a winter cattle allotment. Deer pellet groups were scattered throughout the area at moderate levels as well as moderate numbers for rabbit, with low counts for cattle and very low numbers for elk.

The soil is a fine sandy loam, well drained, and moderately deep. Percent bare ground has decreased substantially since 1986. Protective ground cover comes from an almost equal percent of vegetation and litter. Most of the vegetative cover is contributed by grasses and browse. Forbs provide only 3% of the total vegetative cover. No rock or pavement cover was encountered on the study area. The gentle slope mitigates erosion from becoming excessive, although there is one small gully running southwest of the transect.

The key browse species are Wyoming big sagebrush and spiny hopsage. In the past, Wyoming big sagebrush had about as many decadent plants as mature plants in the population. Now, there is a higher proportion of mature plants as well as a decreased percentage of decadent plants. One-third of the population are classified as young plants with a slightly higher proportion of seedlings than in 1986. The size of the plants has increased to 16 inches in height with a crown of 24 inches. In 1986, 87% of the plants exhibited heavy hedging. Now only 7% of the plants show heavy hedging, with much of the population being only moderately hedged at this time. Two thirds of the decadent population are classified as dying, although, this represents only 11% of the population in 1995. The spiny hopsage population is mature with moderate hedging and good vigor. This plant is utilized primarily in the spring by livestock and wildlife with its usefulness decreasing into the summer. Broom snakeweed is actually the most abundant browse species with a mostly mature population and little biotic potential being expressed at this time. Other less abundant shrubs include; cactus, green ephedra, and blackbrush. Junipers are scattered throughout the area with the point-center quarter method estimating a density of only about 28 trees/acre.

Only 3% of the vegetative cover comes from forbs, most of which are annual species. Grass cover is higher on this site than many of the other sites in this unit. Grasses provide 55% of the vegetative cover with a majority coming from perennial species. Sand dropseed provides most of the perennial herbaceous cover on this site. The other common grass, red three-awn a warm season grass, has poor forage value most of the year. It is an invader and most often indicates long term range deterioration. Indian ricegrass is present at a moderate density. Cheatgrass provides 36% of the grass cover and has a 100% quadrat frequency. All forbs combined do not contribute even 1% of the cover.

### 1986 APPARENT TREND ASSESSMENT

The deteriorating population of the palatable spiny hopsage is an indication of a future downward browse tend. Sagebrush vigor is generally good, but this species may be harmed by increasing future use as hopsage becomes unavailable. Broom snakeweed is likely to increase, but numbers of this species fluctuate so much

they are not a good indicator of trend. Little soil movement is detectable, although there is a large amount of bare soil in the interspaces. There is room for improvement in litter and vegetative cover. The soil trend appears to be stable at this time.

1995 TREND ASSESSMENT

The relative amount of bare ground has decreased since 1986, but is still moderately high. No signs of erosion are present now, but this is more likely due to the almost level terrain of the site which lends itself to a more stable soil trend. Although there is ample grass cover, most of the grasses are increasers or invaders. Since the nested frequency for perennial grasses has stayed nearly the same and forbs comprise less than 3% of the vegetative cover, herbaceous understory is stable but characterized by a poor species composition. The browse trend is slightly up with a more vigorous spiny hopsage population. The Wyoming big sagebrush population has fewer decadent plants and a higher proportion are classified as young plants. The broom snakeweed population should be monitored and could easily increase with poor management.

TREND ASSESSMENT

soil - stable

browse - slightly upward

herbaceous understory - stable but poor composition

VEGETATIVE TRENDS --

Herd unit 34, Study no: 5

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Aristida purpurea	68	*73	27	33	2.42
G	Bromus tectorum	-	353	-	100	4.07
G	Oryzopsis hymenoides	18	35	8	15	.20
G	Sporobolus cryptandrus	156	*137	63	56	4.66
G	Vulpia octoflora	-	20	-	8	.04
Total for Grasses		242	618	98	212	11.40
F	Cryptantha spp.	-	24	-	10	.05
F	Cymopterus spp.	-	6	-	2	.01
F	Erodium cicutarium	-	5	-	2	.01
F	Eriogonum spp.	-	*15	-	6	.03
F	Lepidium densiflorum	-	37	-	17	.08
F	Lygodesmia grandiflora	-	7	-	4	.04
F	Plantago patagonica	-	147	-	65	.32
F	Sphaeralcea coccinea	-	19	-	7	.06
Total for Forbs		0	260	0	113	0.61
B	Artemisia tridentata wyomingensis	7	*4	4	2	.82

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
B	Chrysothamnus viscidiflorus stenophyllus	3	-	1	-	-
B	Grayia spinosa	34	*21	14	10	3.76
B	Gutierrezia sarothrae	74	*45	38	25	3.95
B	Opuntia spp.	3	5	2	3	.06
Total for Browse		121	75	59	40	8.60

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 34, Study no: 5

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	357	8.50	24.78
Rock	-	0	0
Pavement	-	0	0
Litter	382	42.00	25.71
Cryptograms	133	.75	2.11
Bare Ground	278	48.75	33.26

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 5

Type	Quadrat Frequency '95
Rabbit	21
Elk	2
Deer	28
Cattle	5

BROWSE CHARACTERISTICS --  
Herd unit 34, Study no: 5

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	1	1	-	-	-	-	-	-	-	1	1	-	-	66		2	
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
Y	86	-	-	2	-	-	-	-	-	-	2	-	-	-	66		2	
	95	16	1	-	-	-	-	-	-	-	17	-	-	-	340		17	
M	86	-	1	6	-	-	-	-	-	-	7	-	-	-	233	11 13	7	
	95	4	22	2	-	-	-	-	-	-	28	-	-	-	560	16 24	28	
D	86	-	1	5	-	-	-	-	-	-	6	-	-	-	200		6	
	95	4	1	-	-	-	1	-	-	-	2	-	-	4	120		6	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	499	Dec:	40%			
												'95	1020		11%			
<i>Coleogyne ramosissima</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	5	-	-	-	-	-	-	5	-	-	-	166	15 31	5	
	95	-	-	-	1	1	-	-	-	-	2	-	-	-	40	27 50	2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	166	Dec:	-			
												'95	60		-			
<i>Ephedra spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	27 27	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Grayia spinosa</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	4	22	4	-	-	-	26	-	4	-	600	17 33	30	
D	86	-	-	9	-	-	-	-	-	-	-	-	9	-	300		9	
	95	3	1	-	1	6	1	-	-	2	6	-	3	5	280		14	
Total Plants/Acre (excluding Dead & Seedlings)												'86	300	Dec:	100%			
												'95	880		31%			
<i>Gutierrezia sarothrae</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	2	-	-	-	-	-	5	-	-	-	100		5	
Y	86	26	-	-	-	-	-	-	-	-	26	-	-	-	866		26	
	95	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29	
M	86	171	1	-	-	-	-	-	-	-	172	-	-	-	5733	9 5	172	
	95	131	-	-	3	-	-	-	-	-	134	-	-	-	2680	11 15	134	
D	86	33	1	1	-	-	-	-	-	-	35	-	-	-	1166		35	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	7765	Dec:	15%			
												'95	3260		0%			

A G E	YR	Form Class (No. of 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																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	63	63	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	-			
												'95	0		-			
Opuntia spp.																		
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	4	6	2
	95	6	-	-	-	-	-	-	-	-	4	-	-	2	120	6	17	6
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	120		-			

PERCENT BROWSE COMPOSITION--  
Herd unit 34, Study no: 5

Species	Percent of Total	
	'86	'95
Artemisia tridentata wyomingensis	6	19
Coleogyne ramosissima	2	1
Ephedra spp.	0	0
Grayia spinosa	3	16
Gutierrezia sarothrae	88	61
Juniperus osteosperma	.37	0
Opuntia spp.	.75	2

TREND STUDY 34-6-95

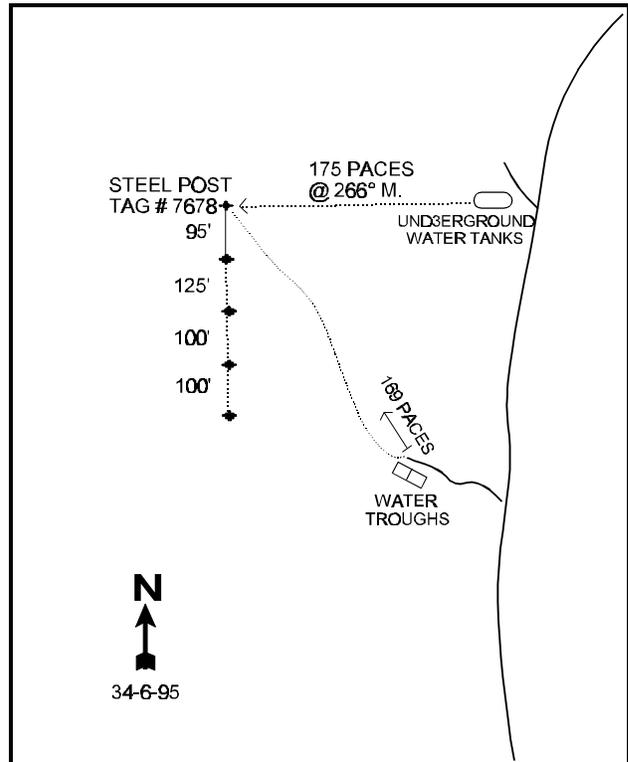
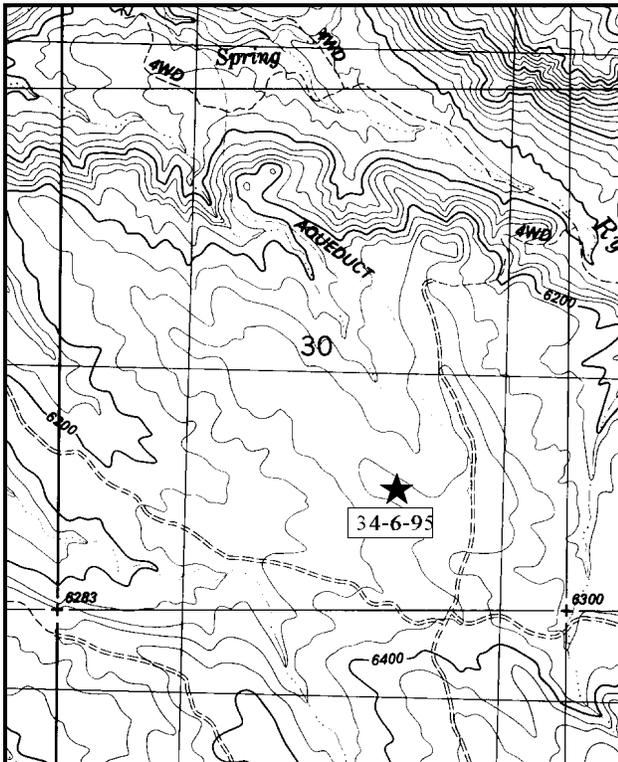
Study site name: Ryan Creek. Range type: Chained, Cabled-Seeded P-J.

Compass bearing: frequency baseline 165M degrees.

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

LOCATION DESCRIPTION

At the "Granary" intersection (Coates Creek 15-minute Quad; T23S, R25E, southeast quarter of section 3) bear left and go east .7 miles to a fork. Take the middle fork, go 2.4 miles and turn right at the next fork. Continue .8 miles to another fork. Turn left. Go .75 miles to a cattleguard. Continue 1.4 miles to a fork. Bear left and go .22 miles to a water development on the left. Drive up to the water troughs. From here, go up the small ridge to the west for .2 miles (1025 feet) to a fence post with browse tag #7678 attached. This fence post, the 0-foot baseline stake, can also be located from the nearby underground water tanks by going 1,060 feet (175 paces) on a bearing of 266°M from the tanks. The transect runs south from the start of the baseline. All other plots are marked by rebar stakes.



Map Name: Steamboat Mesa

Diagrammatic Sketch

Township 22S, Range 26E, Section 30 UTM COOR. 6-66-530E 12 43-02-820N

## DISCUSSION

### Trend Study No. 34-6

This transect is located within an old 1,800 acre pinyon-juniper chaining in Ryan Park, which in the past had been considered an important big-game winter range. The area was chained and aerial seeded with crested wheatgrass, four-wing saltbush, big sagebrush, alfalfa, and bitterbrush in 1968. To help maintain the integrity of the chaining, the BLM used the herbicide tebuthiuron to help kill reinvading pinyon-juniper trees on 300 acres of the chaining. Since the establishment of this trend transect in 1986, the area has burned. The study is located near the top of a south-facing slope at an elevation of 6,300 feet. A deer pellet group transect in Ryan Park, on the Utah side, averages 20 deer days use/hectare between 1986 and 1996.

Annual grass and forb species contribute 69% of the vegetative cover after the fire. The area is characterized as an upland shallow loam site. The surface soil is a fine sandy loam. Vegetation and litter provide adequate ground cover with no evidence of erosion. There is a low amount of bare ground (about 13%) and the rock and pavement combine for a little over 14% cover.

The pinyon and juniper trees and a very low density of miscellaneous browse were eliminated from the site when it burned. Previously the estimated density of pinyon and juniper trees was about 198 trees/acre. The most numerous shrub now is Harriman's yucca. The estimated density is 680 plants/acre with an average height of 10 inches and crown of 14 inches. Other browse species include; broom snakeweed, white rubber rabbitbrush, and some scattered fourwing saltbush. With the loss of the browse species, this site is no longer important as critical winter range for wildlife.

Grasses contribute 80% of the vegetative cover with the dominant understory species being cheatgrass. Seventy four percent of the total grass cover comes from cheatgrass. It is very dense on the site and the potential for another destructive fire is extremely high. Crested wheatgrass is the dominant perennial grass which provides 22% of the total grass cover. Other grass species include; Indian ricegrass, galleta, purple threeawn, muttongrass, and bottlebrush squirreltail. Forbs are composed primarily of annual species, dominated by tumbledustard and storksbill. The dominant perennial forb is heath aster which doesn't provide much forage for wildlife or livestock. Alfalfa is also present, providing some cover and appears very robust and vigorous at this time.

### 1986 APPARENT TREND ASSESSMENT

Density of desirable browse species for deer is very low with little recruitment into their respective populations. However, there is good quantities of forage produced by the crested wheatgrass in the spring and fall. It will be interesting to follow the effects of the Savory grazing system on this particular chaining. Continued maintenance of the pinyon-juniper trees on this chaining is desirable for improving the health of the understory vegetation. Apparent trend for the site is stable, but will be greatly affected by ongoing management decisions and weather patterns.

### 1995 TREND ASSESSMENT

There is adequate cover provided by vegetation and litter to protect the soil surface from erosion. Therefore, the soil trend is considered stable. The herbaceous understory is comprised mostly of annual forbs and grasses, the majority of which is cheatgrass. Crested wheatgrass is abundant as well and may provide some forage later into the fall with some late precipitation. Tumble mustard is quite prevalent and most were knee high in height. The vegetation

provides abundant fine fuels for another wildfire. Trend for the herbaceous understory is down because of the poor composition. There are very few, if any browse species that could provide winter forage for wildlife, so the trend for browse is down.

TREND ASSESSMENT

soil - stable

browse - down with the loss of the browse to wildfire

herbaceous understory - downward because of poor composition

VEGETATIVE TRENDS --

Herd unit 34, Study no: 6

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Agropyron cristatum	286	*215	95	75	5.60
G	Aristida purpurea	-	1	-	1	.00
G	Bromus tectorum	-	365	-	100	18.56
G	Hilaria jamesii	-	3	-	1	.15
G	Oryzopsis hymenoides	-	*12	-	4	.57
G	Poa fendleriana	-	2	-	2	.03
G	Sitanion hystrix	2	4	2	1	.00
G	Vulpia octoflora	4	3	1	1	.00
Total for Grasses		292	605	98	185	24.95
F	Astragalus mollissimus	2	*7	1	5	.02
F	Astragalus nuttallianus	-	6	-	4	.02
F	Cymopterus spp.	-	3	-	1	.00
F	Draba nemorosa	-	6	-	2	.01
F	Erodium cicutarium	-	125	-	48	1.60
F	Euphorbia spp.	-	*14	-	7	.03
F	Lappula occidentalis	-	5	-	3	.01
F	Lactuca serriola	-	6	-	4	.02
F	Leucelene ericoides	-	*28	-	10	1.46
F	Machaeranthera spp	-	*127	-	47	.28
F	Medicago sativa	1	24	1	12	.84
F	Salsola iberica	-	1	-	1	.00
F	Sisymbrium altissimum	-	150	-	65	1.22
F	Silene spp.	-	5	-	2	.01
F	Unknown forb-perennial	2	-	1	-	-
Total for Forbs		5	507	3	211	5.56
B	Chrysothamnus nauseosus albicaulis	-	1	-	1	.15

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
B	Gutierrezia sarothrae	-	-	-	-	.15
B	Yucca harrimaniae	-	3	-	2	.30
Total for Browse		0	4	0	3	0.60

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

BASIC COVER --

Herd unit 34, Study no: 6

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	381	7.25	41.22
Rock	262	4.00	13.35
Pavement	92	4.00	1.11
Litter	384	53.00	45.07
Cryptograms	42	2.25	.61
Bare Ground	259	29.50	13.15

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 6

Type	Quadrat Frequency '95
Rabbit	6
Elk	12
Deer	17
Cattle	3

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 6

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata wyomingensis																		
D	86	-	-	-	-	-	1	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'86	33	Dec:	100%			
												'95	0		0%			
Atriplex canescens																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	28	27	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			

A G E	YR	Form Class (No. of 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 nauseosus albicaulis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	30	46	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
<i>Gutierrezia sarothrae</i>																		
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	10	11	2
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	22	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	20		-			
<i>Juniperus osteosperma</i>																		
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	98	79	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
<i>Pinus edulis</i>																		
Y	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66	78	50	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	132	Dec:	-			
												'95	0		-			
<i>Yucca harrimaniae</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	33	-	-	-	-	-	-	-	-	33	-	-	-	660	10	14	33
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	680		2%			

PERCENT BROWSE COMPOSITION--  
 Herd unit 34, Study no: 6

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	11	0
<i>Atriplex canescens</i>	0	0
<i>Chrysothamnus nauseosus albicaulis</i>	0	3
<i>Gutierrezia sarothrae</i>	22	3
<i>Juniperus osteosperma</i>	22	0
<i>Pinus edulis</i>	44	0
<i>Yucca harrimaniae</i>	0	94

TREND STUDY 34-7-95

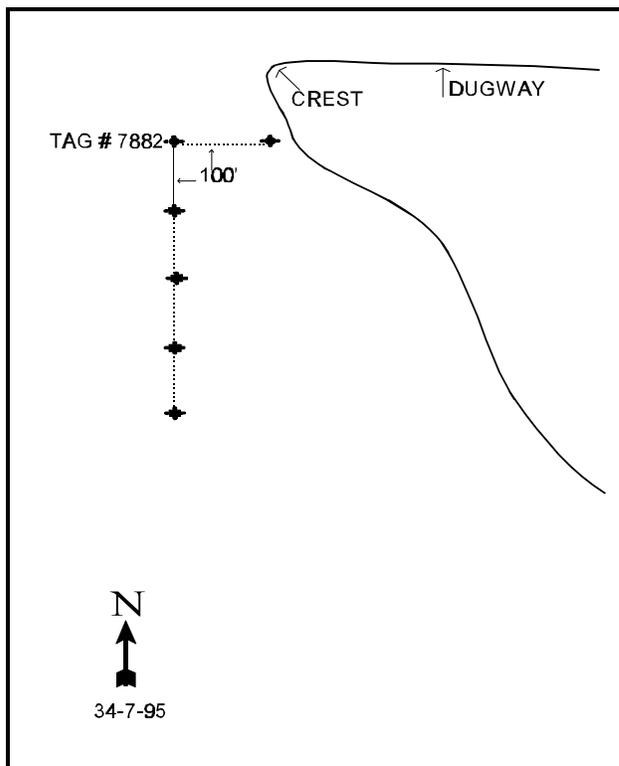
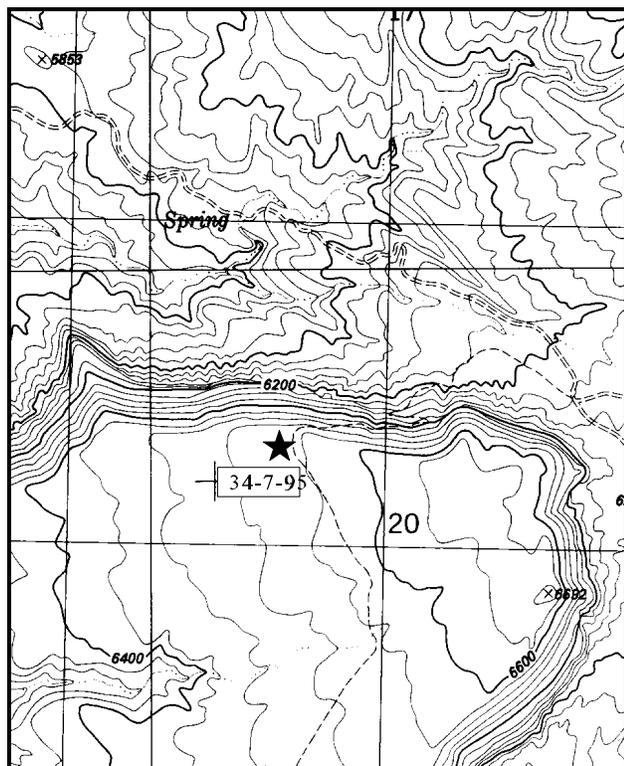
Study site name: Steamboat Mesa North . Range type: Chained, Cable-Seeded P-J .

Compass bearing: frequency baseline 180 degrees.

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

DESCRIPTION

Starting from the "Granary" Intersection in the southeast corner of section 3, T23S, R25E, bear right and go .2 miles to a fork. Stay left. After 1.6 miles turn left. Continue down .7 miles to Granite Creek. Cross the creek and go 4.7 miles to a fork. Stay left and proceed .4 miles to a fence near a stockpond. Continue .2 miles to a fork with several branches. Take the right fork which goes along the base of the mesa, then heads up the side on a steep, narrow road with sharp switchbacks (4-wheel drive recommended). It is .9 miles from the fork to the top of Steamboat Mesa and a witness post on the right side of the road. The witness post (a green fence post) is six feet off the road. The 0-foot baseline stake is 100 feet west of the witness post. All the transect posts are rebar.



Map Name: Steamboat Mesa

Diagrammatic Sketch

Township 23S , Range 26E , Section 20 UTM COOR. 6-66-558E 12 42-95-438N

## DISCUSSION

### Trend Study No. 34-7

Steamboat Mesa is a large flat mesa located in the southeast corner of the Dolores Triangle, just north of the Dolores River and west of the Colorado border. The mesa is surrounded by steep rock cliffs, with the only access being a rough 4-wheel drive road on the north end. This transect was set up in a large chaining just beyond the north edge of the mesa. The study is located on a slight slope with a southwest aspect and an elevation of 6,600 feet. Managed by the BLM, this portion of the Steamboat Mesa allotment was two-way chained and seeded in 1968. Species seeded were crested wheatgrass, four-wing saltbush, big sagebrush, alfalfa, and bitterbrush. The allotment is grazed by 200 head of cattle from December through mid-April. The five year average use is 453 AUMs. Key forage species are crested wheatgrass, Indian ricegrass, and Wyoming big sagebrush. Mule deer use appears to be low judging by the pellet group quadrat frequency data.

Soils characteristic of this site are shallow and well-drained. The fine, sandy loam surface soil is derived from sandstone. Soil depth is variable, from very shallow to moderately deep, with rock scattered throughout the soil profile. Litter accounts for almost 38% of the ground cover, much of which is left from the chaining. Vegetative cover is nearly 27% with about 5% combined rock and pavement cover. Percent bare ground has increased since 1986 to 33%. There are a few shallow bare spots, but overall, no signs of active erosion on the site.

The overstory is being occupied again by pinyon and juniper trees. The point-center quarter method estimated a density of 169 pinyon/acre and 136 juniper/acre. True mountain mahogany, Antelope bitterbrush, rubber rabbitbrush, Wyoming big sagebrush, Utah serviceberry, and four-wing saltbush, although all found at low densities, display good vigor and only light hedging. Green ephedra shows moderate hedging with some appearing to be in poor condition.

Crested wheatgrass is the key forage species for cattle and accounts for nearly all of the grass cover. Cheatgrass is the next dominant grass, but not as abundant as might be expected in this area. Both crested wheatgrass and cheatgrass form large, distinct patches over the site. Other important forage grasses are Indian ricegrass and muttongrass. Needle and thread grass was reported in 1986 as an important forage grass, but was not found in 1995.

A variety of native perennial forbs are found on the site, although none are particularly important in terms of forage value on winter range. Most common are increasers such as rock goldenrod, Hoods phlox, hairy gold aster, and scarlet globemallow. Alfalfa is scattered throughout the site in low densities.

### 1986 APPARENT TREND ASSESSMENT

Juniper and pinyon are becoming more dominant on this site and will begin to impact the more desirable browse species. However, there is a potential for the other shrubs increase. The BLM resource management plan addresses the need to "maintain" this chaining. Big game habitat could be improved if maintenance involved tree removal to release the more desirable browse species. The variety of grasses and forbs currently provide good spring forage. The long-term vegetative trend is down without intervention. The soil trend is considered stable at this time.

### 1995 TREND ASSESSMENT

Bare ground has increased since 1986 although there are no signs of active erosion. The increase in bare ground is due to the lack of litter produced with

drier conditions in recent years. Therefore, the soil trend is stable. Currently, grasses provide good spring forage. There is a wide variety of annual species found on the site as well. Most of the cheatgrass is found in large patches with crested wheatgrass scattered throughout. Although nested frequency for perennial forb species has increased, most are increasers and of little forage value. The herbaceous understory trend is slightly upward, although, a different composition may be desirable. Pinyon and juniper combine for 305 trees/acre. Browse species are scattered throughout in low densities with most showing little utilization. This leads to a stable browse trend.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly upward

VEGETATIVE TRENDS --

Herd unit 34, Study no: 7

T Y P e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Agropyron cristatum	155	*228	63	78	9.01
G	Bromus tectorum	-	163	-	58	1.35
G	Oryzopsis hymenoides	52	*15	22	9	.14
G	Poa fendleriana	4	4	3	3	.04
G	Poa secunda	-	3	-	2	.03
G	Sitanion hystrix	28	*-	13	-	-
G	Stipa comata	8	*-	5	-	-
G	Vulpia octoflora	-	5	-	3	.01
Total for Grasses		247	418	106	153	10.60
F	Agoseris glauca	-	-	-	-	.01
F	Allium spp.	-	3	-	1	.00
F	Astragalus convallarius	7	*1	3	1	.01
F	Astragalus spp.	-	*6	-	3	.01
F	Calochortus nuttallii	-	*8	-	3	.01
F	Cryptantha spp.	-	4	-	2	.01
F	Cymopterus spp.	-	*16	-	8	.04
F	Descurainia spp.	-	4	-	2	.01
F	Draba nemorosa	-	96	-	36	.21
F	Erodium cicutarium	-	8	-	3	.16
F	Erigeron pumilus	2	19	1	8	.04
F	Gilia hutchinifolia	-	28	-	13	.07
F	Haplopappus acaulis	3	7	2	2	.01
F	Heterotheca villosa	-	*16	-	7	.21
F	Lappula occidentalis	-	43	-	21	.15
F	Lactuca serriola	-	6	-	2	.15

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'86	'95	'86	'95	
F	Lepidium densiflorum	-	24	-	9	.19
F	Machaeranthera spp	-	*21	-	9	.04
F	Medicago sativa	-	3	-	1	.00
F	Penstemon spp.	-	1	-	1	.00
F	Petradoria pumila	37	41	16	17	2.21
F	Phlox hoodii	28	32	14	14	.49
F	Phlox longifolia	-	2	-	1	.00
F	Plantago patagonica	-	3	-	1	.01
F	Polygonum douglasii	-	3	-	1	.00
F	Ranunculus testiculatus	-	3	-	2	.01
F	Schoenocrambe linifolia	-	*17	-	8	.07
F	Sisymbrium altissimum	-	27	-	13	.07
F	Sphaeralcea coccinea	-	*13	-	6	.13
F	Streptanthus cordatus	-	3	-	1	.00
F	Tragopogon dubius	14	*5	6	4	.02
Total for Forbs		91	463	42	200	4.42
B	Artemisia tridentata wyomingensis	1	-	1	-	-
B	Cercocarpus montanus	1	-	1	-	-
B	Chrysothamnus nauseosus	3	*-	1	-	.98
B	Ephedra viridis	2	10	2	5	1.35
B	Juniperus osteosperma	-	-	-	-	2.70
B	Leptodactylon pungens	-	1	-	1	.01
B	Opuntia spp.	-	1	-	1	.03
B	Pinus edulis	-	-	-	-	4.77
B	Purshia tridentata	-	-	-	-	.15
Total for Browse		7	12	5	7	9.99

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

BASIC COVER --

Herd unit 34, Study no: 7

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	325	11.25	26.70
Rock	96	.25	4.64
Pavement	57	0	.13
Litter	383	65.00	37.74
Cryptograms	79	.25	.53
Bare Ground	299	23.25	33.34

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 7

Type	Quadrat Frequency '95
Rabbit	18
Elk	1
Deer	19
Cattle	6

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 7

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Amelanchier utahensis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	29	62	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Artemisia tridentata wyomingensis</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	22	19	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	14	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
<i>Atriplex canescens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	1	-	-	-	-	-	-	1	-	-	-	20	38	41	1
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	100%			
												'95	20		0%			
<i>Chrysothamnus nauseosus</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	27	34	5
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	100		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	7	-	-	2	-	-	-	-	-	9	-	-	-	180		9	
M	86	-	-	2	-	-	-	-	-	-	2	-	-	-	133	18	11	2
	95	7	6	2	-	-	-	-	-	-	15	-	-	-	300	17	22	15
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	2	-	-	1	-	-	3	-	-	-	60		3	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
Total Plants/Acre (excluding Dead & Seedlings)												'86	133	Dec:	0%			
												'95	540		11%			
<i>Gutierrezia sarothrae</i>																		
S	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	15	0
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	100%			
												'95	0		0%			
<i>Juniperus osteosperma</i>																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	83	58	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	0		-			
<i>Leptodactylon pungens</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	10	4
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	80		-			
<i>Opuntia spp.</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	18	2
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	60		-			
<i>Pinus edulis</i>																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133	81	47	2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	333	Dec:	-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Purshia tridentata																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Total Plants/Acre (excluding Dead & Seedlings)													'86	0	Dec:	-		
													'95	20		-		

PERCENT BROWSE COMPOSITION--

Herd unit 34, Study no: 7

Species	Percent of Total	
	'86	'95
Amelanchier utahensis	0	0
Artemisia tridentata wyomingensis	9	0
Atriplex canescens	9	2
Chrysothamnus nauseosus	0	12
Ephedra viridis	18	66
Gutierrezia sarothrae	9	0
Juniperus osteosperma	9	0
Leptodactylon pungens	0	10
Opuntia spp.	0	7
Pinus edulis	45	0
Purshia tridentata	0	2

TREND STUDY 34-8-95

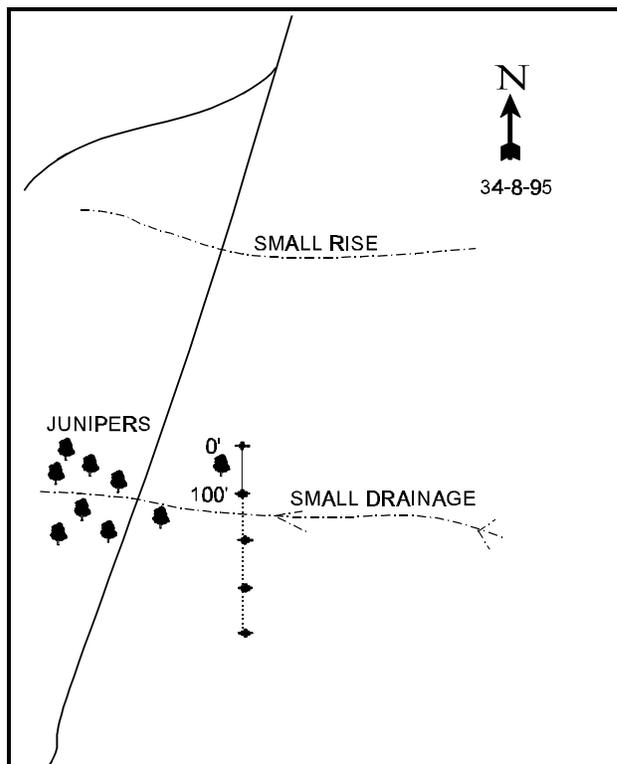
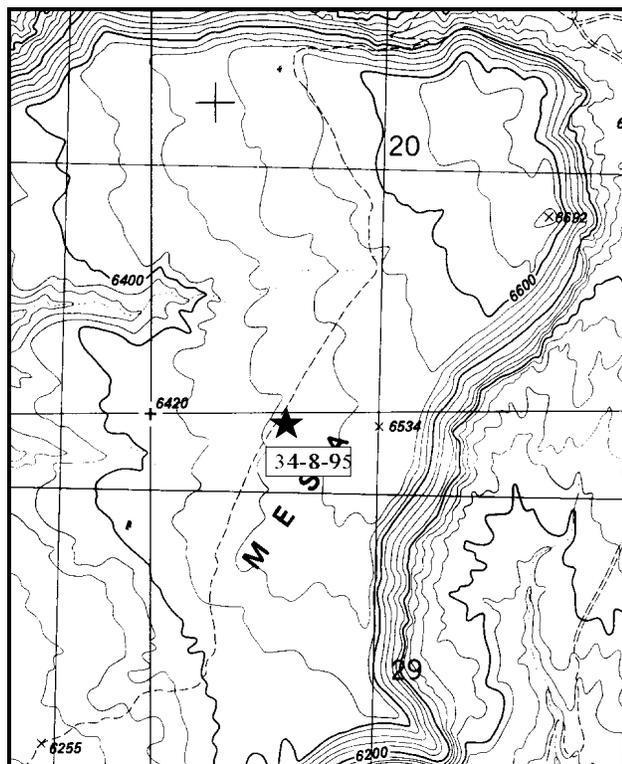
Study site name: Steamboat Mesa South. Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

Go to the intersection in the southeast corner of Section 3, T23S, R25E (.95 miles beyond the Buckhorn Draw transect). Turn right, go .2 miles to a fork. Stay left. After 1.6 miles turn left and go down .7 miles to Granite Creek. Cross the creek and follow the main road 5 miles to a fence near a stock pond. Continue .2 miles to a fork with several branches. Take the right fork which goes along the base of the mesa, then heads up a steep road with sharp switchbacks (4x4 recommended). It is .9 miles from the fork to the top of the mesa and the start of transect 34-7-95. Continue on the same road for .6 miles to a fork. Continue straight .2 miles (halfway to an enclosure) to a large Juniper in a sagebrush-grass flat. The baseline 0-foot stake (tag #7812) is located north of the tree.



Map Name: Steamboat Mesa

Diagrammatic Sketch

Township 23S, Range 26E, Section 29 UTM COOR. 6-66-582E 12 42-94-320N

## DISCUSSION

### Trend Study No. 34-8

Located approximately 3/4 miles south of transect 34-7, the Steamboat Mesa South transect samples a habitat type dominated by native vegetation, although not in a completely natural condition. This open rolling site may be an example of a former sagebrush park undergoing a type conversion to annual grass-sagebrush due to excessive livestock use in the past. A large exclosure is located to the south of the study. Two pellet group transects are also located on Steamboat Mesa. The lower elevation transect (6,300') shows an average of 67 deer days use/hectare between 1986 and 1996. The pellet transect located at 6,700 feet, and closer to the this study, averaged 56 deer use days/hectare for the same time period.

This area of the mesa is an open park in topography that slopes gently to the west with an elevation of 6,500 feet. The surface soil is a fine, sandy loam with no rocks or pavement on the surface. Percent bare ground cover has decreased since 1986 to only about 15%. Vegetative cover is 44%, while litter cover is 61%. Most of the vegetative cover comes from annual cheatgrass.

Wyoming big sagebrush, the key browse species, has an estimated density of 1,620 plants/acre. The population appears vigorous with light to moderate hedging on mature plants. In 1986, 56% were heavily hedged while now only 2% are hedged that heavily. The age class distribution is stable with nearly the same proportion of young and mature. Only 2% of the population is decadent, although, all are classified as dying. Winterfat was also sampled on this site, but is in very low numbers, vigorous with no signs of utilization. Cover is found in scattered junipers along washes and ridgetops. All the trees have been highlined.

Cheatgrass is the most abundant grass accounting for 53% of the total vegetative cover and is found in 95% of the quadrats. Although cheatgrass will provide early spring forage, a stand of this density introduces a severe fire hazard. A fire would eliminate the sagebrush population and further degrade the site as a critical winter range. Both needle and thread grass and mutton bluegrass have significantly decreased in nested frequency value since 1986. Galleta and Indian ricegrass have increased, but are still in low densities. Forbs comprise 21% of the vegetative cover with nearly two-thirds being annual species. The most common are the annual species woolly Indian wheat and prairie pepperweed. Most of these forbs are small and not of much value on winter range.

### 1986 APPARENT TREND ASSESSMENT

The soil is stable with no signs of erosion on the study site. The vegetative trend is generally stable in terms of succession, except for form and vigor of Wyoming big sagebrush. In the past there had been signs of sagebrush that had died, most likely from overuse and/or prolonged drought. A series of winters with constant snow cover and use by cattle could be very detrimental to the sagebrush population. Currently, the sagebrush appears healthy, but the stand density is low.

### 1995 TREND ASSESSMENT

The soil is adequately covered by both vegetation and litter. Both adequate ground cover and no signs of erosion indicate a stable soil trend. Grass cover is good, but most comes from undesirable annual species. Cheatgrass is abundant and contributes large quantities of fine fuel to the litter. Furthermore, 70% of the total herbaceous understory cover is contributed by annual species. Most forbs have little forage value, but do aid in soil stabilization. Because

cheatgrass dominates the site, there is a high probability of losing the sagebrush population with a single wildfire event. The herbaceous understory trend for this site is considered downward because of the high percentage of annual species. Wyoming big sagebrush shows less utilization than in the past, exhibiting characteristics of a stable population. It has a good biotic potential of 10% and the young age class is at 46%. The winterfat population is also stable with no observable utilization. Thus, browse trend is considered stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - downward because of the high percentage of annual species

VEGETATIVE TRENDS --

Herd unit 34, Study no: 8

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Agropyron cristatum	-	*7	-	3	.01
G	Bromus tectorum	-	341	-	95	15.05
G	Hilaria jamesii	17	*52	7	22	.79
G	Oryzopsis hymenoides	6	*20	2	7	.77
G	Poa fendleriana	26	*16	10	6	.05
G	Poa secunda	-	*117	-	46	.65
G	Sitanion hystrix	11	*-	7	-	-
G	Sporobolus cryptandrus	7	*-	3	-	-
G	Stipa comata	257	*91	90	40	.70
G	Vulpia octoflora	-	231	-	70	1.08
Total for Grasses		324	875	119	289	19.14
F	Astragalus spp.	-	*29	-	15	.24
F	Calochortus nuttallii	-	*59	-	28	.14
F	Cymopterus spp.	-	6	-	2	.01
F	Draba nemorosa	-	15	-	5	.02
F	Erigeron pumilus	-	-	-	-	.00
F	Gilia hutchinifolia	-	32	-	16	.08
F	Grindelia squarrosa	-	1	-	1	.00
F	Hedysarum spp.	-	6	-	2	.18
F	Lappula occidentalis	-	16	-	7	.06
F	Lactuca serriola	-	30	-	16	.08
F	Lepidium densiflorum	-	201	-	68	.95
F	Leucelene ericoides	-	*9	-	4	.16
F	Machaeranthera spp	-	*10	-	6	.03
F	Phlox hoodii	-	4	-	1	.03
F	Phlox longifolia	-	4	-	2	.01

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	Plantago patagonica	-	232	-	67	2.34
F	Polygonum douglasii	-	2	-	1	.00
F	Ranunculus testiculatus	-	3	-	1	.00
F	Schoenocrambe linifolia	-	*35	-	16	.08
F	Sisymbrium altissimum	-	50	-	25	.18
F	Sphaeralcea coccinea	207	*108	79	39	1.09
F	Tragopogon dubius	69	*21	29	11	.05
F	Trifolium spp.	-	2	-	1	.00
F	Unknown forb-perennial	15	24	6	8	.06
Total for Forbs		291	899	114	342	5.86
B	Artemisia tridentata wyomingensis	5	21	4	11	1.53
B	Juniperus osteosperma	2	-	1	-	-
B	Pinus edulis	-	1	-	1	1.82
Total for Browse		7	22	5	12	3.36

\* Indicates significant difference at  $\alpha = 0.10$  (annuals excluded)

BASIC COVER --

Herd unit 34, Study no: 8

Cover Type	Nested Frequency '95	Average Cover %	
		'86	'95
Vegetation	393	6.00	44.37
Rock	-	0	0
Pavement	-	0	0
Litter	400	67.00	60.84
Cryptograms	163	0	1.98
Bare Ground	274	27.00	14.81

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 8

Type	Quadrat Frequency '95
Rabbit	5
Deer	18
Cattle	21

BROWSE CHARACTERISTICS --  
 Herd unit 34, Study no: 8

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
<i>Artemisia tridentata wyomingensis</i>																		
S	86	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	95	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
Y	86	5	9	3	1	-	-	-	-	-	18	-	-	-	1200		18	
	95	37	-	-	-	-	-	-	-	-	37	-	-	-	740		37	
M	86	-	7	9	-	-	-	-	-	-	16	-	-	-	1066	17	12	
	95	19	22	1	-	-	-	-	-	-	42	-	-	-	840	17	25	
D	86	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	95	2	-	-	-	-	-	-	-	-	-	-	-	40		2		
Total Plants/Acre (excluding Dead & Seedlings)												'86	2332	Dec:	2%			
												'95	1620		2%			
<i>Ceratoides lanata</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	86	-	-	1	-	-	-	-	-	-	1	-	-	-	66	14	11	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	16	
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'95	60		-			

PERCENT BROWSE COMPOSITION--  
 Herd unit 34, Study no: 8

Species	Percent of Total	
	'86	'95
<i>Artemisia tridentata wyomingensis</i>	97	96
<i>Ceratoides lanata</i>	3	4

TREND STUDY 34-9-95

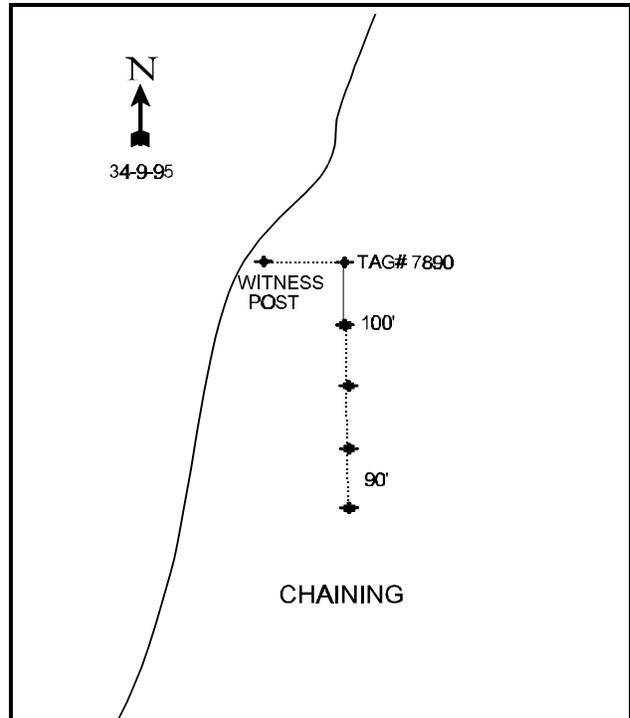
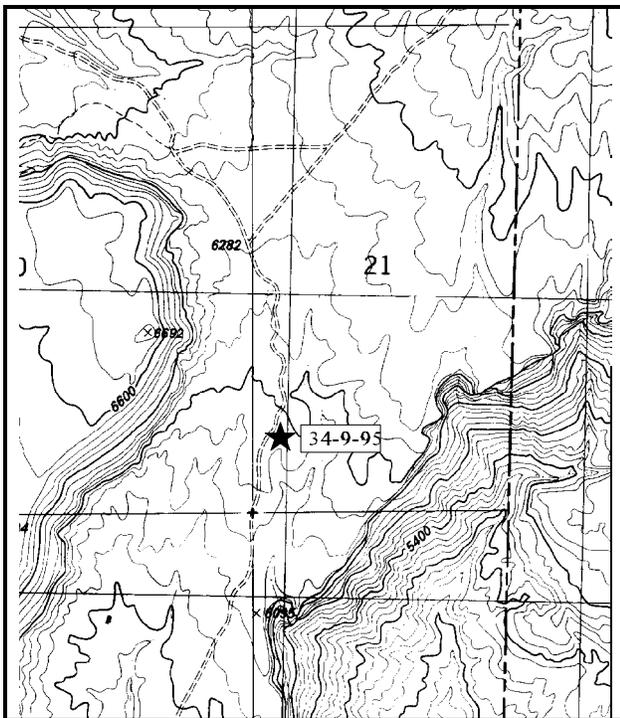
Study site name: Steamboat East Bench . Range type: Chained. Cable-Seeded P-J .

Compass bearing: frequency baseline 180 degrees.

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

LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park, travel west on the Coates Creek Road 1.7 miles to a cattleguard. Continue west 2.3 miles to the Red Cliffs transect. Continue west 3.8 miles to a fork, stay left and continue 2.3 miles to Coates Creek. Cross and go .6 miles to a fork. Stay left, go 2.2 miles to a cattleguard. Keep going 3.3 miles to another cattleguard. Go .4 miles to the Buckborn Draw transect. Continue southeast for .95 miles to the "Granary" intersection. Turn right and go .2 miles to a fork. Stay left. Go 1.6 miles and turn left. Go down this road .7 miles to Granite Creek. Cross the creek and proceed 4.7 miles to a fork. Stay left, then right at another fork which connects back to the main road, traveling .4 miles to a stock pond. Continue .15 miles to a fork with many branches (the right goes up on Steamboat Mesa). Stay on the same road (straight through the intersection and up a steep hill) for .2 miles to another stock pond. Continue .4 miles to an old P-J chaining and a 2 1/2 foot tall rebar witness post on the left, 6 feet off the road. The 0-foot end of the baseline is 100 feet east of the witness post and is marked by a rebar tagged #7890.



Map Name: Steamboat Mesa

Diagrammatic Sketch

Township 23S , Range 26E , Section 21 UTM COOR. 6-67-948E 12 42-94-915N

## DISCUSSION

### Trend Study No. 34-9

This transect is located on a narrow bench (one-half mile wide) below Steamboat Mesa, bounded on the west by the sheer sandstone cliffs of Steamboat Mesa and on the east by deep canyons of the Dolores River. The northern part of the bench was included in the 1968 Steamboat Mesa allotment chaining. Currently, the area supports a moderately dense stand of pinyon-juniper and a variety of shrubs and herbaceous plants.

The study site is on a moderately sloping ridge with a west-southwest exposure and an elevation of 6,200 feet. Drainage off the bench is to the south. Erosion is evident in areas disturbed by roads. Overall the vegetative and litter cover provides adequate soil protection. Some slight pedestalling of some plants and large rocks was noted in the interspaces. Vegetative cover is estimated at 27% with litter cover at 41%. Sixteen percent of the surface is covered by rocks and pavement.

Pinyon pine density is estimated at 183 trees/acre and Utah juniper is estimated at 66 trees/acre. Seventy-three percent of the browse cover is provided by pinyon and juniper trees, while the key browse species make up 23% of the browse cover. There are several desirable browse species, but most occur in low to very low densities. For example, true mountain mahogany provides the most forage (contributes 16% of the total browse cover) even though its density is only estimated at 240 plants/acre. The mahogany population can be characterized as stable to slightly improving with a moderately high biotic potential, a good balance of young and mature plants, while percent decadency is only 8%. Black sagebrush has an estimated density of 440 plants/acre, but only provides 4% of the total browse cover. It shows moderate to heavy hedging yet good vigor. Decadency has decreased with a more mature population than reported in the past. The proportion of young plants is stable with a few seedlings present. Wyoming big sagebrush was also sampled with an estimated density of 120 plants/acre. Fifty percent of the population is mature and there is a decrease in decadency, from 50% down to 33%. Several other preferred shrubs are present including; Utah serviceberry and snowberry. The scattered Utah serviceberry population sampled is young, although some surrounding mature plants measured nearly 10 feet tall with a crown measurement of over 14 feet. True mountain mahogany shows a more mature population measuring 5½ tall with a crown measurement of nearly 8 feet. Both populations show light utilization and appear vigorous. A number of undesirable increaser shrubs are present, including broom snakeweed at a density of 1,680 plants/acre and Harriman yucca at only 20 plants/acre.

Grass contributes 23% of the total vegetative cover on this site and are important in stabilizing the soil. Cheatgrass is the most abundant grass, contributing 50% of the total grass cover. Crested wheatgrass is also present and has significantly increased in nested frequency since 1986, but it is still at a low value considering that it was seeded and provides less cover than cheatgrass. Both Indian ricegrass and bottlebrush squirreltail have significantly decreased their respective sum of nested frequency values. Forbs provide little forage or ground cover with most occurring as low growing life forms or rarely occur at all. Stemless goldenweed, rock goldenrod are the most abundant forbs on the site. Other common forbs include; hairy goldaster, tumble mustard, and Hood's phlox.

### 1986 APPARENT TREND ASSESSMENT

Currently, browse density and diversity is promising on this winter range. However, many of the more palatable shrubs have been heavily hedged and may be receiving too much pressure to continue in the community. The most obvious

downward trend indicator is the gradual reestablishment of the pinyon-juniper woodland. Many of the pinyon are suffering from an unidentified disease (or possibly an herbicide), therefore their increase is difficult to predict and will be interesting to follow the changes taking place. Other trend parameters such as form, vigor, and age class distribution for key species appear stable. The overall soil trend is also considered stable.

1995 TREND ASSESSMENT

Bare ground has decreased since 1986 with only slight sign of erosion. Vegetation and litter offer good protection and contribute to a stable soil trend. The herbaceous understory is comprised primarily of grasses. This includes 2 annual and 6 perennial species, of which, cover is equally distributed. Herbaceous understory is stable, although a better composition is likely desired. The pinyon and juniper extensive root system may be affecting the understory species by being more competitive for moisture. There are several different browse species, of which, broom snakeweed is the most abundant. This population does not appear to be expanding at this time, but are becoming slightly more robust. Both sagebrush populations show a decrease in percent decadency with a few plants being heavily hedged. One out of four black sagebrush and one out of three Wyoming big sagebrush are dead at this time. This is most likely due to extended drought conditions thinning out the sagebrush populations. Although these are high ratio's, there is still a relatively high percentage of young plants in the population. This combined with light use of other palatable browse species, contributes to a stable to slightly upward browse trend.

TREND ASSESSMENT

soil - stable

browse - stable to slightly up

herbaceous understory - stable but poor composition with to many annuals

VEGETATIVE TRENDS --

Herd unit 34, Study no: 9

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
G	Agropyron cristatum	63	*106	26	38	2.00
G	Aristida purpurea	-	*16	-	7	.40
G	Bromus tectorum	-	243	-	79	3.00
G	Hilaria jamesii	-	*14	-	4	.48
G	Oryzopsis hymenoides	29	*17	21	9	.46
G	Poa fendleriana	15	15	7	7	.03
G	Sitanion hystrix	62	*7	29	3	.04
G	Vulpia octoflora	-	4	-	2	.01
Total for Grasses		169	422	83	149	6.45
F	Arabis drummondi	-	*9	-	4	.02
F	Astragalus mollissimus	15	*10	7	4	.05
F	Astragalus spp.	-	4	-	2	.01
F	Calochortus nuttallii	-	*5	-	3	.01

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
F	<i>Cryptantha</i> spp.	-	23	-	13	.06
F	<i>Cymopterus</i> spp.	-	*16	-	8	.04
F	<i>Draba nemorosa</i>	-	4	-	2	.01
F	<i>Erodium cicutarium</i>	-	18	-	8	.04
F	<i>Erigeron pumilus</i>	2	-	2	-	-
F	<i>Euphorbia</i> spp.	13	*4	9	3	.01
F	<i>Gilia hutchinifolia</i>	-	28	-	16	.08
F	<i>Haplopappus acaulis</i>	70	*31	31	15	.39
F	<i>Heterotheca villosa</i>	-	12	-	4	.16
F	<i>Lappula occidentalis</i>	-	2	-	1	.00
F	<i>Lactuca serriola</i>	-	1	-	1	.00
F	<i>Lesquerella ludoviciana</i>	10	-	4	-	-
F	<i>Lithospermum</i> spp.	-	2	-	1	.00
F	<i>Machaeranthera grindelioides</i>	10	*-	4	-	-
F	<i>Mammillaria</i> spp.	-	1	-	1	.00
F	<i>Medicago sativa</i>	-	-	-	-	.01
F	<i>Penstemon carnosus</i>	3	5	1	3	.04
F	<i>Petradoria pumila</i>	28	*14	14	6	.47
F	<i>Phlox hoodii</i>	25	11	10	4	.05
F	<i>Physaria</i> spp.	1	-	1	-	-
F	<i>Sisymbrium altissimum</i>	1	13	1	6	.03
F	<i>Silene</i> spp.	-	*11	-	4	.02
F	<i>Streptanthus cordatus</i>	-	*7	-	4	.02
F	<i>Townsendia incana</i>	3	-	1	-	-
F	<i>Tragopogon dubius</i>	17	*3	7	1	.00
Total for Forbs		198	234	92	114	1.57
B	<i>Amelanchier utahensis</i>	19	-	8	-	-
B	<i>Artemisia nova</i>	6	4	3	3	.85
B	<i>Artemisia tridentata wyomingensis</i>	10	1	4	1	.18
B	<i>Cercocarpus montanus</i>	10	14	6	5	3.25
B	<i>Ephedra viridis</i>	3	-	1	-	.15
B	<i>Gutierrezia sarothrae</i>	4	19	2	11	.71
B	<i>Juniperus osteosperma</i>	12	2	5	2	2.95
B	<i>Pinus edulis</i>	14	11	8	4	11.50
B	<i>Symphoricarpos oreophilus</i>	-	-	-	-	.15

Type	Species	Nestled Frequency		Quadrat Frequency		Average Cover % '95
		'86	'95	'86	'95	
B	Yucca harrimaniae	-	1	-	1	.00
Total for Browse		78	52	37	27	19.75

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

BASIC COVER --

Herd unit 34, Study no: 9

Cover Type	Nestled Frequency '95	Average Cover %	
		'86	'95
Vegetation	316	2.00	27.71
Rock	236	7.00	15.66
Pavement	65	1.75	.52
Litter	382	55.50	41.47
Cryptograms	62	1.00	.80
Bare Ground	264	32.75	26.00

PELLET GROUP FREQUENCY --

Herd unit 34, Study no: 9

Type	Quadrat Frequency '95
Rabbit	17
Elk	9
Deer	6

BROWSE CHARACTERISTICS --

Herd unit 34, Study no: 9

AGE	YR	Form Class (No. of 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	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	119 169	0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-		
												'95	20		-		

A G E	YR	Form Class (No. of 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	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	86	5	6	-	-	-	-	-	-	-	11	-	-	-	366		11	
	95	2	4	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	86	8	4	1	-	-	-	-	-	-	13	-	-	-	433	8 11	13	
	95	3	8	4	-	-	-	-	-	-	15	-	-	-	300	10 18	15	
D	86	3	8	1	-	-	-	-	-	-	10	-	-	2	400		12	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
Total Plants/Acre (excluding Dead & Seedlings)												'86	1199	Dec:	33%			
												'95	440		4%			
<i>Artemisia tridentata wyomingensis</i>																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	1	-	-	-	-	-	-	-	1	-	-	-	33	5 7	1	
	95	1	-	2	-	-	-	-	-	-	3	-	-	-	60	14 22	3	
D	86	-	1	1	-	-	-	-	-	-	1	-	-	1	66		2	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
Total Plants/Acre (excluding Dead & Seedlings)												'86	132	Dec:	50%			
												'95	120		33%			
<i>Cercocarpus montanus</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	2	1	-	2	-	-	-	-	-	5	-	-	-	100	68 94	5	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	0%			
												'95	240		9%			
<i>Chrysothamnus nauseosus albicaulis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	43 56	0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			

A G E	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Ephedra viridis</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	34	35	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
<i>Gutierrezia sarothrae</i>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
Y	86	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	95	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
M	86	39	-	-	-	-	-	-	-	-	39	-	-	-	1300	8	10	39
	95	74	-	-	-	-	-	-	-	-	74	-	-	-	1480	9	13	74
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	3	-	-	-	-	-	-	-	-	2	-	-	1	60			3
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
Total Plants/Acre (excluding Dead & Seedlings)												'86	1566	Dec:	2%			
												'95	1680		3%			
<i>Juniperus osteosperma</i>																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	0		-			
<i>Mammillaria spp.</i>																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	8	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	40		-			
<i>Opuntia spp.</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	11	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			

A G E	YR	Form Class (No. of 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>																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	6	-	-	-	-	-	-	-	-	3	3	-	-	200	81	39	6
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	1	-	-	-	-	-	-	-	-	-	-	-	1	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	333	Dec:	9%			
												'95	0		0%			
<i>Symphoricarpos oreophilus</i>																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	1	-	-	-	-	-	1	-	-	-	20	30	57	1
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'95	20		-			
<i>Yucca harrimaniae</i>																		
Y	86	7	-	-	-	-	-	-	-	-	7	-	-	-	233		7	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	17	-	-	-	-	-	-	-	-	17	-	-	-	566	12	16	17
	95	1	-	-	-	-	-	-	-	-	-	-	-	-	20	10	13	1
D	86	1	-	-	-	-	-	-	-	-	-	-	-	1	33		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Total Plants/Acre (excluding Dead & Seedlings)												'86	832	Dec:	3%			
												'95	20		0%			

ERCENT BROWSE COMPOSITION--

Herd unit 34, Study no: 9

Species	Percent of Total	
	'86	'95
<i>Amelanchier utahensis</i>	0	.76
<i>Artemisia nova</i>	30	17
<i>Artemisia tridentata wyomingensis</i>	3	5
<i>Cercocarpus montanus</i>	0	9
<i>Chrysothamnus nauseosus albicaulis</i>	0	0
<i>Ephedra viridis</i>	0	.76
<i>Gutierrezia sarothrae</i>	39	64
<i>Juniperus osteosperma</i>	0	0
<i>Mammillaria spp.</i>	0	2
<i>Opuntia spp.</i>	0	.76
<i>Pinus edulis</i>	8	0
<i>Symphoricarpos oreophilus</i>	0	.76
<i>Yucca harrimaniae</i>	20	.76

## SUMMARY

### DEER HERD UNIT - 34 - DOLORES TRIANGLE

Four of the nine studies located in the Dolores Triangle deer herd unit sample pinyon-juniper chainings completed in 1968. The Ryan Park (#6) study has recently burned removing most of the pinyon-juniper trees that were reestablishing their dominance. Cheatgrass is the dominant species on the sight in combination with many other annual grasses and forbs. The soil trend is stable as well as the browse trend, although there are low number of forage species. The herbaceous trend is downward because of too many annual species. Fish Park (#3), Steamboat Mesa North (#7), and Steamboat East Bench (#9) are the remaining chainings sampled. Soil trend for these sites is stable. Steamboat Mesa North and Steamboat East Bench both were estimated to have nearly 300 trees/acre while Fish Park was only estimated to have 100 trees/acre. The browse trend for Steamboat East Bench and Fish Park are slightly up and upward respectively with vigorous sagebrush populations. Browse density on the Steamboat Mesa North transect is low but stable. Cheatgrass is the prevalent grass on all three sites causing a downward herbaceous trend on Fish Park. Steamboat East Bench has a stable herbaceous trend and Steamboat Mesa North has a slightly upward trend with increasing nested frequency of perennial species. As with most chainings, the density of pinyon and juniper need to be monitored and control should be implemented so as to not lose these sites to pinyon-juniper stands again.

Four sites are considered sagebrush/grass; Lower Westwater (#1), Upper Westwater (#2), Buckhorn Draw (#5), and Steamboat Mesa South (#8). The Upper Westwater site is a good example of what could happen to the other sites when annual grasses dominate the understory. Cheatgrass was the dominant understory species in the past and is the major reason the site is can no longer be considered winter range for wildlife. A fire eliminated the sagebrush population and the area is now an annual grassland with some annual forbs. Upper Westwater, Buckhorn Draw, and Steamboat Mesa South all have the potential to end up like Lower Westwater if a wildfire occurs. These sites are dominated by cheatgrass which adds fine fuels to the fuel load. Although cheatgrass does contribute to soil stabilization, other perennial species are preferred.

Red Cliffs (#4) is classified as a blackbrush site and winter range for deer. This site has few perennial herbaceous species with 50% of the vegetative cover contributed by blackbrush. Two annual species, cheatgrass and small-flowered milkvetch, are responsible for 93% of the total herbaceous understory. The blackbrush population is stable with very few other shrub species scattered throughout the community.

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